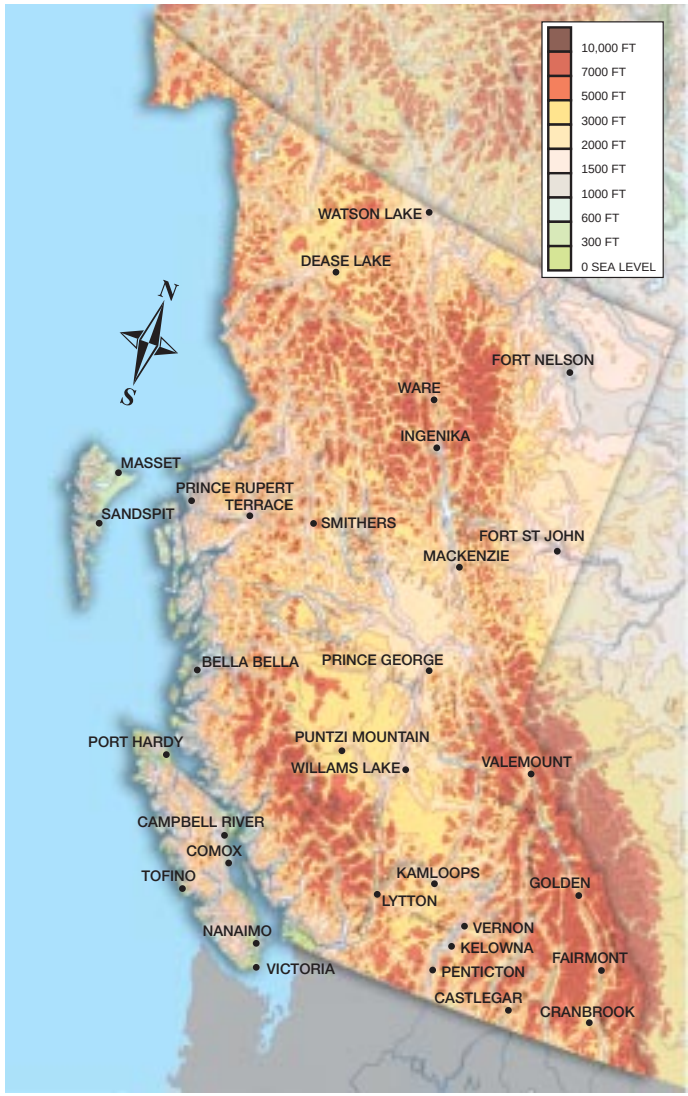
Chapter 4

Seasonal Weather and Local Effects

Introduction

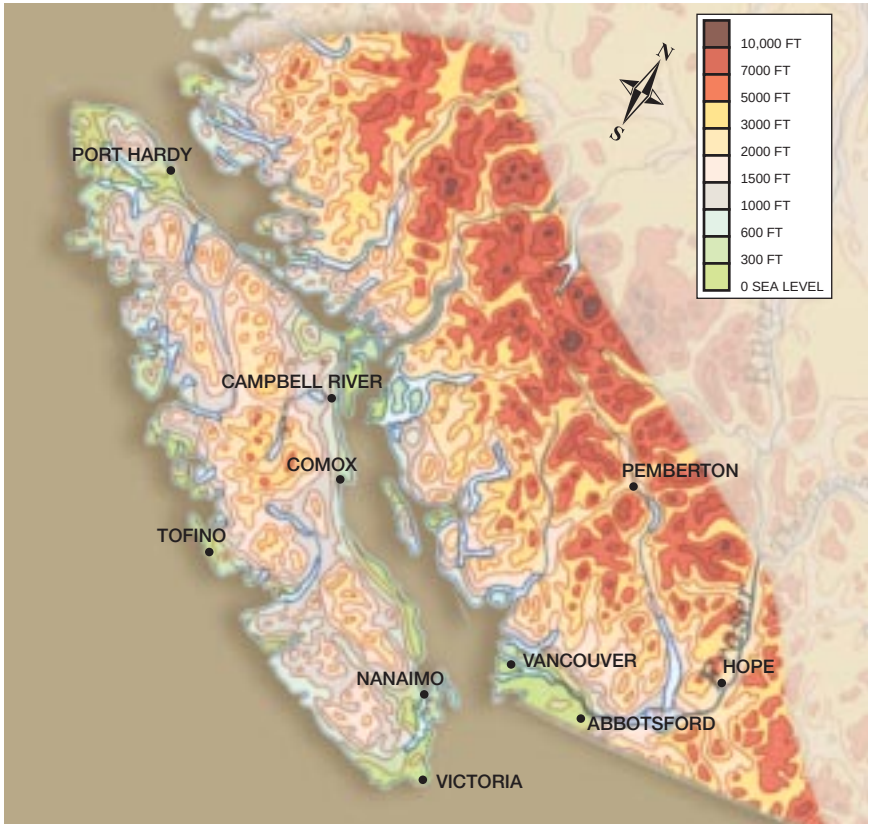


Map 4-1 - Topography of GFACN31 Domain

This chapter is devoted to local weather hazards and effects observed in the GFACN31 area of responsibility. After extensive discussions with weather forecasters, FSS personnel, pilots and dispatchers, the most common and verifiable hazards are listed.

Most weather hazards are described in symbols on the many maps along with a brief textual description located beneath it. In other cases, the weather phenomena are better described in words. Table 3 (page 74 and 207) provides a legend for the various symbols used throughout the local weather sections.

South Coast



Map 4-2 - South Coast

For most of the year, the winds over the South Coast of BC are predominately from the southwest to west. During the summer, however, the Pacific High builds northward over the offshore waters altering the winds to more of a north to northwest flow. Regardless of the direction, the coastal area is exposed to every weather system approaching off the Pacific Ocean. On the plus side, it is the bulk of Vancouver Island that takes the brunt of these storm, ameliorating their effect on the inner waters and mainland areas. Compounding, the problem is the mountainous terrain, that rises abruptly almost from the waters edge, ensuring each system undergoes immediate upslope lift. The question for meteorologists and pilots then becomes not "Will we get precipitation?" but "How much precipitation will we get and what type?" The answer to these questions lies in the seasons of the year.

(a) Summer

Summer over the South Coast tends to be fairly benign, especially when compared to a typical winter. Frontal systems do make an appearance from time to time, but for the most part they make little impression. Approaching from the Gulf of Alaska, but with little in the way of cold air to feed their development, these systems develop slowly and are relatively weak. Typically, a band of cloud and light precipitation over the northern end of Vancouver Island may dissipate to just broken cloud and showers in the south.

Behind these fronts, a ridge of high pressure will build towards the coast. Rising pressures ahead of this ridge will then give a period of brisk northwest winds to the coast. The strongest northwest winds are often reported where the air stream is funnelled between the mountains of the mainland and Vancouver Island. This effect is particularly noticeable in the spring months, as the fronts still retain some of the strength of winter storms.

Traditionally, the latter parts of May and June tend to be a cloudy and wet. During this time, a series of cold lows spawn over the northern Gulf of Alaska and move southward along the coast. Their tracks are difficult to predict but a favourite path is along the west coast of Vancouver Island and then inland, either through the Juan de Fuca Strait or northern Washington State. Either track produces widespread cloud, showers and cool temperatures. Only when the Pacific High builds far enough northward is this pattern cut off.

Although not frequent, thunderstorms do occur along the coast of British Columbia in the summer. Air mass thunderstorms are the most common, tending to develop during the late afternoon or evening and drifting eastward along the sides of inlets or valleys. Although short-lived, they can produce intense hail and lightning. On occasion, frontal thunderstorms will move into the coastal areas. One favourite track is eastward through Juan de Fuca Strait, or northward through Washington, ahead of an approaching upper trough of low pressure.

The scourge of summer over the South Coast is the sea fog and marine stratus that often lies over the cold offshore waters, near the western entrance of Juan de Fuca Strait. When inflow conditions occur, the fog and stratus are frequently drawn into the strait, penetrating as far as the Victoria area. Since inflow is common, fog is frequently found in Juan de Fuca Strait for much of the year.

Many of the mainland valleys experience inflow winds in the summer due to the intense heating of the air over the Southern Interior. As pressures fall over the interior, a flow of cool, moist air begins to flow inland. However, as the thermal trough is forced inland, these inflow winds will occur on a daily basis, drawing low marine cloud into the inner coastal areas and even the mainland valleys.

(b) Winter

Winter is a much more dramatic season. The Pacific High retreats with the sun allowing the Aleutian Low to move back into the Gulf of Alaska. As it does, a strong north to south temperature gradient is established that will provide the energy for significant development of approaching weather systems.

The usual pattern is for a deep low-pressure system to approach from the west to southwest, accompanied by an occluding frontal system. Ahead of the approaching low, a warm front will spread extensive, deep-layered cloud, steady precipitation and strong southeast winds across the area. With the passage of the warm front, the precipitation becomes intermittent or ends completely, the lowest cloud layers break up and the winds shift to a moderate to strong south to southwest direction. The arrival of the trailing cold front is marked by the development of showers, which can be both widespread and heavy in intensity. Finally, behind the cold front, strong gusty northwest winds often prevail. With the most active fronts, warm or cold, the winds can briefly rise to 60 knots with gusts above 80 knots at locations over the northern end of Vancouver Island. Of the two, the southeast winds tend to be the strongest, but they both can be very strong where channelling and coastal convergence occurs.

One particularly wet pattern, known as the "Pineapple Express," occurs when a deepening trough of low pressure offshore causes the frontal system to stall over the South Coast. Eventually, moist, tropical air is picked up by the upper winds from near the tropics and carried northeastward onto the BC coast. The result is extremely heavy precipitation events where local rainfall amounts of 100 millimetres or more can occur..

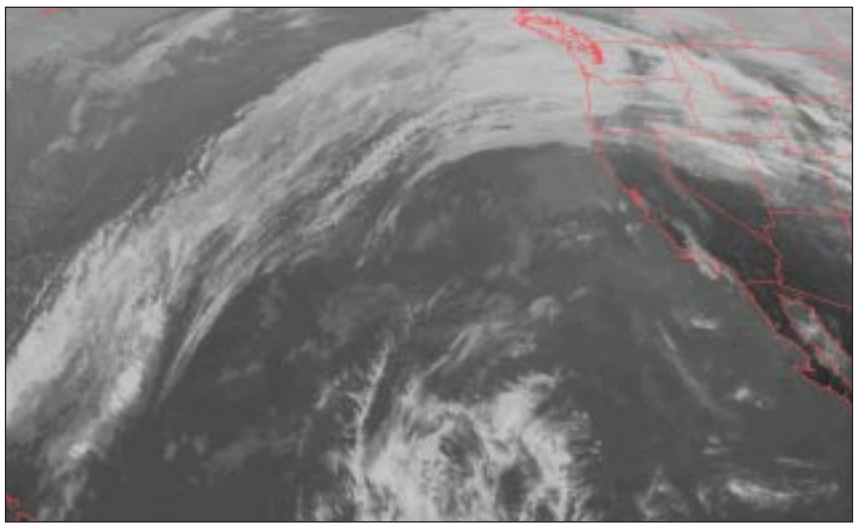


Photo 4-1 - Pineapple Express

Air mass thunderstorms occur most often during the winter, especially in the very cold air that follows the passage of a cold front. This cold air is heated by the ocean and becomes very unstable. As it does, lines of towering cumulus and cumulonimbus cloud develop which then move toward the coast to arrive about 12 to 24 hours after the frontal passage.

Surface high pressure systems, long valued for their generally good weather, are stronger in the winter than in the summer. Along the coast, it is these ridges of high pressure that provide the only break between active weather systems. As the ridge of high-pressure approaches the coast, the higher level clouds dissipate and the lower cloud layer break up leaving scattered to broken convective clouds.

Winter is also the time of "outflow winds". Although infrequent, if the cold air deepens sufficiently over the interior of British Columbia, it can flow through the coastal passes and along the Fraser Canyon to spill out onto the South Coast through the inlets and valleys. Depending on the weather pattern, this outflow condition can persist for days without respite. The most common case will see the cold air cover the northern half of Vancouver Island but stall over the warmer waters of the Strait of Georgia. Only in the strongest outflow situation will the cold air completely cover Vancouver Island.

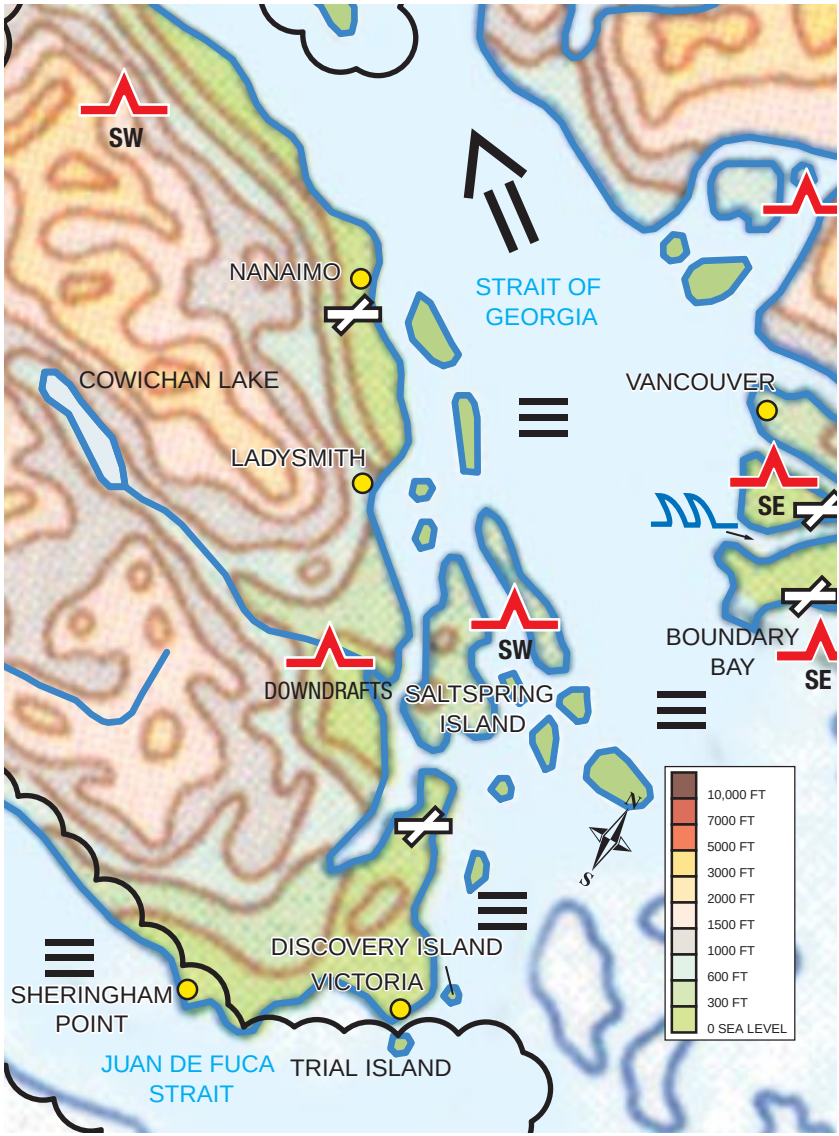
Along the mainland coast, a band of cloud and showers or flurries will accompany the leading edge of the outflow, to be followed by clearing skies. These clear skies will then persist throughout the period of outflow winds. Offshore, the cold dry air flowing over bodies of water, such as the Strait of Georgia or Johnstone Strait, will usually become unstable and will pick up enough moisture to give heavy snow showers along the east side of Vancouver Island.

The strong winds funnel down the mainland inlets often reaching speeds of 25 to 35 knots and occasionally rising as high as 50 knots. When the strong winds flow out from the mouths of the inlets they continue for some distance but gradually fan out and weaken. Extreme caution is advised when crossing coastal inlets during an outflow situation as the winds could increase very abruptly in a narrow band near the mouth of the inlet. One hint is to watch for the telltale ripple or wave pattern produced by these winds.

The end of an arctic outbreak occurs when the cold air is forced back inland by the arrival of warmer air being driven ahead of an approaching storm. With cold air along the coast, the precipitation may start as snow but changes to either rain, or rain and snow mixed, as temperatures moderate. Freezing rain can also occur in the deeper mainland valleys and inlets (including the eastern end of the valley) until the cold air is fully scoured out by the approaching warmer air.

(c) Local Effects

East Coast of Vancouver Island – Victoria to Nanaimo



Map 4-3 - East Coast of Vancouver Island – Victoria to Nanaimo

Summer and autumn weather is more conducive to flying; the main problems this time of year are sea stratus through Juan de Fuca Strait in the summer and sea fog in the fall. The San Juan Islands are more prone to morning fog than the Gulf Islands. The top of the fog usually lies between 1,000 and 2,000 feet AGL while the sea stratus tends to produce ceilings between 1,500 and 2,500 feet AGL. A typical pattern is

for the stratus to move inland over succeeding days and become more and more reluctant to dissipate. Stratus typically lies just off Victoria Airport but covers the Gulf Islands. Fog banks off the east end of the runway at Victoria can be blown in as pulses by the sea breeze.

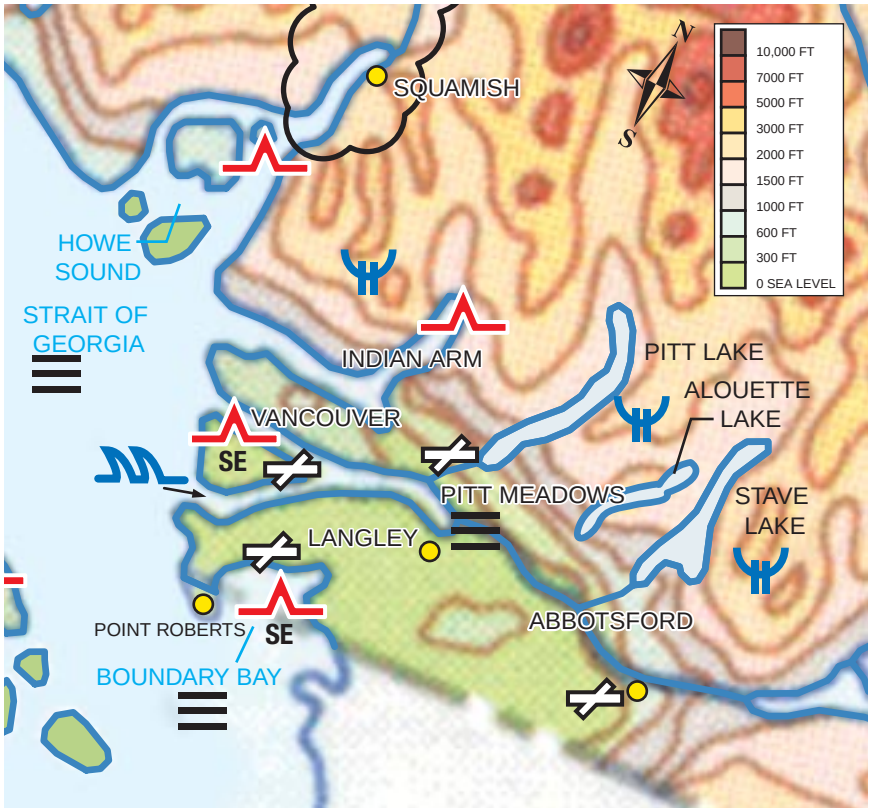
At the Duncan Airport, the runway is oriented 12-30 and lies uphill to the northwest. Westerly winds through Cowichan Valley often turn southward along the runway toward the valley and accelerate (15 knot wind becomes 25 knots). This downflow can be up to 500 ft/min resulting in aircraft landing short.

There are large hills on Pender Island where all winds, except southerlies, flow over hills resulting in downflow winds over the runway.

Nanaimo Airport is situated in a valley with local mountaintops ranging from 700 feet to 4,800 feet. While protected from the stronger surface winds found over the open water, it is susceptible to low-level mechanical turbulence and wind shear when winds aloft are strong. Most common during winter storm conditions, these hazards can be severe. Victoria airport, while somewhat protected from the common southeasterly winds, is more exposed to southerly and southwesterly winds and can experience hazardous wind shear when significant winds aloft are from a conflicting direction.

In addition to the regular METARS, it is worthwhile for low flying traffic over the water to check the marine wind reports from Trial Island just the south of Victoria, Victoria Harbour, Discovery Island east of Victoria Harbour at the south end of Haro Strait, Kelp Reef in Haro Strait east of Victoria Airport, Saturna Island near Active Pass in the Gulf Islands, and Entrance Island north of Nanaimo. Though not certified by Transport Canada for aviation weather, these sites, taken as a group, give a very good indication of the surface winds over the water.

Vancouver Area Including Pitt Meadows, Langley and Boundary Bay



Map 4-4 - Vancouver Area Including Pitt Meadows, Langley and Boundary Bay

As most systems move over the south coast from the west or southwest (upper flow, not the surface winds), the north side and east end of the Fraser Valley tend, due to upslope, to get greater amounts of cloud and precipitation producing widespread areas of low flying conditions. When icing is indicated, you can expect it to be significantly heavier over the north shore mountains from Powell River to Hope. This includes not only the usual mixed icing in the convective build-ups associated with cold fronts, but also moderate and heavy rime icing with the onset of warm fronts. Pilots report some of the worst icing conditions they've ever experienced occur in this area. Because of this, most choose to ascend to the west over the Strait.

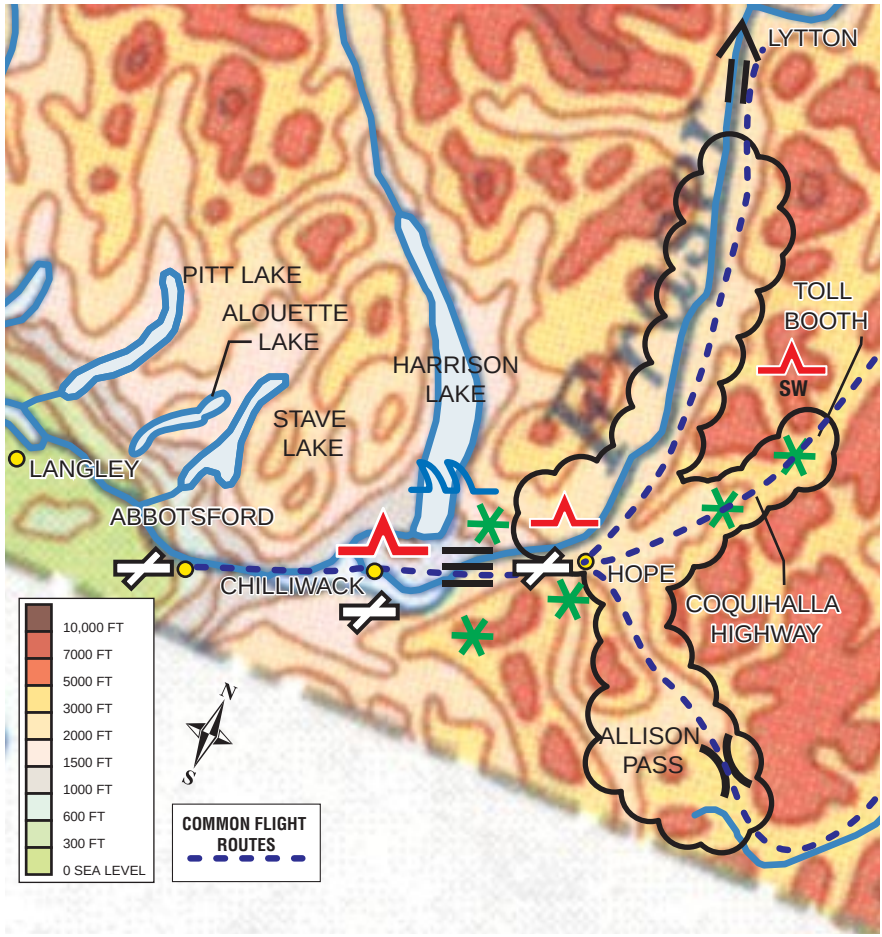
A general sense of the local weather can usually be obtained by making reference to the local METARS as well as the one from Bellingham (KBLI). Radiation fog is common around Langley and Pitt Meadows in the fall due to the low, flat bog land. Abbotsford Airport, however, is seldom a problem. Vancouver and Boundary Bay, on the other hand, are very susceptible to marine stratus/fog advection coming off the straits. This can cause conditions to deteriorate very rapidly. It most commonly occurs

in the early morning with inflow conditions [usually with a ridge along the coast], and can last from an hour or so to several hours, sometimes continuing into mid afternoon. When conditions persist over several days, the low cloud/fog tends to persist longer each day.

Strong winds at Vancouver are usually from either the west or southeast with the southeasterlies tending to be gusty and turbulent. West winds can reach speeds exceeding 40 knots on occasion but tend to be stable and relatively smooth.

Tidal currents in the Fraser River can be hazardous for landing seaplanes, especially with northwest winds that oppose the current, producing steep, choppy waves. Similar or worse conditions are observed in the Pitt River, all the way to Pitt Lake.

Abbotsford to Hope



Map 4-5 - Abbotsford to Hope

The worst weather in the Fraser Valley occurs from September to April and is usually associated with precipitation that brings on rapidly lowering ceilings and visibility. The low cloud tends to thicken noticeably near Agassiz and worsens as you go eastward into the mountains. In a southwesterly flow, poor weather piles up along the mountains, with higher ceilings on the south side of the valley.

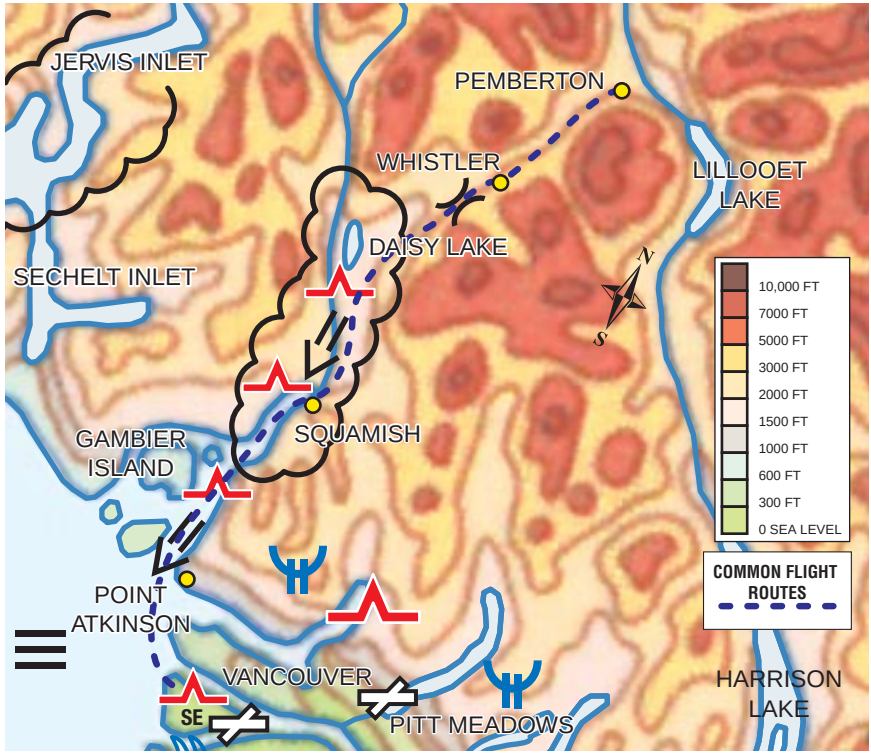
During times of strong northwest winds over the Strait of Georgia, the winds will curl into a strong westerly along the valley. Westerlies of 25 gusting to 45 knots with stronger gusts are common behind cold fronts. If the air mass is cold, snowshowers and very poor visibility will be found along the high ground that rims the eastern end of the valley. During times of strong inflow, anticipate significant mechanical turbulence on the south side of the Fraser River near Hunter Creek, located west of Hope between Laidlaw and Flood. During times of strong outflow the weather will generally be clear, but significant turbulence should be anticipated around Chilliwack and Sumas Mountains below 5,000 feet ASL.

The summer sea breeze channels between Chilliwack and Hope and can be quite strong (20 to 35 knots). Smog (top of layer 1,500 to 2,000 feet) can reduce visibility to 2 to 3 miles at the east end of the valley during warm, summer afternoons. When approaching from higher levels, reflection of sunlight off the smog can make it difficult to view the ground.

Very strong winds are common over Harrison Lake and Harrison River in summer. Over the lake, the worst winds are northerly sea breezes during summer afternoons. These can produce significant turbulence and waves as high as 4 feet.

Low cloud and poor visibility are facts of life in Hope from late fall to late spring. Only during times of dry, cold outflow will the cloud clear from the area. Turbulence is common in the Hope area when strong inflow or outflow winds are occurring. Inflow is common year round while outflow tends be a winter phenomenon. Local pilots report that this turbulence is usually restricted below 3,000 feet AGL. During the winter months, icing in cloud is often significant to the east and northeast of Hope, along the Coquihalla to Merritt route. When checking the local METARS note that Hope Slide is about 10 to 15 miles east of Hope and about one thousand feet higher up.

Vancouver to Pemberton along Howe Sound



Map 4-6 - Vancouver to Pemberton along Howe Sound

There is a high volume of traffic along this route throughout the year. It is possible for pilots to contact others on VHF to determine the weather ahead. However, when the conditions are marginal and pilots fly at low altitudes, radio contact is limited by the terrain to a very small area ([usually only a dozen miles ahead, often much less).

Often used as an alternate route to the interior, this route follows Howe Sound north from Vancouver to Squamish and then follows the Cheakamus River valley to Whistler and Pemberton. Just north of Squamish the valley splits into three valleys, with the largest, the Squamish River valley, opening to the northwest. Experienced pilots tell of frequent navigation errors near Squamish, especially in bad weather.

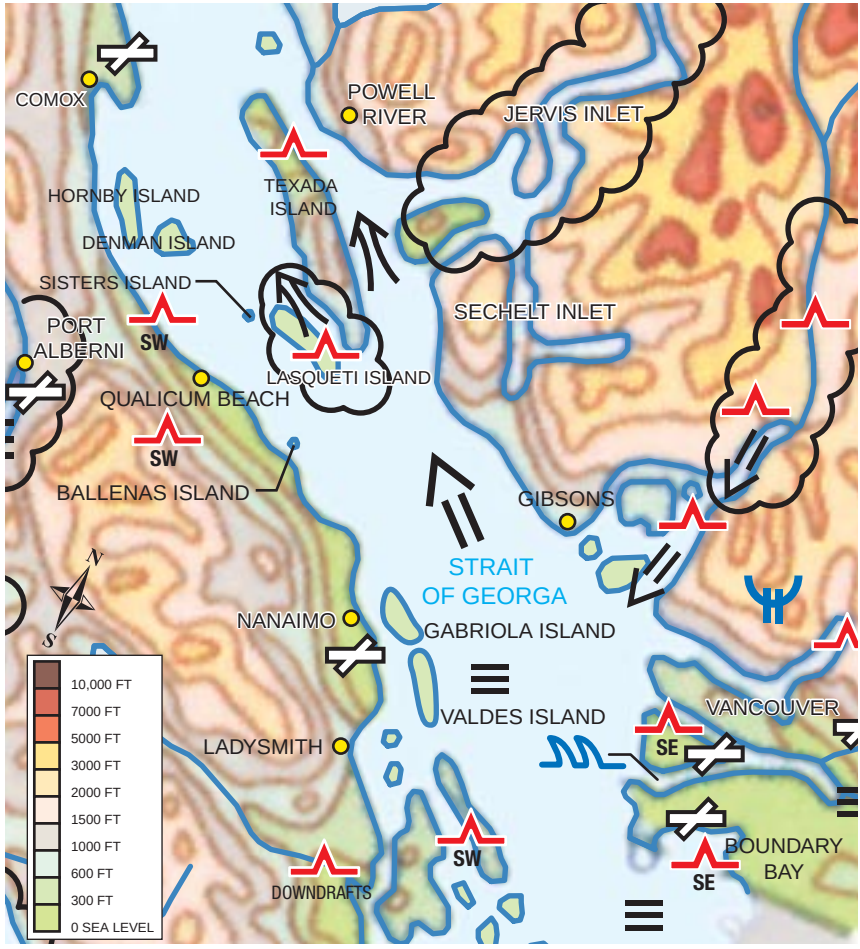
At the mouth of Howe Sound, near Vancouver, channelling causes outflow winds to increase dramatically. Burrard Inlet runs east-west and meets Howe Sound at right angles just northwest of Vancouver in the Strait of Georgia. When the outflow are strong through Howe Sound and Burrard Inlet, expect at least moderate mechanical turbulence in the immediate vicinity. The winds over the open waters of the southern Strait of Georgia are also often in conflict. When the outflow from Howe Sound is strong and there is a strong southeasterly wind blowing along the Strait, these winds

are meeting each other almost head on. Add to this the fact that the upper winds just off the surface are commonly south or southwesterly winds aloft producing a hazardous condition with mechanical turbulence at lower levels and shear turbulence just above the turbulent boundary level winds, starting anywhere from 800 to 2,000 ft MSL. This area lies on busy float plane routes in and out of Vancouver Harbour enroute the Sunshine Coast and Howe Sound.

In the summer, thunderstorms are not infrequent in Howe Sound and tend to move up the sound. Strong inflow winds are common into Howe Sound to Squamish, often exceeding 30 knots. In a strong southeast flow up Howe Sound, there is strong turbulence along the highway where it is cut into the cliffs.

In the winter, during outflow conditions, turbulence to 5,000 feet AGL is common on the route north of Squamish, especially where the valleys narrow. Local pilots report that the bad weather tends to pile up on the east side of the river and recommend staying on the left side with the river to your right. The worst location for low cloud is one to two miles north of Squamish. The low cloud usually ends near Daisy Lake. A second choke point exists near the bend in the road, to the south of Whistler. The valley from Whistler to Pemberton is notorious as one of the last to dry out and clear after frontal precipitation. Also note, there are some very high wires along Highway 99, which are dangerous for fixed wing aircraft following the river.

Strait of Georgia – Vancouver - Nanaimo - Powell River - Comox



Map 4-7 - Strait of Georgia – Vancouver - Nanaimo -Powell River - Comox

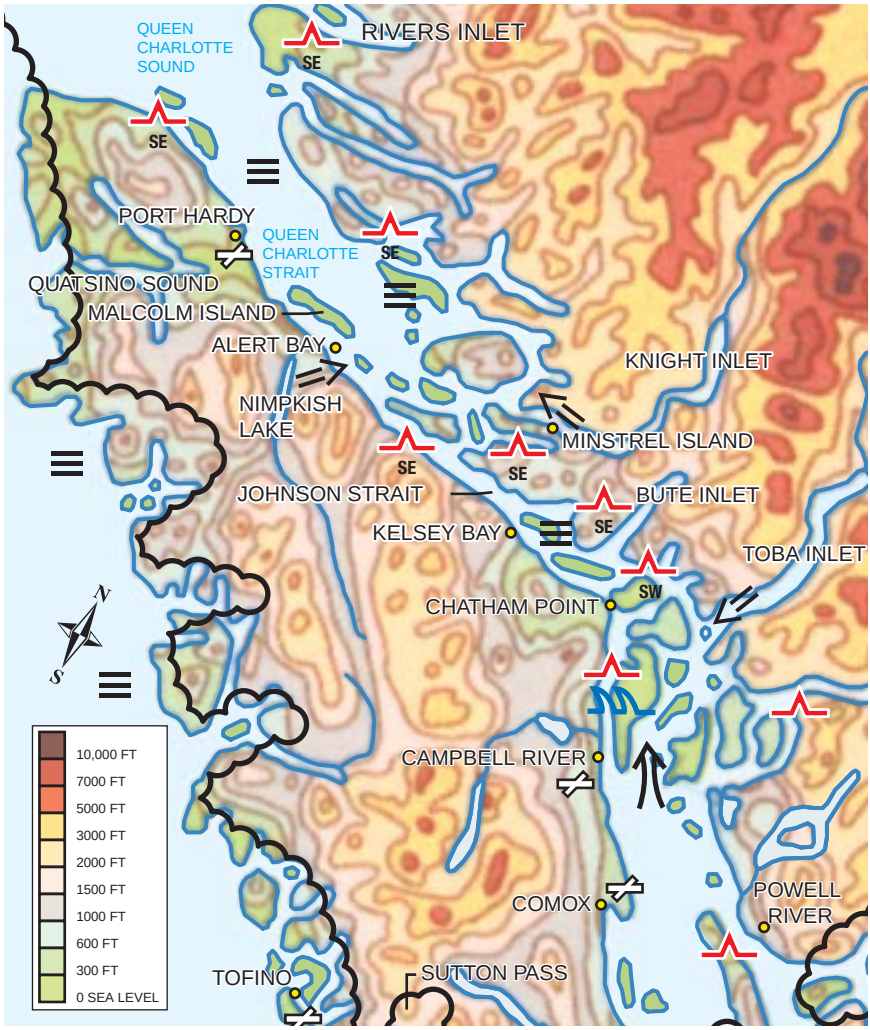
Southeasterly winds are the most significant along the strait and they tend to be gusty. Turbulence along this portion of the strait is generally not significant except for mechanical turbulence in the vicinity of terrain along the coast and the northern Gulf Islands. Channelling and coastal convergence of the surface wind can be severe along either side of Texada Island due to the height of the ridges. Coastal convergence can produce winds of up to 35 knots in the summer near Qualicum Beach. Nanaimo Harbour is almost always calm.

Low cloud and fog tend to persist wherever there are hooks of land to hold it, such as around Nanaimo and between Texada and Lasqueti Islands. In general, fog and low cloud are more persistent over the northern half of the strait. At Nanaimo, fog is much more common over the airport than at the floatplane base.

Powell River can be hazardous in southeast winds with lots of subsiding air near the runway. Hills in the vicinity rise to approximately 3,500 ft. The lake can be especially bad in southeast winds, which swirl around a point of land on the southern end of the lake. Although still dangerous at times, it is often calmer on the north end of the lake, and along the ridge on the west side of the lake.

Once again the unofficial wind reports from the marine bulletins are very useful indicators of surface wind conditions. See especially Grief Point near Powell River, Sisters Island off the southwest tip of Texada Island, Ballenas Island near Qualicum Beach, and Merry Island just offshore from Sechelt.

Inner Straits from Powell River/Comox – Queen Charlotte Sound



Map 4-8 - Inner Straits from Powell River/Comox – Queen Charlotte Sound

As with areas further south, weather in this region tends to be relatively dry as Pacific weather systems are dried as they pass over Vancouver Island. The airport at Campbell River reports considerably more fog than occurs over the Strait, especially during autumn months. The Comox Airport, right along the water, is not affected as much by this fog. Note, however, that if the conditions in the Strait near both Comox and Campbell River involve ceilings or even significant quantities of scattered cloud at 400 feet or below, Campbell River, because of its elevation will usually be in fog. The prevailing southeasterly winds in the winter tend to force low cloud onto the east coast of Vancouver Island, often leaving the mainland half of the Strait less congested.

Bute Inlet is very susceptible to strong outflow with strong vertical eddies over the water. Evidence can sometimes be seen in a "catspaw" area with whitecaps. A very turbulent spot, both on the water and in the air, is Seymour Narrows in Discovery Passage.

In summer, other than the occasional weak frontal system, the main problem is fog, which tends to sit along the coastal areas and over the straits. This situation is very common when there is an area of high-pressure building to the west of the island. The fog and stratus become widespread overnight and generally wrap around the north end of the island, and extend both northwards along the Central Coast and southwards to Malcolm Island, or even as far as Chatham Point. Heating from the sun will dissipate the fog and stratus off the land by late morning; however, fog banks will persist over Queen Charlotte Strait throughout the day and begin to expand once the sun sets. In general, during July and August, conditions tend to be poor in the morning, good in the afternoon and often decrease rapidly after sunset.

The sea breeze activity is pronounced in this area during the summer. Winds over the straits and at Port Hardy will be light in the morning and strengthen to northwesterly 15 to 25 knots in the afternoon. Alert Bay airport has an abrupt drop-off near the northwest end of the runway that induces a downflow in strong southeasterly winds.

Winter storms tend to induce strong southeasterly winds in the straits reaching typical values of 25 to 45 knots in Johnstone Strait and 35 to 50 knots in Queen Charlotte Strait. In such cases, moderate to severe mechanical turbulence is common. Local pilots report that, in a strong east-southeast flow, severe turbulence is common near Actaeon Sound (about 20 miles northeast of Port Hardy), in Sargeant's Pass near Minstrel Island and in Surge Narrows (near Campbell River).

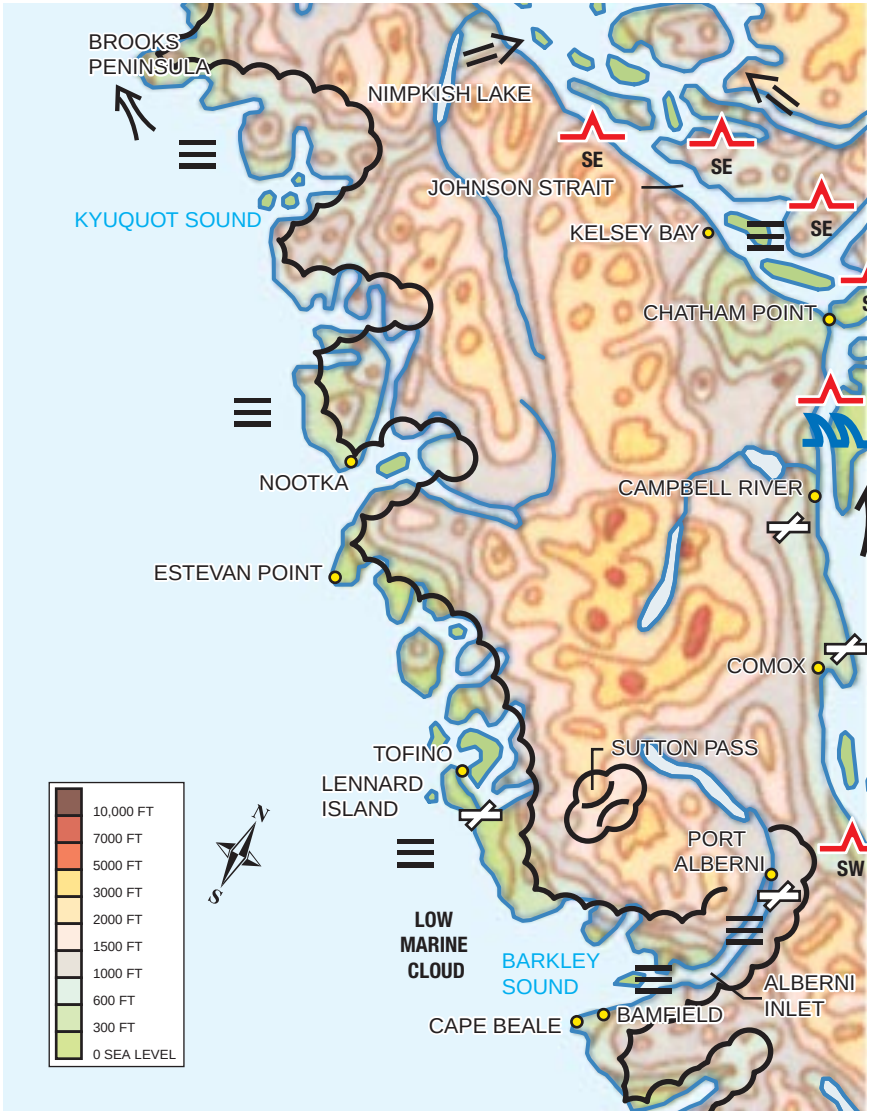
When the upper flow is strong southwesterly (around 50 knots or greater) there is a tendency for strong channelled winds to come out of Telegraph Bay (near Malcolm Island). Also in such conditions strong rotor activity develops in Blind Channel (between Kelsey Bay and Chatham Point) resulting in swirling winds, sheets of water lifting from the surface and even waterspouts.

There is a typical weather regime change at Kelsey Bay with cloud and rain becoming more common further north as wind patterns change. One area with consistently poor weather is along Johnstone and Queen Charlotte Strait, with the area between Chatham and Alert Bay receiving special mention for low hanging cloud.

The ceiling report at Port Hardy is often representative of surrounding land areas, as long as the differing terrain height is considered. If the ceiling is 500 feet at Port Hardy, terrain to the west is most likely obscured. In autumn and winter months, the northern end of the island is often battered by extreme winds reaching 80 knots or more. In such a case, turbulence is often extremely violent in the vicinity of the Brooks Peninsula and near Sartine Island in the Scott Islands Group.

Wind speeds over the water are available from the Marine Bulletins. Near Campbell River see Mudge Island (more indicative of winds at the water aerodrome at Campbell Spit). At the south end of Johnstone Straits, see Chatham Point, at the north end, Helmcken Island. From south to north the winds in Queen Charlotte Sound are found at Pulteney Point, Scarlett Point and Herbert Island. North of Port Hardy are Pine Island and Egg Island.

West Vancouver Island Including Routes to Port Alberni and Tofino



Map 4-9 - West Vancouver Island including routes to Port Alberni and Tofino

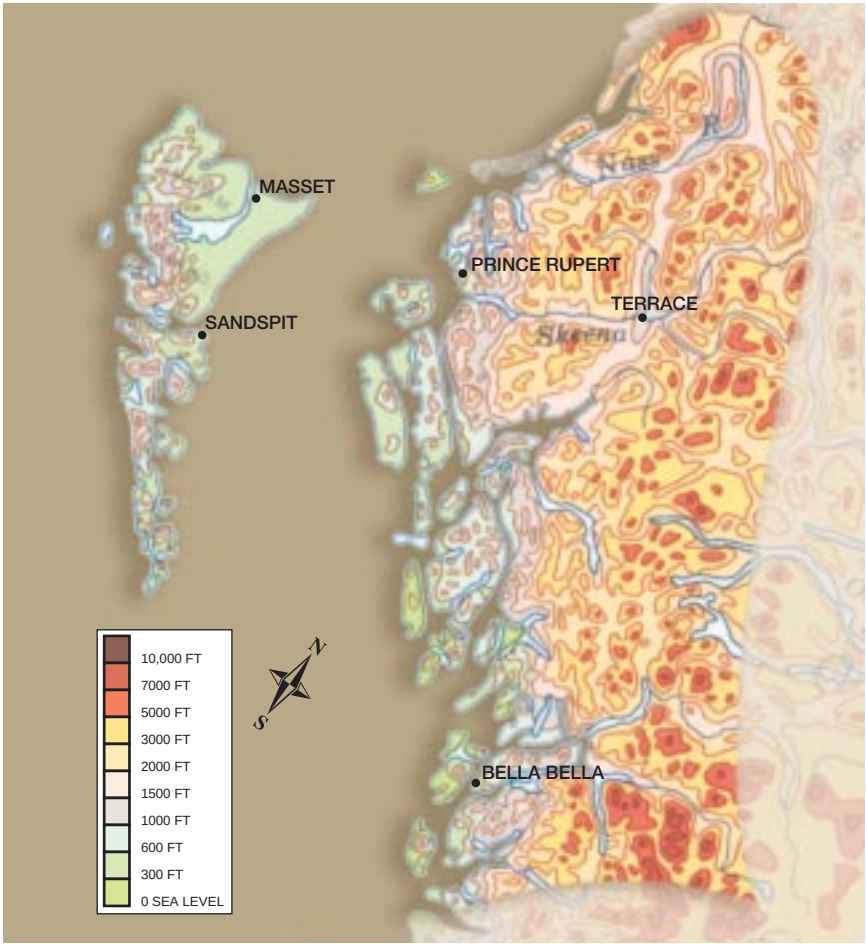
There are a few common routes across southern Vancouver Island. One follows the Cowichan Valley from Duncan west past Cowichan Lake to a pass at Nitinat Lake and thence to the coast. If the ceilings permit it is possible to go north over the mountains from Cowichan Lake directly to Port Alberni, but this route is more commonly used to reach the west coast and points north. Most traffic to Port Alberni takes the route west from the Parksville/Qualicum area. This climbs over a pass to Port Alberni

The route from Parksville to Port Alberni may appear clear until just prior to reaching Port Alberni. Mechanical turbulence is common at the junction of Cowichan Lake Valley and Nitinat Lake Valley, as well as shears occurring at the east end of Cowichan Lake during afternoon, when westerly flow along the valley meets onshore sea breezes. The valley is tight from the southwest end of Cowichan Lake to Port Alberni with low cloud persisting sometimes at the bend in the road, on the west side of the knoll. If flying from Alberni down Sprout Lake, light to moderate turbulence is common near Kennedy River. In a westerly flow, turbulence is frequent over the ridge near Cameron Lake, as well as the area between Horne and Cameron Lakes. In the winter, conditions in Sutton Pass can get very low, especially where the road sits up on the side of the pass. During the winter, snow along the road at the top of the pass is not uncommon.

Some of the worst weather in British Columbia occurs along the west coast and western slopes of Vancouver Island. Strong winds, low cloud, heavy precipitation and fog banks combine to make this a treacherous route year round. Tofino is a favourite place to visit but low cloud and fog frequently sit off the coast and are quick to move over the airport. Local pilots say it is essential to have sufficient fuel to return to an alternate when trying to fly into the area. The observing site at Tofino Airport does not provide an unobstructed view to the sea and, thus, sea fog may not be seen. Lighthouse reports at Amphitrite Point, Estevan Point and Lennard Island are extremely important, especially for float plane activity. If any low cloud is reported at coastal airports, the west coast of the island is likely closed to visual traffic. From the south to north, marine reports on the west coast include Sheringham Point, Carmanah, Pachena Point, Cape Beale, Amphitrite Point, Lennard Island and Estevan Point.

Near Gold River and Tahsis, inflow winds can make water very rough at the seaplane dock. There are also strong river currents near the dock at Gold River. See the marine report at Nootka for an indication of winds in Nootka Sound west of Gold River.

North Coast



Map 4-10 - North Coast

The predominate circulation over the North Coast is from the west. As in the south, the coastal area is fully exposed to every weather system approaching off the Pacific Ocean, and once again the terrain rises abruptly from the water's edge ensuring each system immediately undergoes strong upslope lift. If one observation could be made, it would be that seasonally the North Coast weather tends to be more prolonged and nastier than the southern section. Most of this can be attributed to the fact that the northern storm track tends to lie over this area for much of the year and the fact that there is no sheltering bulk of Vancouver Island to weaken the incoming storms. VFR flight is possible in this area any time of the year, but the combination of rapidly changing weather and a lack of alternate airports can ensnare the unwary.

(a) Summer

During the summer months, fronts tend to approach the coast from the northwest across the Gulf of Alaska. Over the coastal areas, a band of cloud and light rain usually accompanies the front. Winds will tend to increase along the coast just ahead of the front and can be expected to reach values of 30 to 40 knots over some exposed locations around the Queen Charlotte Islands.

Behind the front, pressure rises are fairly strong as the following ridge of high pressure builds towards the coast. This produces strong northwest winds following the frontal passage. The strongest northwesterly winds are often reported along the west coast of the Queen Charlottes.

Although not frequent, thunderstorms do occur over the inland sections of the North Coast in the summer. Air mass thunderstorms are the most common, tend to develop during the late afternoon or evening, and drift eastward along the sides of inlets or valleys. On rarer occasions, frontal thunderstorms will move into the coastal areas.

Sea fog and marine stratus are prevalent over the offshore waters just to the west of the Queen Charlottes and is easily advected into the coastal areas. Once there it will tend to dissipate or thin during the day but then be quick to reform again once darkness falls. This pattern will continue until some kind of pressure system moves drier air into the region.

(b) Winter

Along the coast, approaching frontal systems provide for dramatic weather. Ahead of the warm front, extensive, deep-layered cloud will give steady heavy precipitation and strong southeast winds across the area. With the passage of the warm front, the precipitation becomes intermittent, the lowest cloud layers break up somewhat but the higher cloud layers will persist. At the same time, strong southerly winds usually persist. Frequent showers of rain and ice pellets mark the arrival of the trailing cold front, which can be both widespread and heavy in intensity. Strong west to northwest winds usually prevail, especially around the Queen Charlottes and Dixon Entrance. With the most active fronts, warm or cold, the winds can briefly rise to 60 knots with gusts above 80 knots at locations around the Queen Charlotte Islands.

Air mass thunderstorms occur most often during the winter in the very cold air that follows the passage of a cold front. They often move across the area as squall lines about 12 to 24 hours after the frontal passage.

The only breaks in winter are when ridges of high pressure move across the area, and these tend to be of short duration. As the ridge approaches, the skies tend to clear leaving areas of scattered to broken convective clouds. Usually there has to be a trough to get thunderstorms.

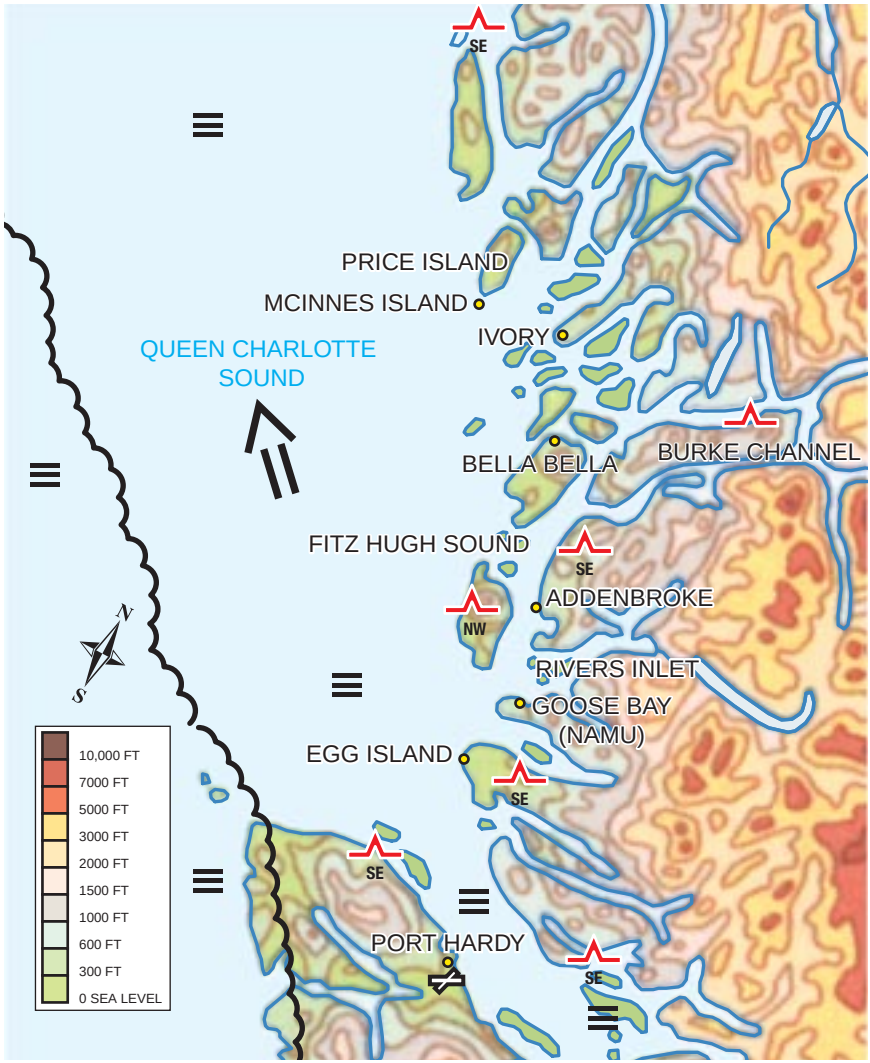
If the cold air deepens sufficiently over the interior of British Columbia, it can flow through the coastal mountains, down the coastal inlets, and cascade out over the coastal waters far enough to cover the Queen Charlotte Islands. This outflow condition can persist for days without respite. The strong winds funnel down the mainland inlets often reaching speeds up to 60 knots and occasionally rising as high as 100 knots. Side tributaries from the main inlets also have strong winds and, where a major side valley joins the main inlet, chaotic conditions are found. When the strong winds flow out from the mouths of the inlets, they continue for some distance but gradually weaken as the flow is no longer confined. Extreme caution is advised when crossing coastal inlets during an outflow situation as the winds can increase very abruptly in a narrow band near the mouth of the inlet.

Outflow conditions bring some of the best flying conditions along the North Coast during the winter. After the initial surge of cold air, accompanied by a band of cloud and flurries, the skies will clear and remain so throughout the period of outflow winds. Offshore, the cold dry air flowing over bodies of water, such as Hecate Strait, will become unstable and pick up enough moisture to give the potential of heavy snowshowers along the east side of the Queen Charlotte Islands.

The end of an arctic outbreak occurs when the cold air is forced back inland by the arrival of warmer air being driven ahead of a storm approaching from the Pacific Ocean. The precipitation with the system frequently starts as snow but changes to either rain, or rain and snow mixed, over the Queen Charlottes and along the coast as temperatures moderate. In the inlets; however, the cold outflow winds will gradually ease as the southeast winds strengthen along the coast. Often rain will be reported at the mouths of the inlets while snow continues further up in the inlet. Freezing rain can also occur in the inlets until the cold air is fully scoured out by the approaching warmer air.

(c) Local Effects

Northern Vancouver Island to McInnes Island



Map 4-11 - Northern Vancouver Island to McInnes Island

The scenery along the Central Coast is considered to be some of the most beautiful in British Columbia. Like the Port Hardy area, the weather in this region varies strongly between summer and winter, and the combination of widely scattered airports, lack of information and the speed at which the weather can change makes this a treacherous place to fly. All pilots who regularly fly this area make the same suggestions - wait for the breaks in the weather, carry lots of fuel and have a viable plan on where to go if the weather closes in.

In summer, the main pattern is the persistence of low cloud and fog banks all along the coast from Prince Rupert to Port Hardy. These fog banks will move offshore with daytime heating but are capable of moving back in abruptly and without warning. Usually the fog will only close the mouths of the inlets, but in the extreme cases the entire inlet will fill up.

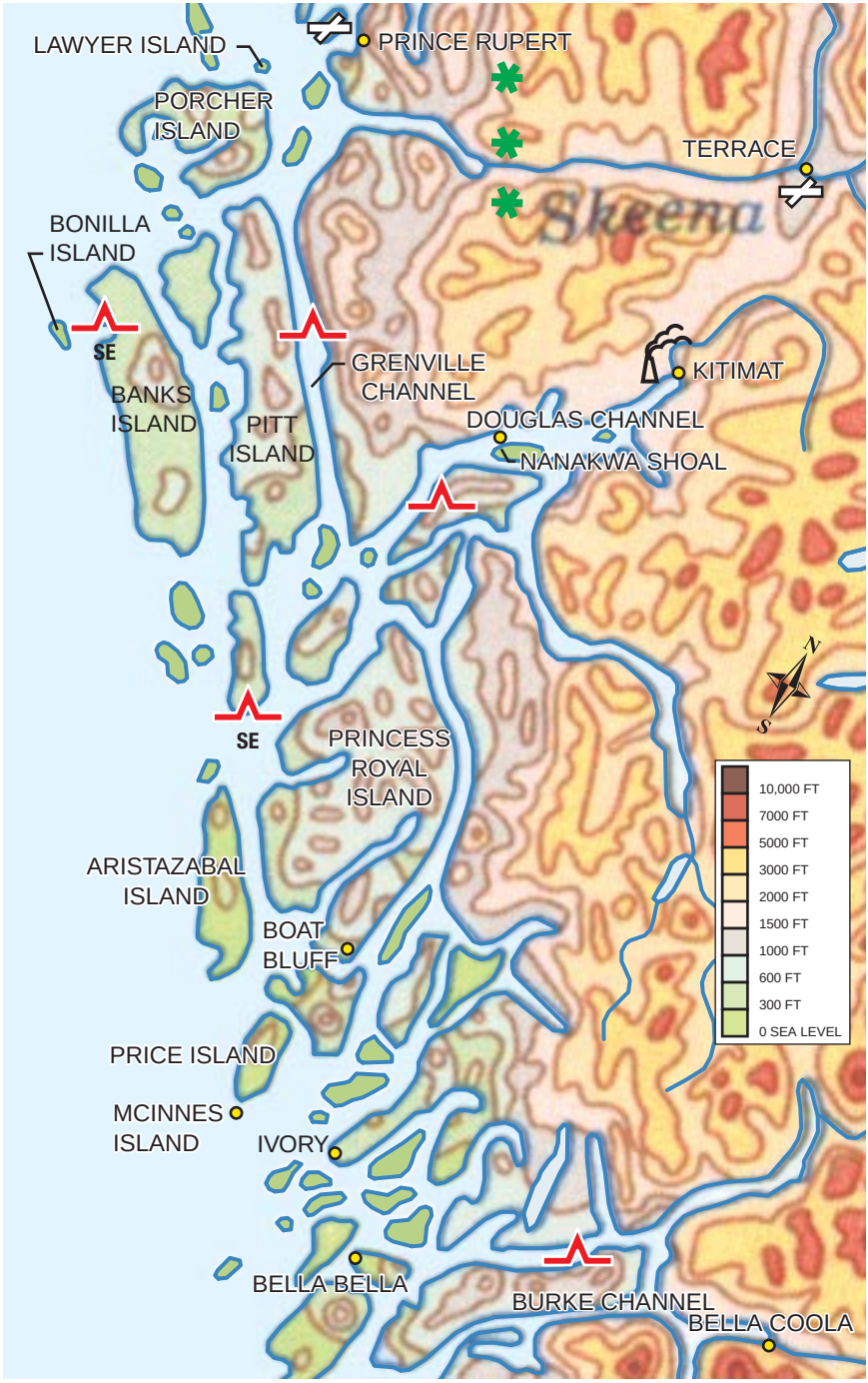
A strengthening afternoon inflow is common in the channels so that by late afternoon the winds are frequently strong and the water too rough to allow floatplanes to land at the head of inlets.

A couple of places have made a name for themselves. Local pilots suggest you stay at least 5 miles clear of the Goose Bay area (Namu) and the big hill on the south side of the mouth to Rivers Inlet when strong southeast winds are blowing (for an indicator of wind strength check the report for Addenbroke). Lee waves are present over top of Rivers Inlet and flight near 500 feet will be extremely rough in windy conditions.

Very strong outflow conditions are common when pressures build over the interior and values in excess of 50 knots are not uncommon near Cathedral Point, in the Burke Channel. These winds are the best indicator of inflow/outflow conditions on the central coast and are worth monitoring on a regular basis. Outflow of cold air will also occur ahead of approaching systems, and in the winter this creates the potential for freezing rain.

The weather report from Bella Coola cannot be used as representing Bella Bella. Bella Coola lies about 70 miles east at the end of an inlet, which penetrates deep into the Coastal Range. Bella Bella, the more exposed marine site, reports much more low cloud and fog. The marine reports from Dryad Point and Ivory Island are more indicative of conditions near Bella Bella. Westerly winds tend to produce severe turbulence over portions of Rivers Inlet, due to the steep bluffs on the west side of the inlet. Sea fog is very common over Queen Charlotte Sound. The lighthouse report from Egg Island is very representative for conditions along the mainland coast. For Rivers Inlet see the report from Addenbroke at the south end of Fitz Hugh Sound. There is also a report from McInnes Island further north.

Bella Bella to Prince Rupert



Map 4-12 - Bella Bella to Prince Rupert

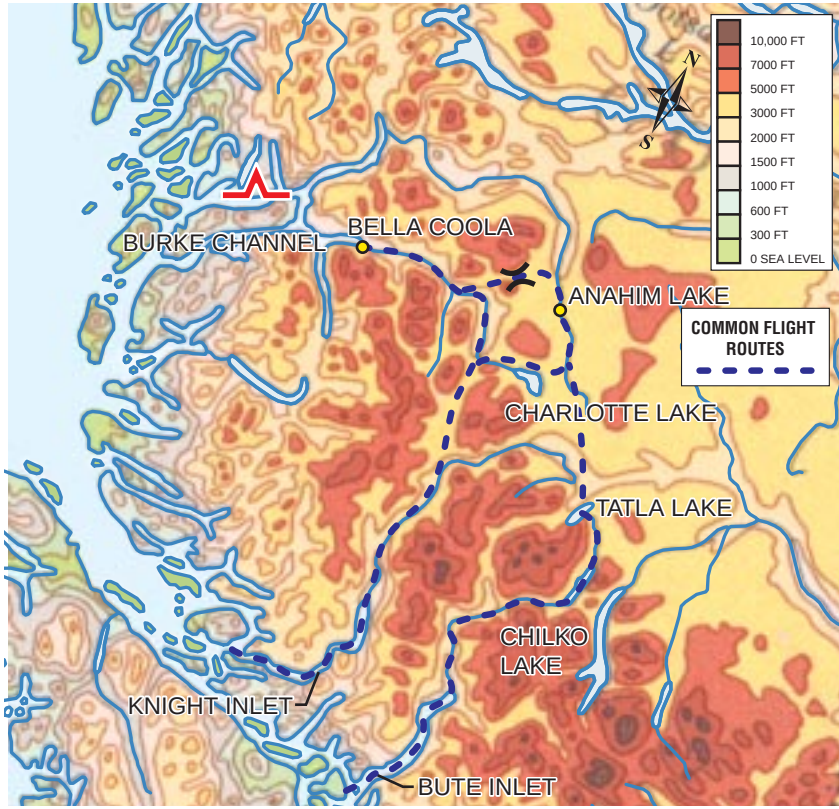
As with most other regions of the coast, weather hazards differ from summer to winter. In winter, Pacific low pressure systems can produce very strong winds, often exceeding 50 knots. When winds exceed 25 knots, moderate or greater turbulence can be expected around virtually all terrain. Channelling and funnelling can produce extreme winds in most inlets. The severity of these winds should not be underestimated. Every winter on the north coast there are occasionally winds extreme enough to induce swirls that can lift water frrom the surface. Note, however, that even when winds reach 35 knots or more in Chatham Sound (see Lucy Island), Seal Cove can be relatively calm.

When the strong southeasterly or southerly winds are blowing, experienced pilots flying between Prince Rupert and the central coast will avoid the inside routes such as Grenville Channel, and take the longer route outside the islands to avoid the heavy turbulence induced by the narrows and terrain. The strong northeasterly outflow winds, common in the winter months, also cause significant turbulence near similar terrain features. The Portland Inlet, just north of Prince Rupert, the mouth of the Skeena River and the Douglas Channel further south between Kitimat and the coast, are particularly affected by outflow winds, often causing turbulence prohibitive of all small aircraft flight. In the summer strong northwesterly winds can cause moderate to severe turbulence and rough sea conditions near Port Simpson just south of the mouth of the Portland Inlet. For indicators of the above conditions see the winds at Grey Island for the mouth of Portland Inlet and Port Simpson, and at Holland Rock for the mouth of the Skeena River. The Nanakwa Shoal winds in the buoy report are indicative of the winds in the Douglas Channel.

Winter systems also bring a lot of precipitation to the north coast. Low ceilings and poor visibilities are a fact of life for much of the winter. Low cloud tends to bunch up against Hayes Mountain and lie over the city of Prince Rupert and the airport on Digby Island. Seal Cove, however, is often less affected and will enjoy somewhat higher ceilings and visibility. Marine weather reports are available for Green Island and Triple Island off shore Prince Rupert in Chatham Sound and for Bonilla Island further south in Hecate Strait.

In summer, two factors dominate local weather: sea fog and afternoon inflow sea breezes. The inflow can reach 40 knots in some inlets. Fog is most prevalent in August and early September. Throughout the summer, the fog can sit over the sea, expanding right to the head of the inlets overnight and retreating during the day. Persistent fog often lies just west of Digby Island and can intermittently roll in and out over the runway or approaches. Fog is more common over Port Edward and Digby Island than over Seal Cove.

Central Coast to the Interior Plateau



Map 4-13 - Central Coast to the Interior Plateau

There are several things that can be said about these routes in general. Firstly, they go from wet coastal weather near sea level between some of the highest peaks in the Coastal Range to dry belt weather on the Interior Plateau in a relatively short distance. Secondly, they are all susceptible to inflow and outflow influences. The coastal inlets and valleys are prone to low cloud during and after precipitation. Inflow winds tend to push this cloud up the valleys toward the mountains. Outflow winds on the other hand bring drier air, but at times can be strong enough to cause significant mechanical turbulence particularly near narrows and rough terrain. Thirdly, these routes weave through a maze of rivers, valleys and passes. In poor weather conditions they lend themselves to navigational errors which are all too often fatal. Pilots who are not experienced and very familiar with their route and its terrain, should not attempt it in low or even marginal conditions. This hazard is increased for west bound flights as the weather conditions encountered from the crest of the mountains west are often considerably poorer than those experienced at the same time on the drier eastern side. Lastly, there is virtually no weather reporting sites anywhere along these routes and conditions can, and often do, change rapidly.

(a) Burke Channel to Anahim Lake

The Bella Coola Valley frequently has fog or low cloud that can persist all day during the fall and winter seasons. When present, this low cloud tends to persist all the way from Bella Coola to the crest of the Coast Mountains. There is a highway along this route, but it is not recommended due to its higher elevation. The preferred route is to follow the Hotnarko and Atnarko River inland due to their lower elevations.

In the winter, high pressure will often dominate over the interior giving outflow conditions. This can produce significant downslope winds and turbulence over eastern sections of the Bella Coola Valley.

(b) Bute Inlet to Chilko Lake/Tatla Lake

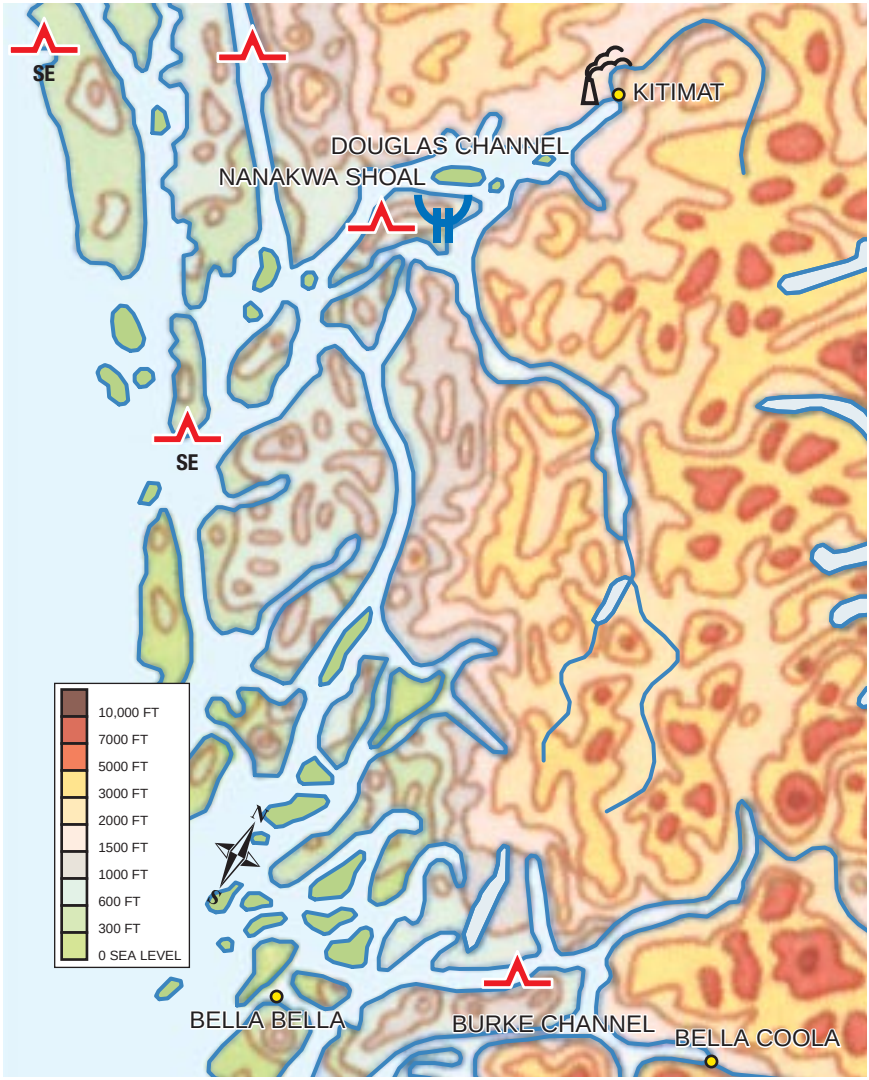
This route follows the Homathko River through the mountains from Bute Inlet. It is a common route for pilots flying to and from the south coast. Again, low cloud at the southwest end of the route and mechanical turbulence in strong outflow winds, are the most common problems.

(c) Knight Inlet To Nimpo Lake/Anahim Lake

This route follows the Klinaklin River from the Knight Inlet to the interior. The same problems with low cloud and outflow turbulence found on the other routes also pertain here. However the terrain along this route involves higher passes than the other routes, and thus this route requires even fairer weather to be flyable.

Coastal lighthouse station reports are available and are especially useful for conditions near the mouths of the inlets. The automatic weather station at Cathedral Point in the Burke Channel is the best indicator of inflow/outflow winds along the central coast.

Bella Bella to Kitimat (Douglas Channel)

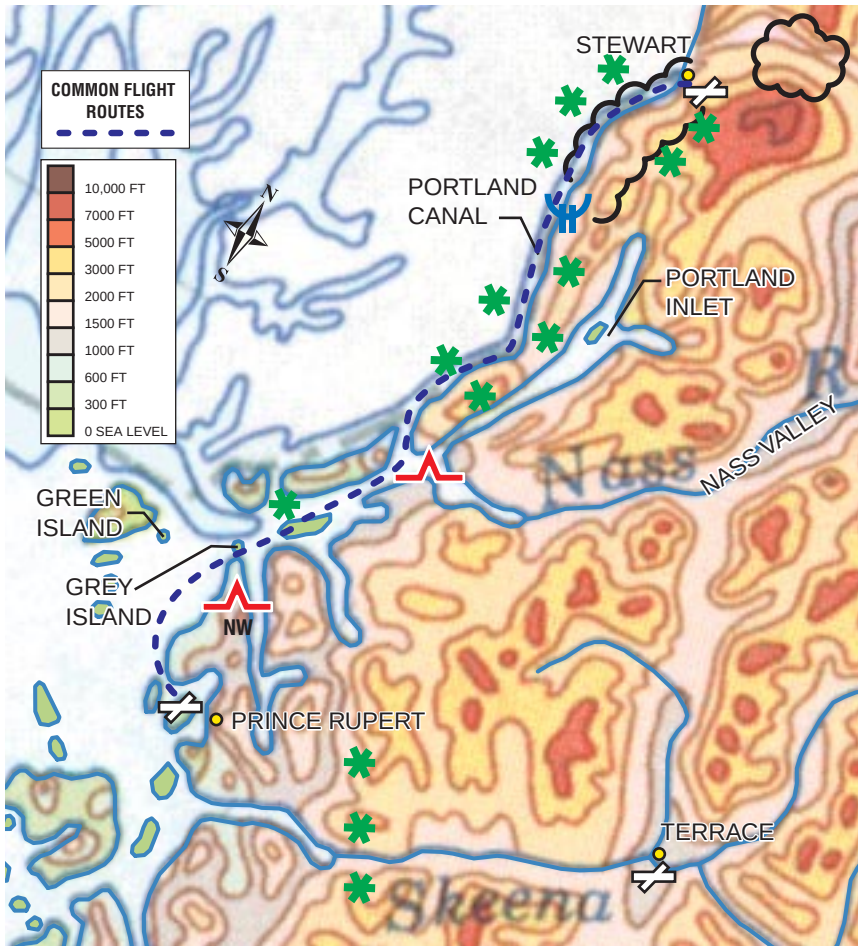


Map 4-14 - Bella Bella to Kitimat (Douglas Channel)

When active storms are moving northward along the Central Coast, there may be rotor turbulence on the east side of the valley, due to the higher southeasterly storm winds interacting with the generally north to south terrain. This turbulence is often severe if a strong southerly inflow is blowing. (For an indicator of inflow/outflow winds see the report from the buoy at Nanakwa Shoal. The worst turbulence is usually found from mid-mountain to peak levels within one or two miles of the slopes. Flight conditions will generally be smoother and safer along the west side of the passage.

This channel is extremely susceptible to freezing rain as the warm air ahead of approaching frontal systems overruns the cold air in the valley bottoms.

Prince Rupert to Stewart



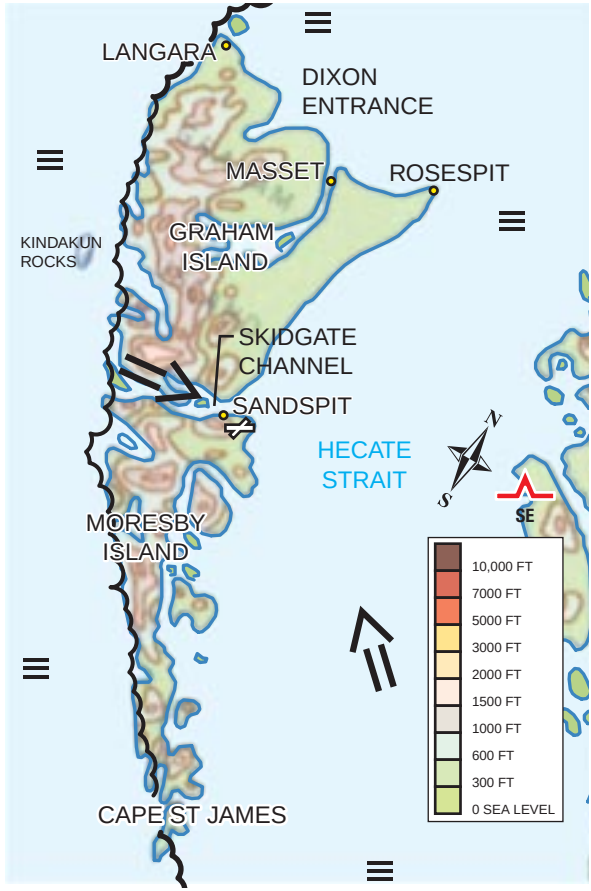
Map 4-15 - Prince Rupert to Stewart

The Portland Canal opens to the northwest just north of Prince Rupert. It runs northwest and then turns north into the Coastal Range to Stewart. The canal cuts through a steady upslope regime from low hills and islands at the coast to peaks either side of the narrow canal in the north ranging from 5 to 7 thousand feet. It is extremely susceptible to heavy snowfall ahead of an approaching frontal system, followed by freezing rain as the warm air overruns the cold air in the valley bottoms.

Significant turbulence is observed with northwesterly winds to the north of Seal Cove. The channel at Kincolith experiences severe turbulence in inflow and outflow

patterns. The Portland Canal to Stewart is also often very rough, especially in winter outflows. Above the highest terrain height, this mechanical turbulence is reduced. For indicators of these conditions see the winds at Grey Island at the mouth of Portland Inlet.

Queen Charlotte Islands



Map 4-16 - Queen Charlotte Islands

Though a group of many islands, Graham Island in the north and Moresby Island in the south make up most of the landmass of the Queen Charlotte Islands. A narrow channel of water, the Skidegate Channel, separates the two main islands. The two main airports are Sandspit at the northeast corner of Moresby Island and Masset on the north coast of Graham Island.

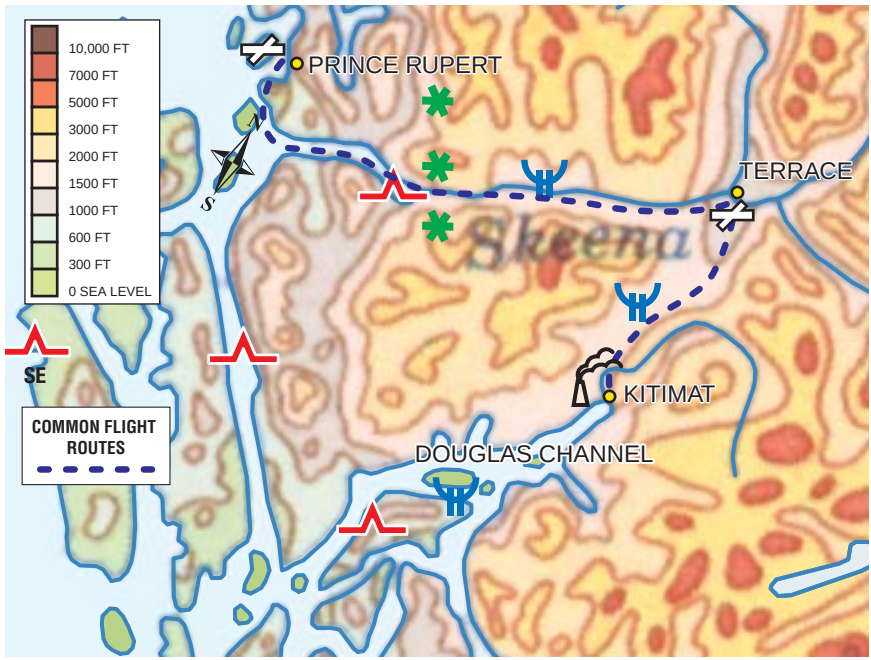
The Queen Charlotte Islands exhibit many of the weather phenomena common to the rest of the North Coast. Winter brings a seemingly endless procession of fronts off the Pacific accompanied by severe winds, abundant precipitation, low cloud and

limited visibilities. Hurricane force winds are a frequent feature of winter storms. In summer the breaks between the systems are longer and sunnier.

Moderate turbulence is often reported to the lee of Tow Hill, east of Masset, during northwesterly or southeasterly winds exceeding 25 knots. Thunderstorms (summer and winter) tend to move through Skidegate Channel on a regular basis, reducing visibility from unlimited to near zero (rain or snow) in a matter of a few minutes.

The only METAR on the islands is at Sandspit. Langara Island and Rose Spit give winds for the northwest and northeast corners of Graham Island respectively. The best indicator of conditions in Masset is a limited marine weather report from Langara in the marine bulletins. Kindakun Rocks gives winds on the exposed west coast as does Cape St. James on the south tip of Moresby Island.

Prince Rupert to Terrace/Kitimat



Map 4-17 - Prince Rupert to Terrace/Kitimat

This route follows the Skeena River. With a fall of less than 200 feet, the Skeena River west of Terrace widens considerably with mountains along either side of the river rising from 5 to 7 thousand feet. It can be very rough behind the mountain shoulders along the Skeena River with Telegraph Point renowned for its severe turbulence. Staying over the river can generally reduce the turbulence. When frontal systems ride in from the Pacific, low cloud will persist in this area until well after the front has passed. As with coastal inlets and valleys in general the inflow conditions

which often arise after frontal passage cause low cloud to build up at narrows or where there are bends. The region near Salvus can receive extremely heavy precipitation, due to both convergence at the narrows and lift from the upslope terrain.

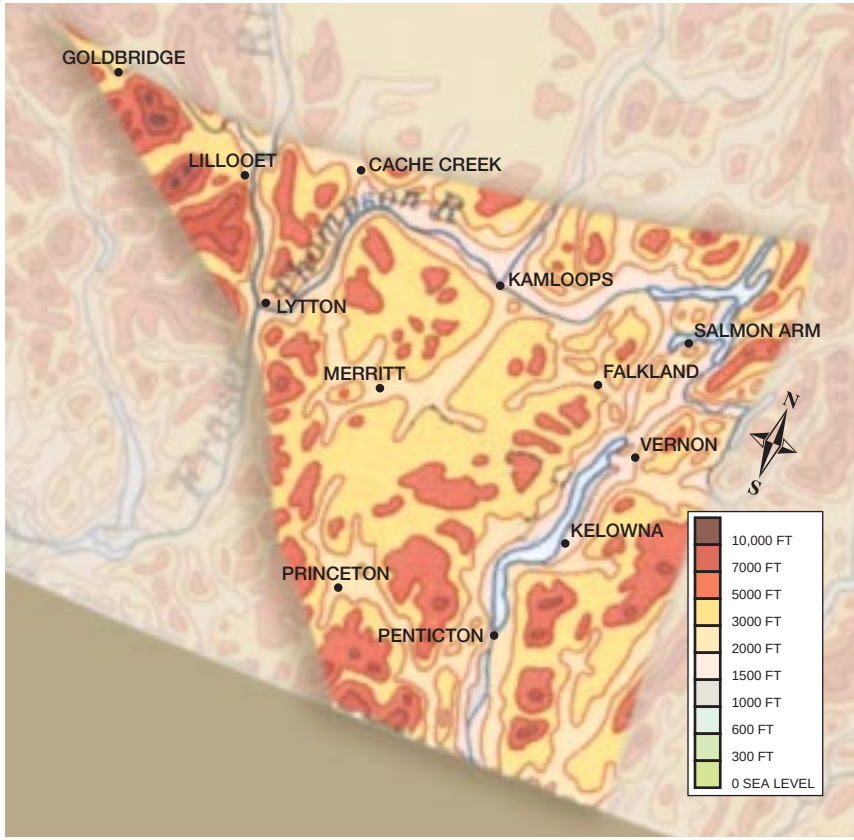
With extensive swampy land and other water sources, the valley near Terrace is very susceptible to fog and low cloud. The airport at Terrace is particularly prone to low cloud and fog due to its elevation, approximately 500 feet above the town and the valley floor. To the south of Terrace, the mills and smelter at Kitimat can reduce visibility and ceilings, particularly along the west side of the valley.

The Douglas Channel south of Kitimat as well as the valleys south and west of Terrace are extremely susceptible to freezing rain as the warm air ahead of approaching frontal systems overruns the cold air in the valley bottoms. The strength of the inflow/outflow winds can be monitored by checking the report from the buoy at **Nanakwa Shoal**.

Routes Inland from Terrace

For information on these routes please see the Central and Northern Interior Section.

Thompson - Okanagan



Map 4-18 - Southwest Interior

The Southwest Interior, better known as the Thompson-Okanagan, is essentially a mountainous area bounded by the Fraser River, on the west, and the Monashee Mountains, on the east. Most of the population and airports are located in river valleys that have a strong north to south orientation. Only Kamloops, on the northern edge of the area, lies in an east to west valley.

This area has essentially two seasons – summer and winter, with a very short spring and fall to mark the transition from one to the other. The climate of this area is strongly influenced by the Coast Mountains. When the flow aloft is southwesterly, it is common to see Pacific frontal systems produce little or no precipitation over this area. Only when the upper flow turns to the south does significant precipitation penetrate these valleys. The annual precipitation is almost equally split among the months – weather systems providing the precipitation in the winter and convection in the summer.

(a) Summer

Summers in the Southwest Interior tend to be sunny and hot as the Pacific Ridge pushes the main storm track north of the area. Those fronts that do try to move inland are significantly weakened by subsidence to the lee of the Coast Mountains. The cloud cover will develop noticeable breaks and precipitation, if any, will be light. In crossing the Coast Mountains, these fronts often lose their definition or disappear completely.

For the most part the summer is dry and hot with afternoon temperatures reaching into the mid-to-upper 30 degree Celsius range. Under such conditions, deep convection occurs almost every day but, on many occasions, there is insufficient moisture available to support anything but cumulus clouds. Despite this, convective turbulence and even the occasional dust devil can provide for a turbulent ride. At this time of the year, the upper winds are usually light so that non-convective turbulence is at a minimum.

One major exception to this pattern is the movement of a cold low over or near the area. These lows tend to produce broad areas of cool, cloudy weather with frequent shower and isolated thundershowers. While the precipitation is usually light, areas of upslope flow will see larger amounts.

The most active thunderstorms tend to occur when some sort of front of upper trough moves across the interior, producing a band of afternoon or evening thundershowers. These thunderstorms often persist well into the night. Over most regions, the predominant types are air mass and nocturnal thunderstorms and, when they do occur, they generally move along the valleys. The mountainous terrain hinders the full development of thunderstorms so that severe weather is uncommon. When it does, it usually consists of severe lightning, large hail and downburst winds. While thunderstorms can occur at anytime during the summer, the main period is from June to August.

(b) Winter

Winters in the Southwest Interior tend to be a long drawn out cloudy affair because of the frequent frontal systems that move in off the Pacific and the presence of cloud trapped in the valleys. As a front moves inland, it will weaken due to subsidence; however, usually sufficient moisture will persist to give some precipitation. In the case of snow, accumulations are usually light in comparison to the coast. One major concern for meteorologists is the location of the snow level, that is, the level where falling snow changes into rain. It is worth noting here that the snow level is usually found 500 to 1,000 feet below the freezing level. It is not uncommon, especially during late fall and early spring, to have rain falling in the valley bottoms with snow falling just a few hundred feet above the valley bottoms. Fortunately, freezing precipitation is rare; however, icing in this cloud can be significant.

Areas of high pressure, unless accompanied by cold air, tend have a reduced impact because of the widespread valley cloud. Cold air stagnating in the bottom of valleys causes a strong low level inversion to form, which traps any moisture from local sources. This moisture eventually forms cloud, which, despite being only a few thousand feet thick, fills the entire valley and can persist for weeks. Depending on the height of the inversion, the base of the valley cloud may lower enough to bring the airports below alternate or landing limits for prolonged periods of time. This cloud will produce some precipitation, but only light snow, in areas where the moisture supply has been increased. Valley cloud will only move if strong winds develop in the valley, or it will dissipate if the major moisture sources freeze over. Since the larger lakes in the Southern Interior of British Columbia freeze over completely only in the coldest winters, most southern valleys remain susceptible to the development of valley cloud from November to mid-February.

Valley cloud can offer a significant icing threat. With temperatures that are relatively warm, they contain a significant percentage of supercooled water droplets resulting in SLD icing. In addition, these larger droplets have been known to settle out of the cloud, producing freezing drizzle just below the cloud base.

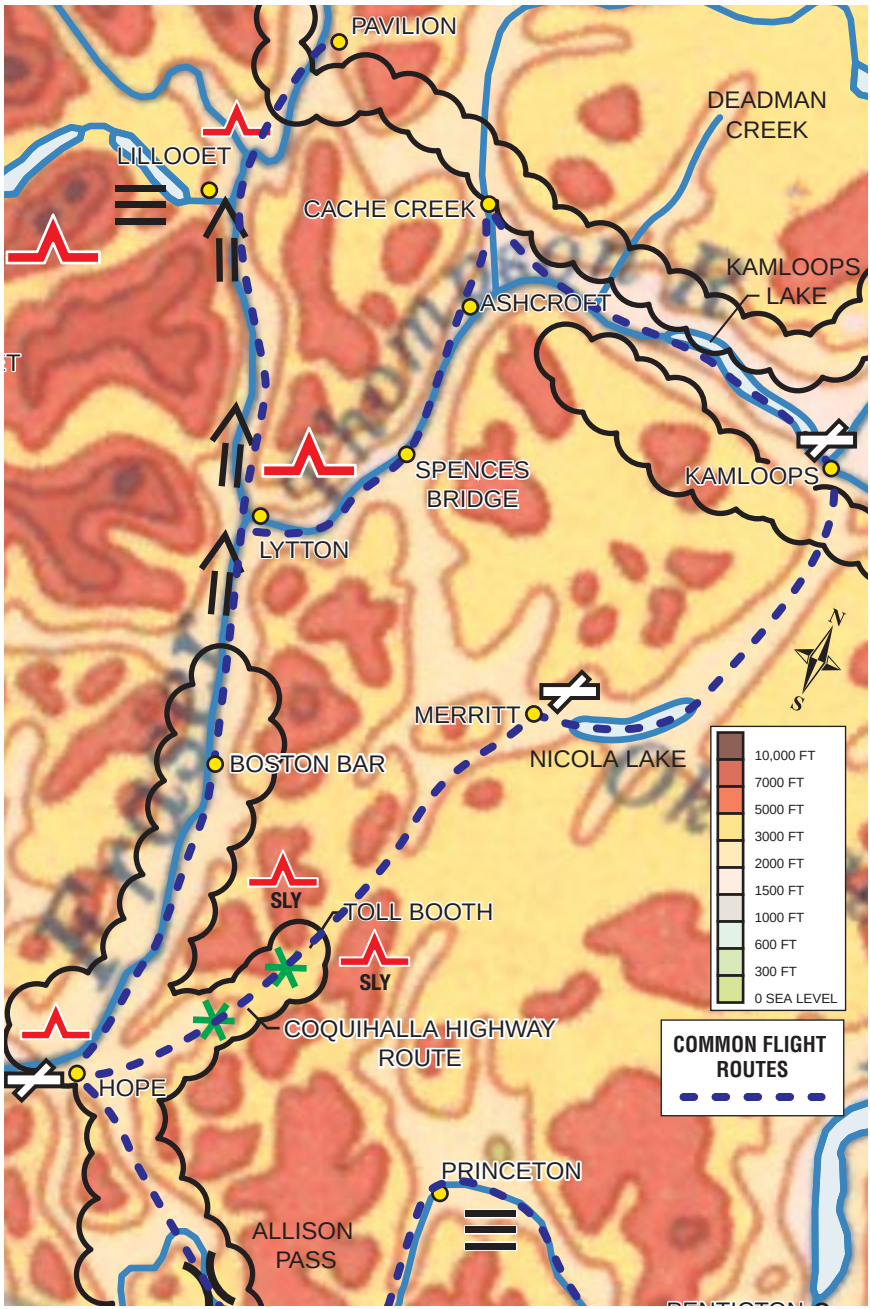
During winter, a strong area of high pressure forms in the very cold air over Alaska, the Yukon and the northern end of the Mackenzie River valley. This cold arctic air moves southeastward into the Prairies but can also spread over northern and central British Columbia. Most often, the Arctic air pushes southward into the Central Interior before coming to rest. At the same time, Arctic air also flows through the mountain passes from Alberta and fills the Rocky Mountain Trench. Depending on the strength of the arctic front, winds can shift abruptly into the northwest with the passage of the front and be gusty for several hours. At least once or twice each year, the advance of Arctic air is so strong in British Columbia that it spreads into the Southwest Interior.

Arctic air over the interior offers little problems other than the temperature. Most of the valley cloud dissipates, giving clear cold days and nights. Over the bodies of water that have remained unfrozen, such as Okanagan Lake, sea smoke will form over the water and lift to form cumulus clouds. These clouds, if there is a significant difference between the air temperature and the water temperature, will be turbulent, contain icing and produce local heavy snow showers. Other than this, good flying conditions will prevail except for some localized problems with stratus.

The upper flow during the winter months is usually a strong southwesterly. This, combining with the local mountains, produces light to moderate, occasionally severe mechanical and lee turbulence across the area. At the same time, the combination of the upper flow and the channelled winds in the valleys will produce wind shears near the top of the valley.

(c) Local Effects

Routes Inland from the Coast



Map 4-19 - Routes Inland from the Coast

Hope – Lytton – Cache Creek

This route follows the Fraser Canyon from Hope to Lytton and then turns northeastward up the Thompson River Valley past Spences Bridge and Ashcroft to Cache Creek. This has long been one of the primary routes from the coast to the interior of British Columbia.

If the Hope area is impassable, then the Fraser Canyon as far north as Boston Bar will also likely be impassable. During the fall and winter, the route from Lytton south is prone to patchy fog developing overnight, which is slow to dissipate the following day. The lowest conditions usually occur around Yale and improve further north.

Despite frequent reports of strong winds at Lytton, turbulence is seldom encountered south of Boston Bar. However, during times of strong southerly winds (30 knots or greater) severe turbulence should be expected near Lady Franklin Rock (across from the Yale Tunnel). North of Boston Bar, pilots have, despite wind gusts to 60 knots, noticed little turbulence. The area around the Lytton airport can be turbulent at times due to the splitting of the strong winds into the Fraser and Thompson River valleys.

The area to the north of Lytton is extremely dry. Occasional periods of low ceilings and visibility due to system weather can occur year round but, for the most part, the area offers good flying. Like the southern part of the Fraser Canyon, strong winds will occur in the summer giving localized areas of turbulence.

Hope - Princeton

This route climbs eastward from Hope over the Coastal Mountains at the Allison Pass in Manning Park. The route west of the Allison Pass is part of a very wet upslope regime, and is an area known to be slow to dry and become clear of low cloud after precipitation.

Simply put, if Hope is impassable then the Hope-Princeton west of Allison Summit is likely impassable. The Hope Slide area is particularly treacherous as the barren hillside reflects light, especially when snow-covered, causing a “brightening” in the cloud, making pilots think that conditions are improving ahead. Visibility falls rapidly along this route once steady precipitation begins. As little as ten minutes can see the route change from passable to closed.

When travelling eastbound from Hope to Princeton, experts recommend that aircraft pass Hope with sufficient altitude to safely cross Allison Pass. The low cloud tends to lie to the east of the Skagit Valley, but elsewhere it is areas of reduced visibility that remain a problem. Also, east of the Skagit River, the valley rises very steeply to the summit. This gradient exceeds the climb capability of most conventional aircraft, and the rapidly narrowing valley makes safe turning dangerous or impossible.

Hope - Kamloops via the Coquihalla

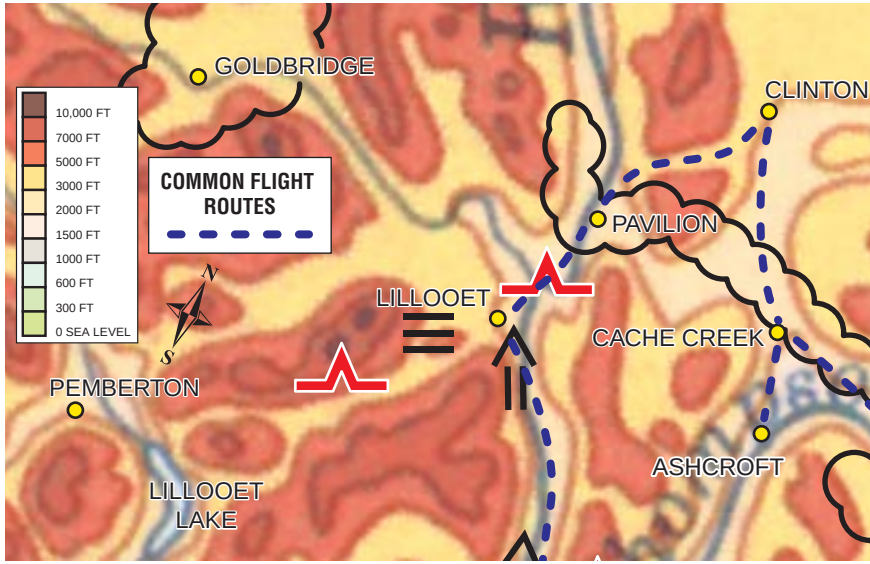
This route follows Highway 5 up the narrow Coquihalla River Valley to a pass near the Toll Booth Plaza. It carries on to the Nicola Valley at Merritt and then climbs over a highpoint at Lac La Jeune before descending into the Thompson River valley at Kamloops. The route from Hope to the Toll Booth Plaza, especially the section from Portia north, is subject to frequent low ceilings and visibility in snow during the winter. Conditions are described as being similar in characteristic to the weather around Hope, but it occurs over a longer run. Precipitation results in a very rapid lowering of ceilings and visibility. Snow showers can result in an instant lowering of the visibility to near zero.

North of the TollBooth Plaza following the highway is generally feasible, but low cloud can build up in the higher ground around Lac La Jeune. A good alternate is to use the Nicola Valley, but be aware that you can run into low cloud over the hills just to the south of Kamloops.

For pilots flying south, even when the northern highpoint is open the Coquihalla Pass and the area south may be closed. Also it is necessary to have scattered conditions or ceilings above 3,000 feet in the Fraser Valley or pilots can find themselves trapped on top.

Low level turbulence is a factor mostly in the southern section of the route from the Toll Booth to Hope where the valleys narrow and the terrain is more extreme. Lee wave turbulence can be encountered near Merritt below 14,000 feet ASL. Also when strong southerly winds aloft are occurring, expect moderate occasional severe turbulence at 6,000 to 7,000 feet near Yahk Mountain and Zopkios Ridge.

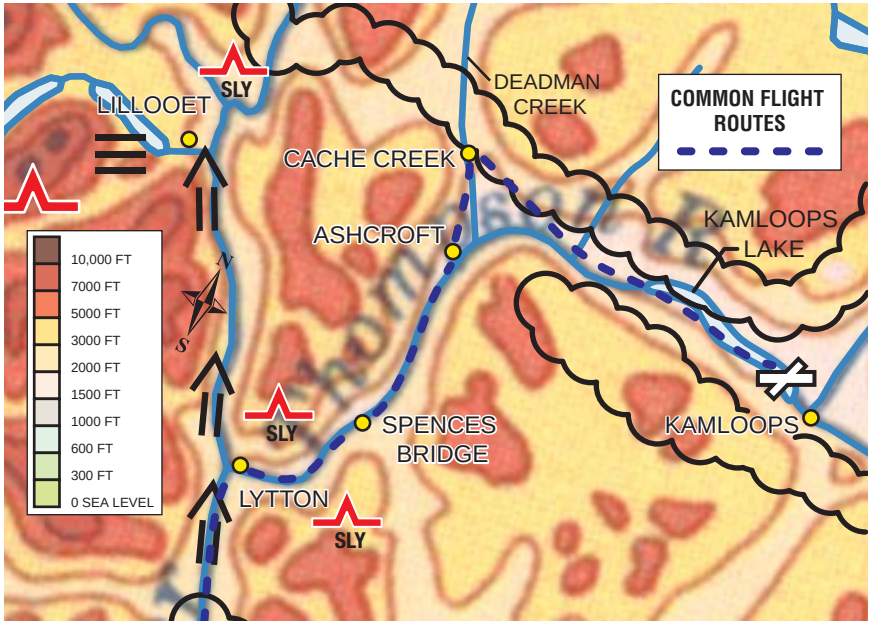
Pemberton, Highway 97 – Lillooet – Cache Creek



Map 4-20 - Pemberton, Highway 97 – Lillooet – Cache Creek

This more northerly route is a popular route to fly as it often avoids the poor conditions and strong winds occurring in the Fraser Canyon. However, low cloud is common near Pavilion. Occasionally in summer, strong thunderstorms can be encountered, and in fall fog can be a problem near the lakes.

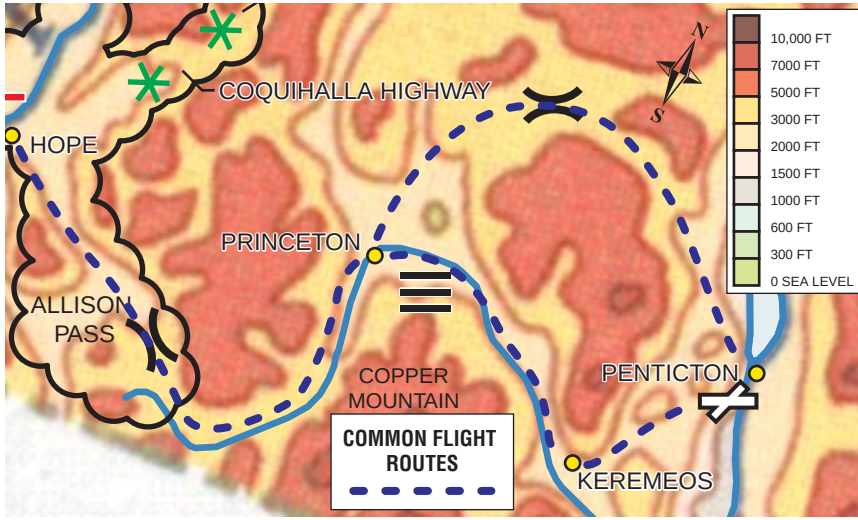
Cache Creek to Kamloops



Map 4-21 - Cache Creek to Kamloops

This route follows the Thompson River valley westward via Kamloops Lake to Cache Creek. Precipitation generally brings low cloud all along the route. Low cloud is slow to dissipate over Kamloops Lake just west of the Kamloops Airport. Kamloops wind strength and direction give an indication as to which end of the lake the cloud will be heavier. If passage is difficult, beware of the sucker hole at the west end of Kamloops Lake. Deadman Creek heads north and usually looks good, but it narrows rapidly and rises into the plateau where ceilings will be quite low. Further west tends to be drier. Remember that the Kamloops Valley, like other valleys in the region, is susceptible to valley inversion conditions.

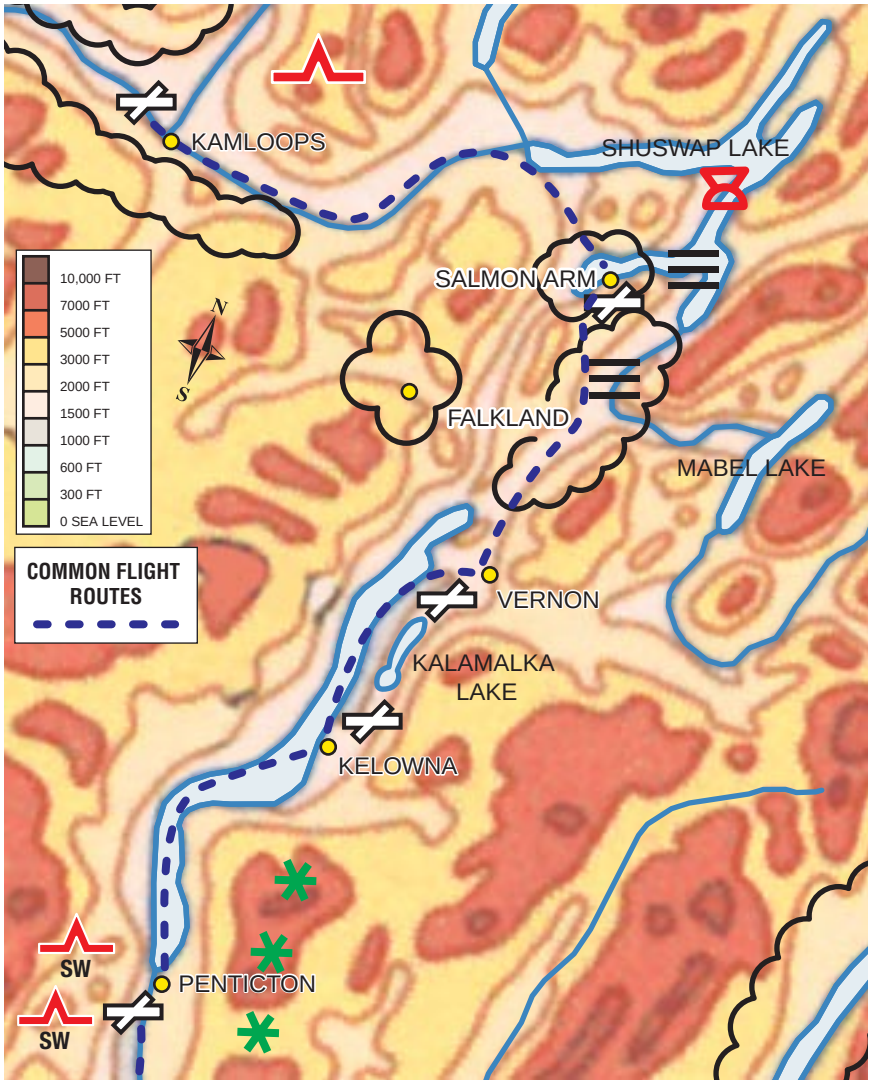
Princeton to Penticton



Map 4-22 - Princeton to Penticton

This route follows the Similkameen River Valley from Princeton to Keremeos, then turns northeast and climbs up the Ollala Valley and over the hills before dropping into the Okanagan Valley. Peaks that are from 3,000 to 4,500 feet higher than the valley floor encircle Princeton. The bowl thus created is often filled with fog during the fall and spring. Fog is not so prevalent during the winter, but low valley-type cloud is often present. The approach into Princeton is quite narrow from the south and blowing snow coming off the ridges can at times reduce visibility significantly. When the surface winds are strong the area around Keremeos is prone to mechanical turbulence at lower levels.

Okanagan Valley - Kamloops - Salmon Arm



Map 4-23 - Kamloops to Salmon Arm

The Okanagan Valley extends in a generally north-south orientation from just south of the Shuswap Lake to the very south of Washington State. It is one of the driest areas in BC with desert conditions south of Penticton. The valley tends to have steep sides with peaks along both sides from 6 to 7 thousand feet. In general, the weather is excellent except when major systems are moving through the area.

Winds and temperatures aloft have a strong effect on flying conditions in the valley. Westerly to southwesterly winds aloft is common, and when strong, cause lee wave

turbulence and downdrafts on the west side of the valley. This is aggravated in the summer by a significant loss of aircraft performance when aircraft fly from the cooler air over the lake to the hotter air over the hills (density altitude). It can be very hazardous to try to turn and climb west or southwestward out of Penticton. Particularly in hot weather pilots new to the area should be warned to gain sufficient altitude southbound over the valley before turning westward enroute.

Another effect common to many BC valleys is that of temperature inversion. Often associated with ridges, warmer air aloft traps cooler air in the valley. In the Okanagan the lakes provide a moisture source and radiation cooling overnight aggravates the inversion. Low cloud forms and rises as the day warms up but is capped by the inversion causing ceilings from 1,800 to 3,000 feet. This effectively limits VFR flying to the valley itself. The longer these conditions last the longer the cloud persists each day. After a few days it can often stay overcast until mid afternoon.

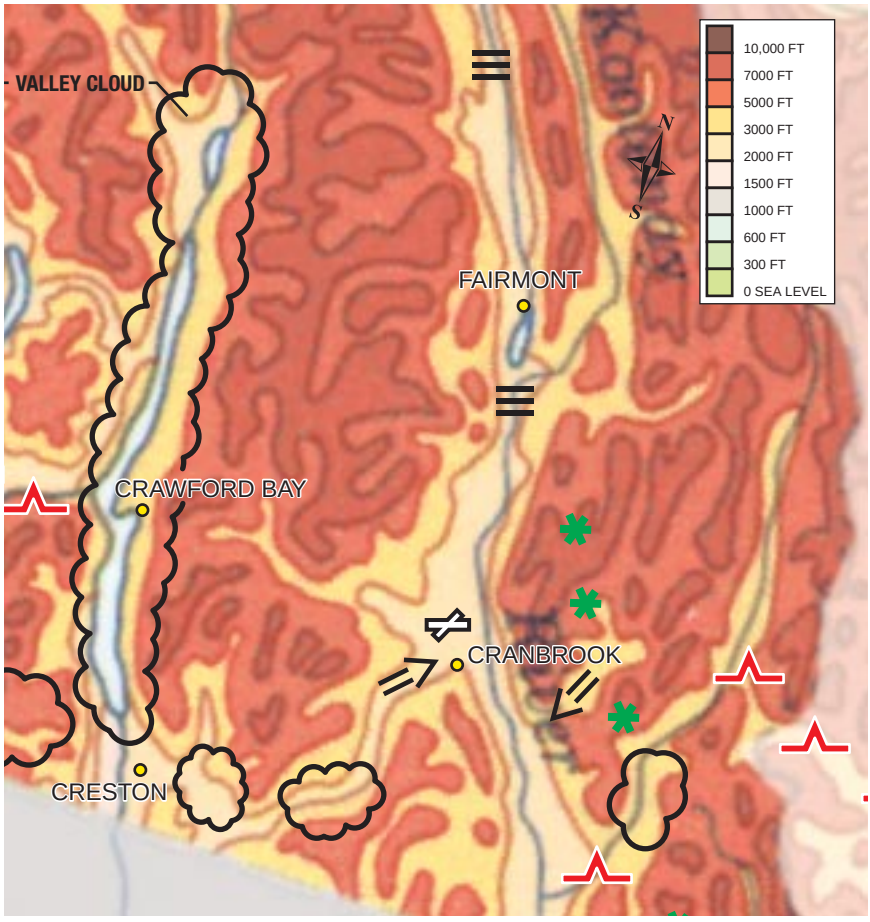
Though it is possible to fly from Kamloops into the Okanagan Valley without climbing out of the valleys, it is a much longer route to do so. It would involve following the South Thompson to Shuswap Lake and then turning south into the Okanagan Valley via Enderby and Armstrong. The more common and much shorter route involves climbing out of the South Thompson valley east of Kamloops at Monte Creek and following the highway through the valley passes of Westwold and Falkland. The area is generally dry but after precipitation low cloud will often remain in the upper valley passes longer than at Kamloops (the only local METAR). With strong winds at 3 and 6 thousand feet expect mechanical turbulence in the passes. It can also be quite turbulent at times in the wide part of the valley just east of Kamloops.

The Sushwap Lake area is a junction for pilots transitioning from the east-west routes to and from Alberta via Kamloops and Golden and the north-south Okanagan route. The base of the valley cloud that extends out of the Okanagan and across the Shuswap area is usually at the same height, except for an area around Enderby/Armstrong and southern Kalamalka Lake, where ceilings can be considerably lower. As you approach Shuswap Lake, low cloud develops as the moisture increases. This is quite common from October to mid-March. It is also worth noting that the arms of Shuswap Lake freeze over but the deep central part usually remains open.

The airport at Salmon Arm is 600 feet higher than Shuswap Lake and can make approaches difficult during times of prolonged low valley cloud.

During the summer months, thunderstorms tend to intensify near Shuswap Lake, and many feel that the lightning capital of BC is the area just east of the lake.

Kootenays and Columbias



Map 4-24 - Kootenays and Columbias

The Kootenays and Columbias consist of the eastern and southeastern sections of the southern half of the province. Being mountainous, with most of the valleys running in a north to south direction, the weather of this area is essentially a wetter, colder version of the Southwest Interior. It is wetter because of the terrain that gradually increases in height from the west until it reaches the crest of the Rockies. Any system that crosses the Coast Mountains on an eastward track will undergo further upslope lift in this area, resulting in additional precipitation. It is colder because of the Arctic air that can seep through the mountain passes from Alberta.

(a) Summer

The weather during the summer is essentially benign. Frontal systems that do move into the Southern Interior and continue eastward will begin to respond to the effects

of upslope lift. As it does, the cloud band will thicken and the precipitation becomes heavier and more widespread along the upslope areas. For the most part, the rainfall is persistent but generally light. However, when a cold low moves across the area local accumulations may reach 50 to 80 millimetres.

The majority of precipitation over this area during the summer is convective. For the most part, the mountainous terrain hinders the development of severe thunderstorms. Instead, airmass and nocturnal thunderstorms develop and move along the valleys. Severe convective weather is most often the result of storms moving northeastward out of Washington and Idaho. Even these storms usually produce severe lightning, large hail and downburst winds. Only one tornado, near Cranbrook in 2001, has ever been verified. While thunderstorms can occur at anytime during the spring and summer, the main period is from June to August.

(b) Winter

The most difficult weather in this area occurs in the winter months. Frontal systems are stronger and wetter resulting in widespread cloudiness and precipitation. For the most part, the precipitation will fall as snow resulting in extensive low ceilings and visibility. Accumulations are usually light in comparison to the coast. One notable exception is along the Monashee and Columbia mountains, between Revelstoke and Blue River, where upslope lift often produces significant accumulations.

Areas of high pressure have a lesser impact because of the widespread valley cloud. Cold air stagnating in the bottom of valleys causes a strong low level inversion to form that traps any moisture from local sources. This moisture eventually forms cloud which, despite being only a few thousand feet thick, fills entire valley systems and can persist for weeks. This cloud will only produce light snow in areas where the moisture supply has been increased. Valley cloud will only move if strong winds develop in the valley or it will dissipate if the major moisture sources freeze over. Since the larger lakes and rivers seldom freeze over completely, most valleys remain susceptible to the development of valley cloud from November to mid-February.

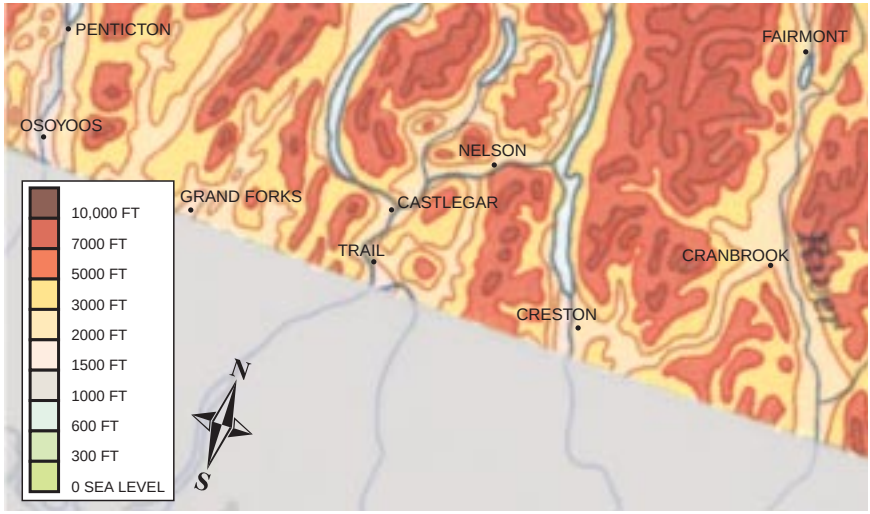
Incursions of arctic air from the north and east are fairly common during the winter. A strong area of high pressure forms in the very cold air over Alaska, the Yukon and the northern end of the Mackenzie River valley. This cold arctic air moves southeastward into the Prairies but can also spread over northern and central British Columbia. Most often, the Arctic air pushes southward into the Central Interior before coming to rest. At the same time, the arctic air also flows through the mountain passes from Alberta and fills the Rocky Mountain Trench. Depending on the strength of the arctic front, winds can shift abruptly into the east with the passage of the front and be gusty for several hours. As the cold air deepens, it will gradually move southward until the entire area is covered. Castlegar is often the last place in the Southern Interior to feel the arctic air.

Arctic air offers little problems other than the temperature. Most of the valley cloud dissipates giving clear, cold days and nights. Over the bodies of water that have remained unfrozen, sea smoke will form over the water and lift to form cumulus clouds. These clouds, if there is a significant difference between the air temperature and the water temperature, will be turbulent, contain significant icing and produce local snow showers. Other than this, good flying conditions will prevail except for some localized problems with stratus.

(c) Local Effects

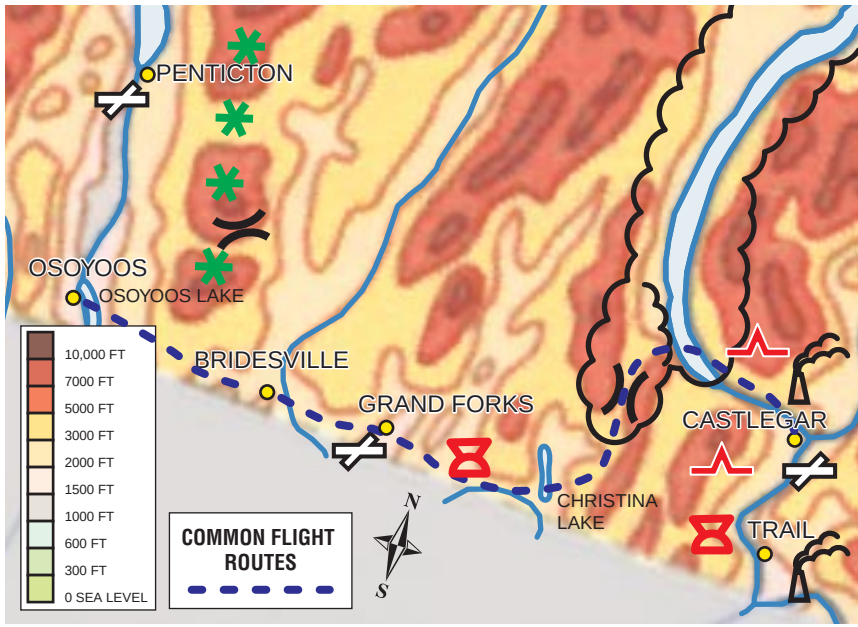
Aircraft movement in British Columbia, unless the weather is very good (clear or high ceilings), tends to be a matter of flying established routes. There is a major route to the north, (Salmon Arm to Revelstoke and Golden), and a southern route from Osoyoos to Cranbrook and eastwards. Aircraft usually change from one to the other using the Okanagan Valley and Rocky Mountain Trench. Finally, there is a well established route northwards along the Rocky Mountain Trench into the northern interior.

Southern Route – Osoyoos to Cranbrook and Eastwards



Map 4-25 - Southern Route – Osoyoos to Cranbrook and Eastwards

Osoyoos to Castlegar



Map 4-26 - Osoyoos to Castlegar

This route climbs out of the Okanagan Valley in a steep climb to the east from Osoyoos near Anarchist Mountain. The route has to clear the Bridesville Pass (5,000 feet ASL) to get to the Kettle Valley from Rock Creek to Midway. It then climbs again to almost 3,500 feet before dropping into the valley at Grand Forks. From there it follows Highway 3 past Christina Lake, rising another 2,000 feet through yet another upslope region with the usual increase in precipitation and cloud, before dropping into the Columbia River valley west of the Arrow Dam and Castlegar. Another option from Grand Forks, is to fly just south of the US border eastward to Northport, Washington and then north up the Columbia River to Trail and Castlegar. This is much drier and lower than the more northerly route.

This route is seldom a problem during the peak of summer except for thunderstorm activity. The area is hot and dry with little weather other than thunderstorms. These thunderstorms usually originate in Washington State and move northwards along the valleys during the afternoon and evening. Most dissipate by midnight but, on occasion, a few nocturnal thunderstorms will last into the early morning.

The rest of the year is another story. The combination of a narrow pass near Bridesville and low cloud can make this route treacherous. Upslope lift east of the Okanagan Valley and again just west of Grand Forks causes increased precipitation and cloud and, when applicable, aggravates convective build-ups. The high ground between Osoyoos and Grand Forks is a known snowbelt that extends in a north to

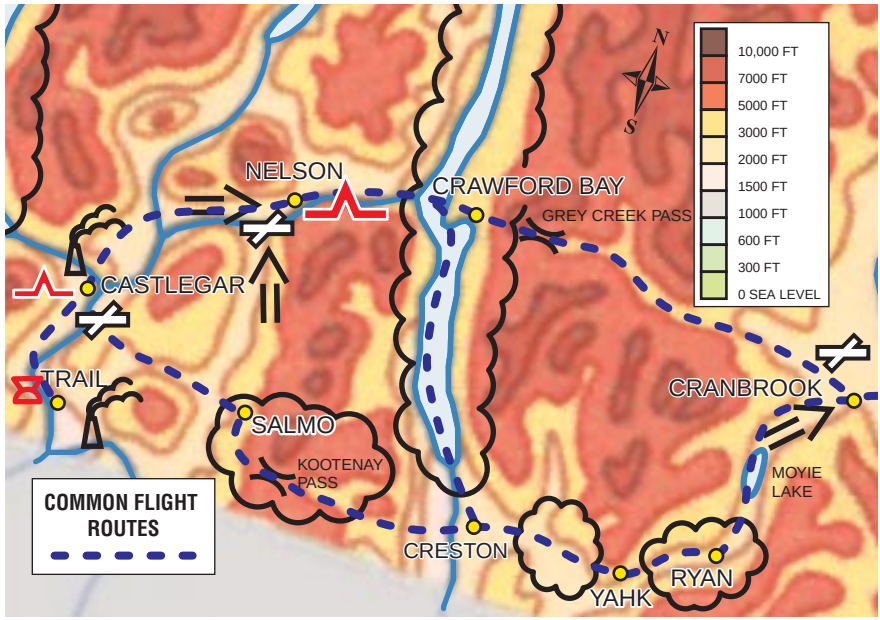
south line along the peaks. Generally, when conditions are marginal in Penticton, they are, or soon will be, worse at these points. The route from the Lower Arrow Lake to Christina Lake is very narrow and can also be blocked by low cloud. Movement through here is a matter of waiting for the openings. The more southerly route through Northport, is often a more viable option.

Once into the Columbia River Valley the main problem is the Castlegar area itself. The Arrow Dam where the Columbia River valley narrows is a known area of turbulence in strong winds. There are also the pulp mill, 5 miles west of town and the Cominco Smelter, 10 miles south at Trail, which add condensation nuclei, aggravating the fog and low cloud problems in and around Castlegar. Usually, west of the Arrow Dam, ceilings and visibility improve.

The valley is very deep, with Castlegar below 2,000 feet ASL and peaks all around within 3 miles topped above 8,000 feet ASL. This combination makes Castlegar a prime candidate for valley inversion problems when the right conditions occur, and is also one of the last valleys to "scour out" the cold air after an arctic outbreak. Fortunately being so far south, arctic outbreaks don't commonly reach Castlegar.

Commercial traffic face special problems with Castlegar due to all the preceding factors. The terrain features mean that the valley can be open to VFR flight while closed to IFR. The approach minima range from around 3,000 feet for the GPS to the more common LOC/DME at about 3,400 feet. As ceilings often hover in this range and change rapidly, commercial pilots often refer to the airport as "Cancelgar". Being in the middle of an upslope area the Castlegar region is also susceptible to heavy icing, especially in the mid ranges (10,000 to 16,000 feet) thus affecting mostly inbound and outbound traffic or enroute traffic without oxygen equipment.

Castlegar to Cranbrook



Map 4-27 - Castlegar to Cranbrook

There are several routes that are used, depending on the weather of that particular day. The route from Castlegar to Creston along Highway 3 requires passing through a high mountain pass between Salmo and Creston, which makes this an unpopular route with most pilots. Weather along this route has forced a few emergency landings on the highway. In addition to low cloud, strong winds with wind shear are common.

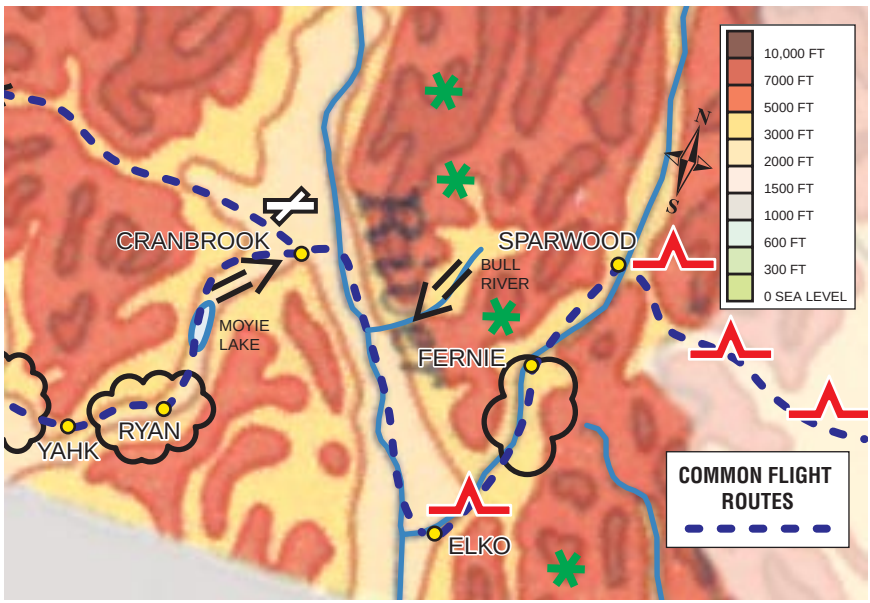
A second possible route from Castlegar to Creston is to go east past Nelson until you reach Crawford Bay and then turn south along Kootenay Lake. With all mountain routes clouds and winds can be a problem. Low-level winds can be strong in the Kootenay Bay area due to converging winds where the valleys come together. Winds here and at Nelson tend to be worse in a southwest flow. Nelson airport itself is known to have crosswinds on a regular basis. In general, weather is reported to be better east of Nelson than between Nelson and Castlegar. In fact, pilots have reported some of the worst icing ever seen north of the Castlegar Airport, over the Brilliant Beacon. This icing is typically between 10,000 and 16,000 feet ASL.

The trip from Creston to Cranbrook has its own problems. The Moyie River Valley between Yahk and Moyie Lake receives more precipitation than other areas, even during the summer. The corner near Yahk, on occasion, is turbulent and can distract pilots into taking the southern valley into the United States by mistake. There are two areas where low cloud tends to linger. These are between Moyie and Ryan and near

the junctions of Hwy. 3 and 95 and extending 5 miles to the west.

The third option involves going directly between Crawford Bay and Cranbrook, and this is the route preferred by many pilots travelling between Castlegar and Cranbrook. The highest point is Grey Creek Pass, approximately 5 miles east of Crawford Bay. In the pass itself, it is recommended that you follow the road rather than the power line. When travelling west to east after crossing the pass, the weather tends to improve along the rest of the route. To get through the pass, ceilings must be higher than 7,500 feet ASL. If the route closes behind you, there is no way out; you are committed to going east into the Trench. When travelling east to west, route finding is more difficult due to the many side valleys.

Cranbrook and eastwards through the Crowsnest Pass



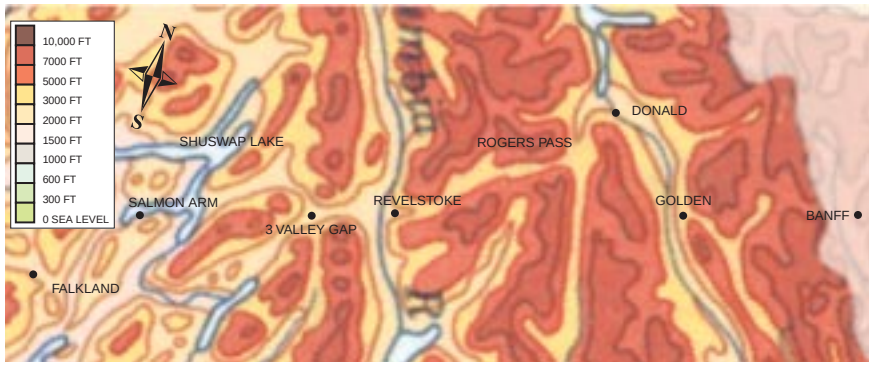
Map 4-28 - Cranbrook and eastwards through the Crowsnest Pass

At the Cranbrook airport itself, although winds are not very strong, the prevailing westerly wind is across the runway. Shear has also been reported as significant within 200 feet above the runway The route from Cranbrook follows the Rocky Mountain Trench south to the Elk River Valley, then turns northeast up the valley to Fernie, Sparwood and east. The weather at Cranbrook Airport tends to be representative of the weather along the Trench. However, low cloud is more common over the Kootenay River. If the weather is bad at the airport, the Trench is more than likely closed.

The route up the Elk Valley to Sparwood and on to Blairmore (in Alberta) is well known for its strong winds (up to 80 knots) and turbulence. Planes have been forced

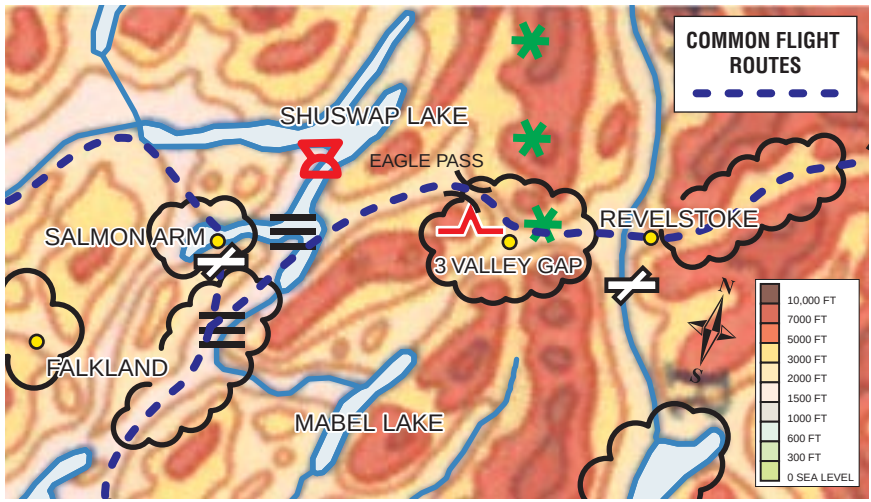
down near Blairmore by severe turbulence. Local pilots say, "A nice day in Blairmore is like winning the lottery." On most days, the north side of the valley is less turbulent than the south side. Drier weather is experienced along the Iron Creek from Fernie to Bull River. The pass between Fernie and Bull River is easy to see from just west of Fernie. If this pass is closed, then similar conditions likely exist along the highway to the south of Fernie. A heavy snowbelt runs along the Rockies from the Bull River to the Flathead River. Strong outflow winds are common out of the Bull River valley.

Northern Route – Salmon Arm to Banff



Map 4-29 - Northern Route – Salmon Arm to Banff

Salmon Arm to Revelstoke



Map 4-30 - Salmon Arm to Revelstoke

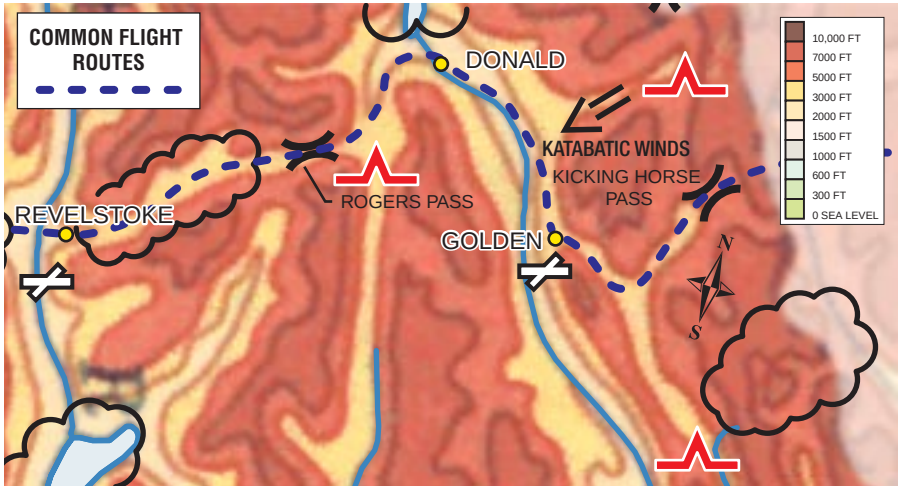
This route follows the Eagle River east through the Eagle Pass and then cuts through a north-south range of mountains at Three Valley Gap (note that these are

narrow gorges rather than high passes). At Three Valley Gap, the narrow confluence of valleys channels both wind and low cloud and is the usual problem point when conditions are marginal. When winds are strong pilots should assume that there will be significant mechanical turbulence in this area. The upslope lift encountered by weather system approaching from the southwest or west increases the instability and precipitation. This causes ceilings and visibility to be lower in the vicinity of Three Valley Gap than in Kamloops or Salmon Arm. If conditions are low in Salmon Arm, there is a strong chance you won't be able get past this chokepoint. However, when going the other way, if you can get out of Revelstoke, you can usually get to Salmon Arm.

Revelstoke sits in a deep valley with the airport beside a lake. The peaks in the vicinity rise from 8,500 to 10,000 feet above the valley floor. The Revelstoke area, including the valleys immediately to the east and west on this route, is very susceptible to low cloud and fog, especially in the mornings. The most common low visibility is in the flats near the airport. Some mornings, the entire region can be clear while fog closes both approaches to the Revelstoke Airport. Surface winds at Revelstoke can be very strong following an arctic front but, in general, are not usually a hazard to aviation. Note that, as is often the case in BC valleys, when combined with a sufficiently strong valley inversion, the low cloud can persist for much of the day.

At Revelstoke, it is possible to continue eastwards towards Golden or to turn northwards towards the Mica Dam. Of the two, the eastward route is the preferred. Mostly helicopters use the route from Revelstoke north to Mica Dam. The route is essentially two 700-foot steps with ceilings dropping as one travels north. Pilots must be aware that low cloud is common over open water, and beware of the power lines crossing the route several times north of Downie Creek.

Revelstoke to Golden to Banff



Map 4-31 - Revelstoke to Golden to Banff

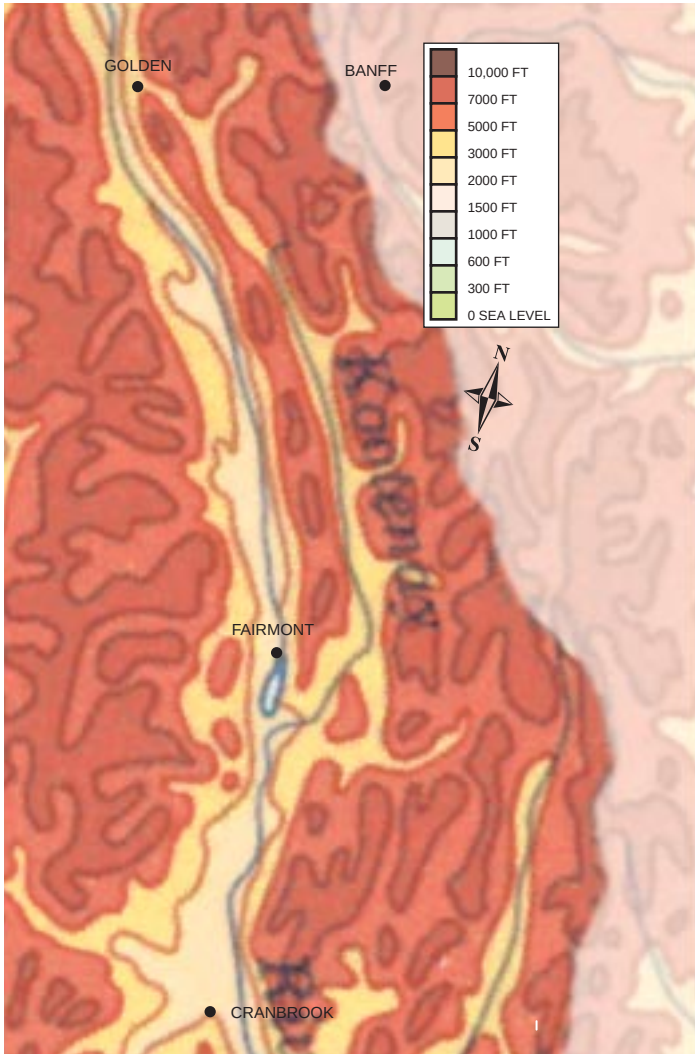
This part of the route climbs eastward through a highpoint at the Rogers Pass. It then drops into the Columbia River valley and Golden. From Golden it follows the Kicking Horse River to Field then climbs over the mountains at the Kicking Horse Pass to Banff in Alberta.

Although a relatively wide mountain pass, the Rogers Pass (elevation 4,534 feet ASL) has intimidated even experienced pilots. Low cloud tends to pile up west of the summit of Rogers Pass making passage difficult. The weather often looks good entering Rogers Pass from the east; however, getting to Rogers Pass summit does not assure passage to Revelstoke. Generally speaking ceilings at Revelstoke and Golden need to be at least 3,000 to 4,000 feet AGL for the likelihood of the pass being flyable. It is rarely open during times of precipitation and should not be attempted when conditions are deteriorating rapidly from the west (i.e. a front moving in).

The route from Golden to Banff crosses a major hydrological regime change over the Continental Divide. Generally from Lake Louise east is relatively drier. Differences in aviation weather along this route can be equally as dramatic. While winds are generally not a major concern between Golden and Kicking Horse Pass, local funnelled winds can provide some turbulence. The pass itself, at 5,350 feet ASL, is dominated on either side by peaks to over 11,000 feet. When the winds are strong, the worst turbulence, often moderate or greater, is usually found to the east of Banff, and can make an otherwise clear day unflyable. Even higher altitudes, say 10,000 to 16,000 feet ASL, often provide no refuge from the turbulence due to the frequency of lee wave activity. A pressure difference on either side of the Rockies usually indicates winds and associated turbulence in the pass and vicinity.

Photo 4-2 - Kicking Horse Pass

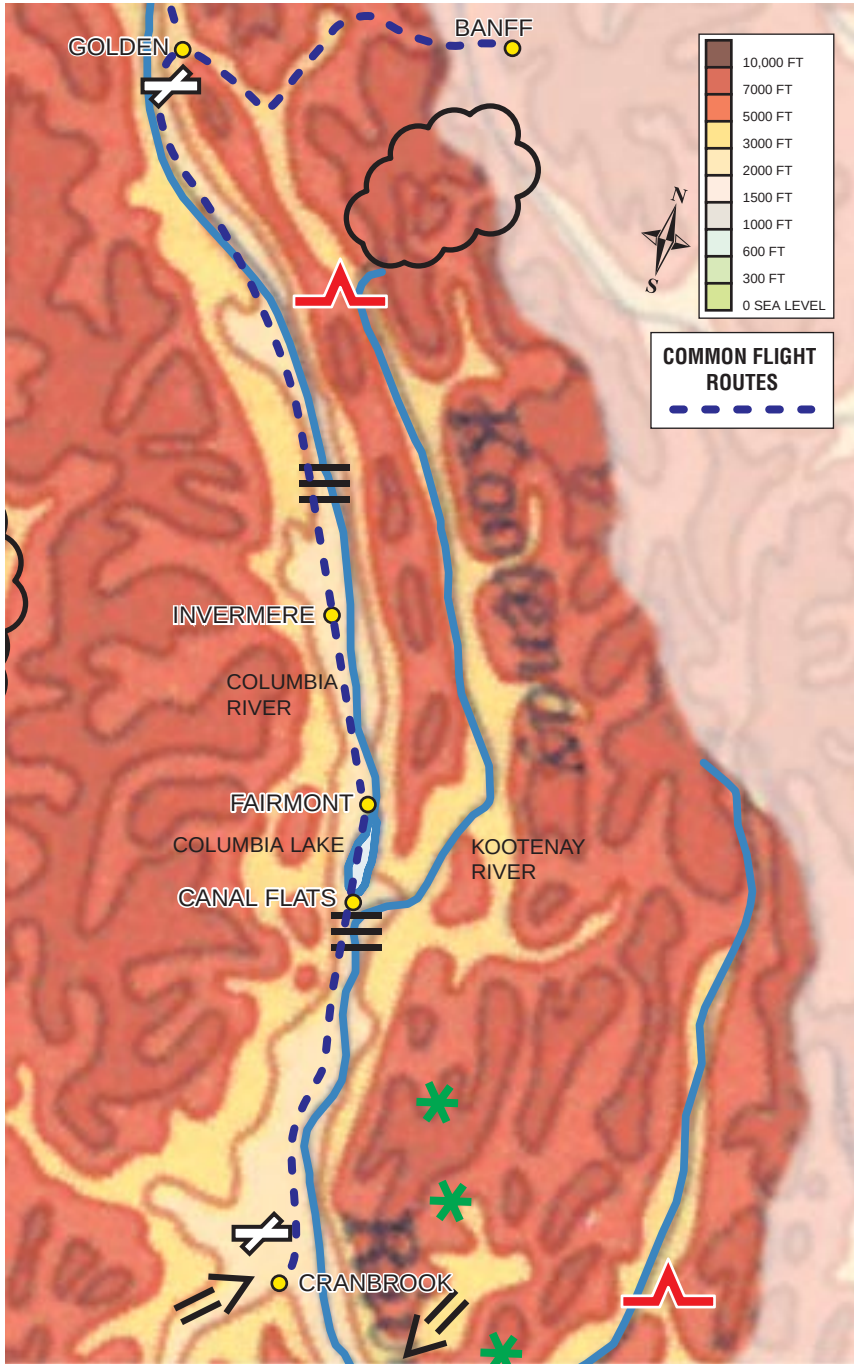
Rocky Mountain Trench



Map 4-32 - Rocky Mountain Trench

The southern portion of the Rocky Mountain Trench follows the Columbia River Valley northwest from the U.S. border past Cranbrook. From here the "Trench" continues past Golden to Kinbasket Lake (created by the Mica Dam). North of Kinbasket Lake, the Rocky Mountain Trench, holding true to its course, continues through Valemount, Mcbride and Mackenzie. From Mackenzie it forms the valley of the Williston Lake and continues northwestward eventually reaching Watson Lake and the Yukon.

Cranbrook to Golden



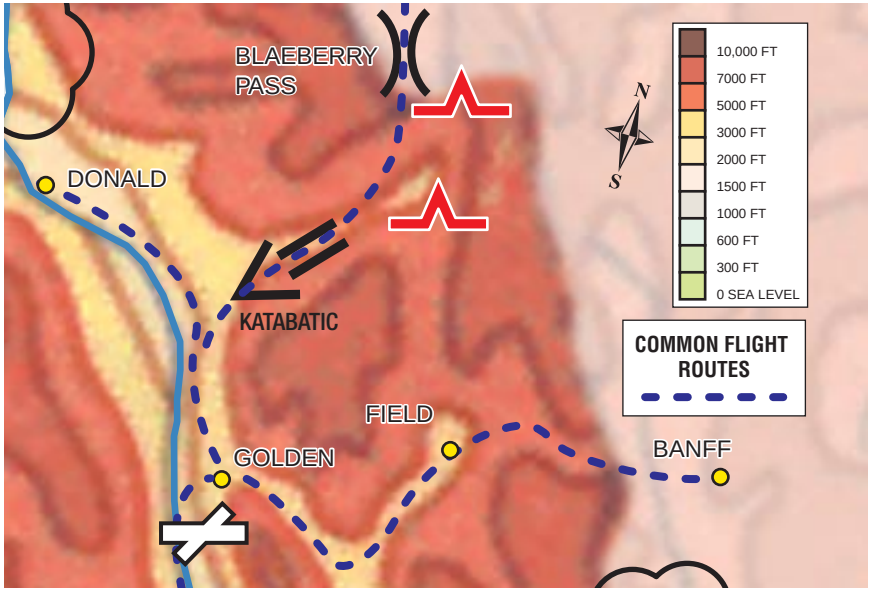
Map 4-33 - Cranbrook to Golden

This route follows the Columbia River valley northwest up the Rocky Mountain Trench to Golden. With the Purcell Mountains to the west and the Rocky Mountains to the east, this route may receive the best aviation weather in all of Western Canada. System weather tends to be lighter in the south and is generally weakened by subsidence. Weather-related hazards are few except for relatively frequent low cloud and fog near Parson. Radiation fog is common under clear skies in autumn although it generally burns off by 10 a.m. In winter, valley cloud between 4,000 and 6,000 feet ASL (ceilings from 1,200 to 2,000 feet) often closes higher routes and produces significant icing. In general when cloudy conditions do prevail, aircraft can encounter heavy icing conditions in the cloud east of Cranbrook and Golden in the upslope conditions of the western slopes of the Rocky Mountains.

Infrequent strong winds do not usually produce significant turbulence due to the wide, linear valley, except where valleys merge with the Trench from the side. With strong winds aloft (west to southwest), occasionally lee wave turbulence will affect flights into and out of Cranbrook.

Golden Airport is not usually representative of the weather along the Trench. It tends to be much drier than areas to the north and south, especially the north. The airport at Cranbrook is on a hill above the town and is often subject to crosswinds from the west. Note that if the weather is bad at Cranbrook it is likely as bad or worse in the Trench between Golden and Cranbrook.

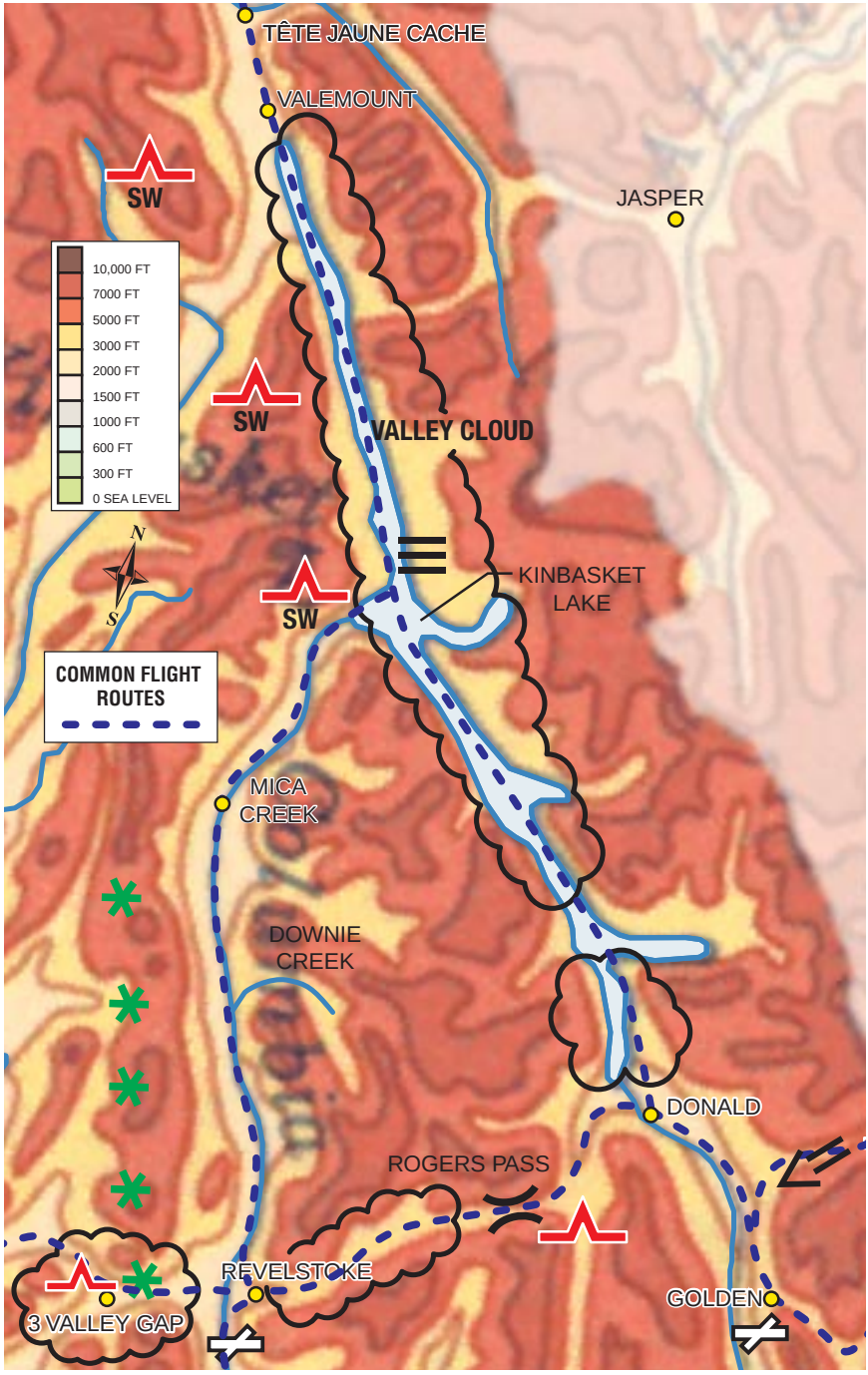
Blaeberry Pass, Golden to the North Saskatchewan Crossing



Map 4-34 - Blaeberry Pass, Golden to the North Saskatchewan Crossing

Another common route out of the Rocky Mountain Trench is Blaeberry Pass along the Blaeberry and Howse Rivers. Opening out of the Rocky Mountain Trench just north of Golden the Blaeberry Valley climbs to the Blaeberry Pass. The valley becomes very narrow and deep as it approaches the pass and has peaks on either side from 8 to 11 thousand feet high. East of the Blaeberry Pass the valley follows the Howse and then the North Saskatchewan Rivers. Beside the usual cloud problems associated with Rocky Mountain passes, this route has the potential for very hazardous wind and turbulence conditions. An extremely bad spot, even for helicopters, is at Mummery Creek. West of this location, winds and turbulence diminish rapidly except for extreme katabatic winds on sunny summer evenings. With the effects of channelling and rugged terrain on valley winds and the katabatic winds off the ice fields and glaciers, wind patterns can be very chaotic. The only way to avoid these conditions is to fly before 10am or after 5pm when surface winds are light or at much higher altitudes when ceilings allow it. Clearly this is not a recommended route for light, low performance aircraft if low level valley flying is involved.

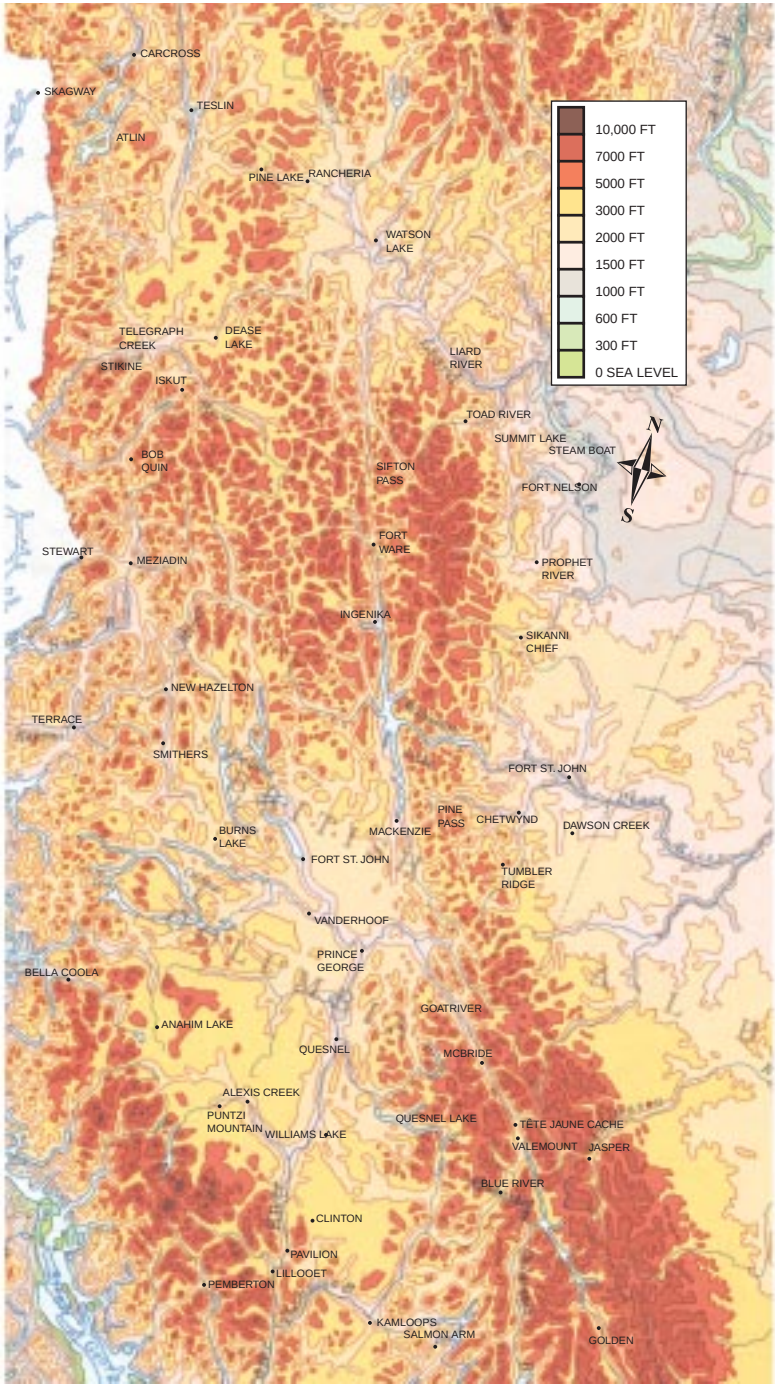
Golden - the Mica Dam – Tête Juane Cache - Jasper



Map 4-35 - Golden - the Mica Dam – Tête Juane Cache - Jasper

This route follows the Rocky Mountain Trench northwest to Tete Jaune Cache where is turns sharply east past Mount Robson and up the Fraser River headwaters to the Yellowhead Pass into Alberta. Although still in the relatively dry Rocky Mountain Trench, this section receives considerably worse weather than areas further south. Just north of Golden the main route along Blackwater Creek is higher than an alternate route which stays over the river and goes around Blackwater Mountain; however, in bad weather, experienced pilots recommend neither route. Winds along the Columbia River are almost always much stronger than those further south at Golden. The water usually freezes by mid winter, reducing the amount of fog and low cloud.

Central and Northern Interior



Map 4-36 - Central and Northern Interior

The Central and Northern Interior occupies the bulk of the BC Interior. The Central Interior is essentially the area from just north of an east to west line through Clinton to a rough east-west line through Mackenzie. The Northern Interior extends from that point to the Yukon border. Bounded to the west by the Coastal Mountains and to the east by the Rockies, the area has an extremely wide variation in climate between summer and winter. Summers tend to be pleasant while winters can range from seasonably cold to outright frigid.

(a) Summer

Like the rest of BC, summer is the benign season where the weather is strongly influenced by the position of the main storm track. During the early part of summer and in the fall, the storm track tends to lie over the Central Interior. This exposes this area to the travelling frontal systems sweeping across the area giving frequent cloudiness and precipitation.

In the middle of summer, low pressure areas usually remain offshore as the Pacific High strengthens and moves further north. This northward shift causes the main storm track to shift into the northern Gulf of Alaska and across northern British Columbia, or even into the Yukon. South of this track, minor frontal systems, upper troughs and thunderstorms produce most of the weather. In August and September, weeks can pass between weather systems.

In the Central Interior of British Columbia and the northern section of British Columbia, the plateau type terrain allows the thunderstorms to reach full intensity. While air mass thunderstorms still remain the predominate type, frontal thunderstorms and nocturnal thunderstorms are common. The typical scenario would see the beginning of thunderstorm activity early in the afternoon and for it to dissipate in the evening. Most often the thunderstorms move towards the northeast and, given the right conditions, their intensity can reach the severe level. Within BC, it is the area around Prince George that has the potential each year to produce tornadoes. The normal thunderstorm season for both areas is June to August.

(b) Winter

As Pacific frontal systems move inland, they do not weaken as much as they do in the south. This is simply because the Coast Mountains are not as high at these latitudes. As such, steady precipitation is to be expected whose type will vary with the local temperatures. Accumulations are usually light, however, local accumulation can be larger especially near the Arctic front.

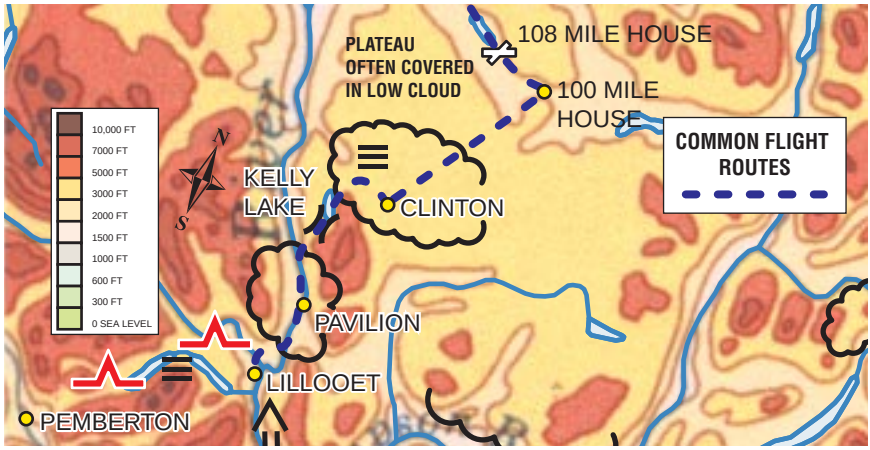
The northern half of British Columbia is subject to widespread valley cloud only during the early part of the season, as the lakes and rivers generally freeze over completely. Thus, ridges of high pressure during mid and late winter bring widespread clear, cold weather.

During winter, a strong area of high pressure forms in the very cold air over Alaska, the Yukon and the northern end of the Mackenzie River valley. This cold arctic air moves southeastward into the Prairies but can also spread over northern and central British Columbia. Most often, the arctic air pushes southward into the Central Interior before coming to rest somewhere near Clinton. At the same time, arctic air also flows through the mountain passes from Alberta and fills the Rocky Mountain Trench. Depending on the strength of the arctic front, winds can shift abruptly into the northwest to northeast with the passage of the front and be gusty for several hours

Arctic air over the interior offers little problem, other than the temperature. Most of the valley cloud dissipates, giving clear cold days and nights. Over the bodies of water that have remained unfrozen, such as Williston Lake, sea smoke will form over the water and lift to form cumulus clouds. These clouds, if there is a significant difference between the air temperature and the water temperature, will be turbulent, contain icing and produce local snow showers. Other than this, good conditions will prevail except for some localized problems with ice fog.

(c) Local Effects

Lillooet - Pavilion - Clinton

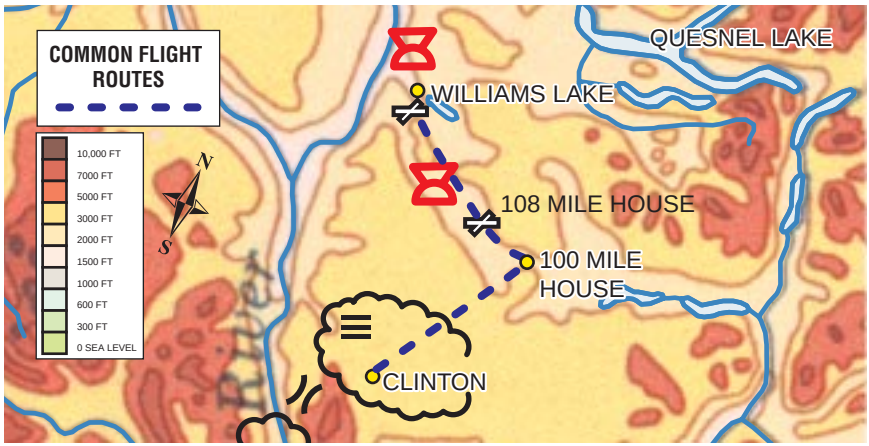


Map 4-37 - Lillooet - Pavilion - Clinton

This is the continuation of the route from the south coast via Howe Sound, Whistler and Pemberton. At Clinton it meets the route which runs north from Cache Creek to Williams Lake. From Pemberton it follows the valley along Anderson and Seton Lakes to Lillooet. It then follows the Fraser River to Pavilion before turning northeastward to climb onto the Interior Plateau at Kelly Lake and on to Clinton.

Low cloud and fog are usually concentrated over the plateau while the lower elevations, such as along the Fraser River Valley, are often below the cloud deck. If the ceiling is too low to get through Pavilion, it is likely the same at Kelly Lake.

Clinton to Williams Lake



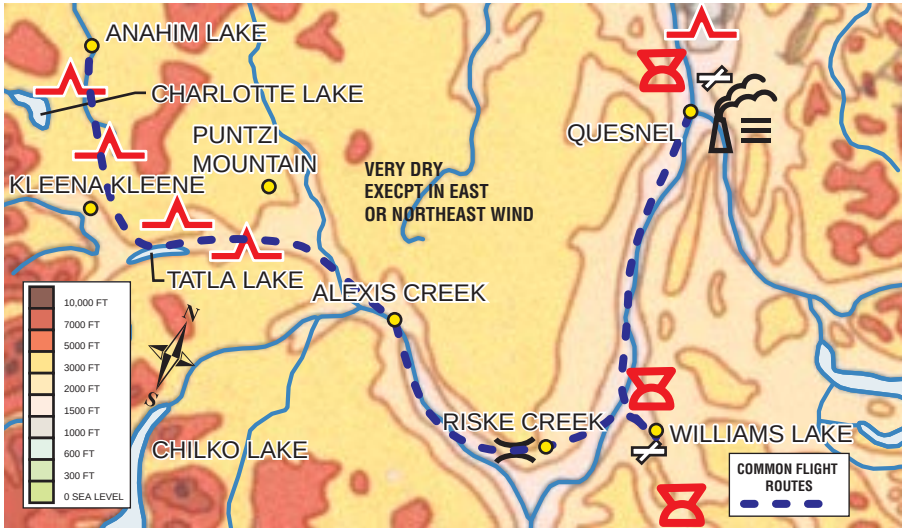
Map 4-38 - Clinton to Williams Lake

This route rises gradually on the Interior Plateau to 100 Mile House. North of 108 Mile Airport it follows a valley again from Lac La Hache to Williams Lake where it rejoins the Fraser River.

Anywhere in the central and northern regions of the province winter weather is greatly influenced by the position of the Arctic Front. During the winter months it will generally be somewhere along this route or just north. Where the Arctic Front combines with a moisture source either on the ground or aloft in the form of frontal activity, expect flurries and low visibilities.

Low cloud develops in the rising ground just south of Clinton and usually extends across the Central Plateau. Conditions along the route between 100 Mile House and Williams Lake tend to be uniform, although ceilings lower as the terrain rises when heading southeast. Ceilings are much lower over the higher ground while fog is more prevalent in the valley.

Williams Lake - Alexis Creek – Puntzi Mountain – Anahim Lake



Map 4-39 - Williams Lake - Alexis Creek – Puntzi Mountain – Anahim Lake

As an alternative route to the coast through the Coastal Mountains, this route crosses the Interior Plateau westward from Williams Lake. Leaving Williams Lake the route runs south before crossing the Fraser River to climb over a highpoint west of Riske Creek at almost 4,000 feet ASL. It then weaves its way west over the high plateau, following the Chilcotin and Chilanko Rivers just south of Puntzi Mountain to Tatla Lake. Then turning more northwest, it crosses the plateau to Nimpo and Anahim Lakes.

Generally, weather systems give more precipitation east of the Fraser River. However, low cloud and fog are common to both areas in the fall and early winter before freeze-up and again during spring melt, especially at the lower elevations. This is also true for the section from Alexis Creek to Puntzi Mountain, especially near the larger lakes until they freeze over. However, low cloud can occur with a moist easterly circulation at any time of year. In this more western section the fog and low cloud are more likely to burn off by late morning.

Over the eastern section of the Interior Plateau, light to moderate turbulence usually occurs during the afternoon in the summer season due to convective heating. Thunderstorms are more frequent, especially in the vicinity and east of the Fraser River. West of the Fraser River, cells are generally smaller and in the developmental stage.

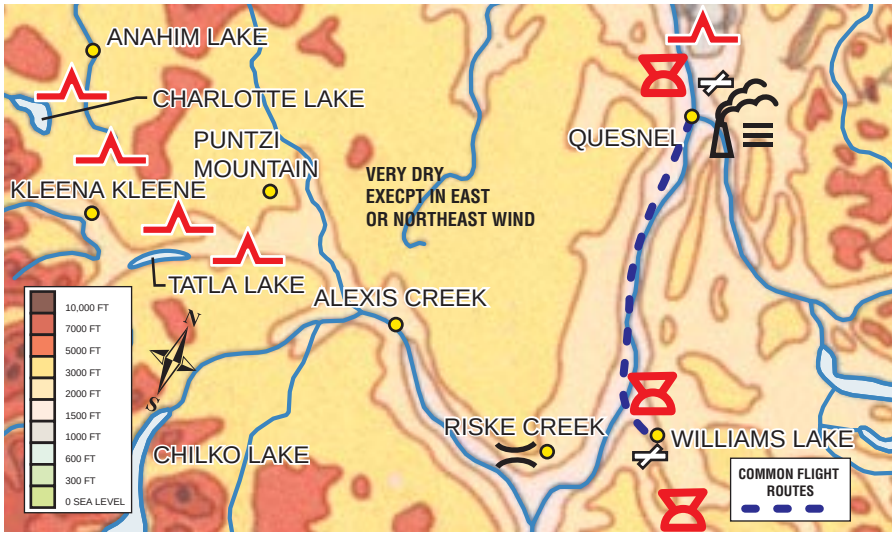
Lying immediately to the lee of the Coast Mountains, the region between Puntzi Mountain and Anahim Lake is dry belt country. In the winter severe lee wave turbulence to the east of the Coast Mountains is common with very strong westerly or

southwesterly winds aloft. This lee area includes the entire stretch of lakes from Chilko and Tatla in the south, to Nimpo and Anahim in the north. In most cases it is impractical to climb above this turbulence, as it would necessitate ascending to nearly 15,000 feet ASL. Experienced pilots suggest that it is best to stick close to the sides of the valleys.

Anahim Lake to the Coast

See data for this route as described in a previous section under "Central Coast to the Interior Plateau".

Williams Lake to Quesnel



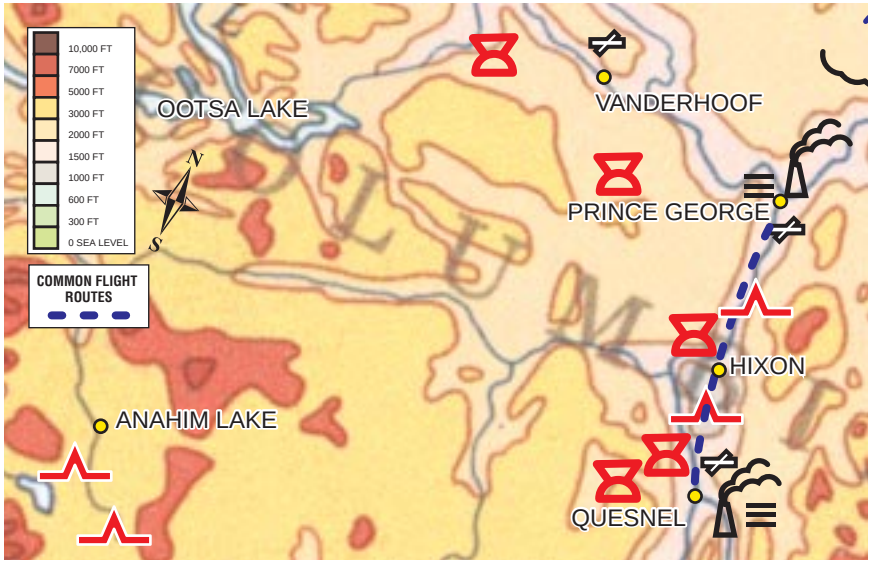
Map 4-40 - Williams Lake to Quesnel

The Fraser River valley from Williams Lake to Quesnel is relatively broad and the grade is gradual. For most of the year, aircraft operations are not hindered excessively by the weather. There is a notable exception during the winter. Whenever the arctic front oscillates back and forth through the area, the front is accompanied by freezing drizzle, low cloud, poor visibility in snow, fog and wind shear. The Cariboo-Central Interior is not prone to winds. However, the Fraser River Valley can be windy, particularly southerly winds, which can exceed 40 knots at low levels, in autumn and winter. Although they are strong and generate high wind shear values, these winds do not generally produce significant turbulence in the Valley.

Fog that fills the valley between Williams Lake and Quesnel is often below the much higher altitude Williams Lake Airport. However, it must be recognized that, in cases of extensive low cloud, the valley may be suitable for VFR flying while the Williams Lake Airport is closed due to low ceilings.

Flight routes east into the valleys of the Cariboo Mountains are common, especially during the summer months. Weather systems impact somewhat harder in these areas, with lower ceilings and visibility. This area is well known for its summer thunderstorm activity with the accompanying gusty winds and turbulence.

Quesnel to Prince George



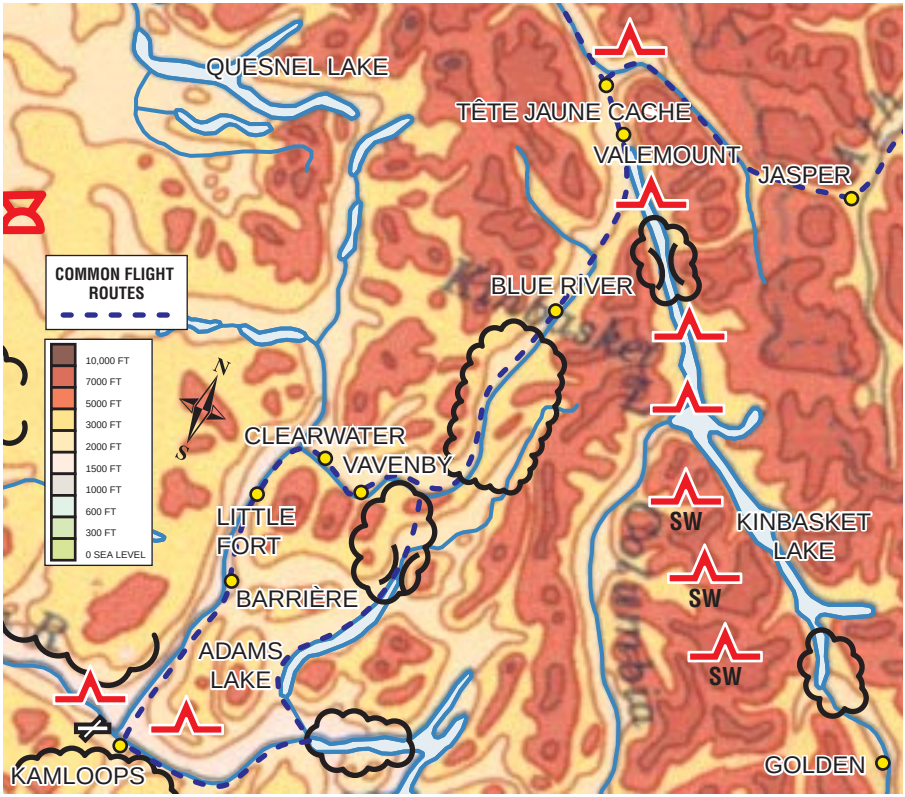
Map 4-41 - Quesnel to Prince George

Fog is relatively common along the valley, especially near Prince George and Quesnel, due to the mills located just north of the Prince George Airport and just south of the Quesnel Airport. Some days, the fog will extend only a few miles from the airports with clear conditions elsewhere. The emissions from the mill stacks often give a visual representation of the low-level vertical wind pattern.

Turbulence is not usually strong along this route, except near Trapping Lake up to 8,000 or 9,000 feet ASL. In summer, convective cloud is most common in a north to south band through Hixon.

The most significant hazard around the Prince George Airport is low cloud and fog, enhanced by the moisture along the rivers as well as the pulp mills north of the airport. Even on a clear day, fog associated with the mills can obscure the approach to runway 15. In this case, the southern approach to runway 33 is generally better. Strongest winds at the airport tend to be from the south. Light northerly winds at the surface often occur in conjunction with strong southerly winds aloft, say at 800 feet. The loss of airspeed on takeoff can cause small aircraft to drop into the river valley, near the bluffs on the north side of the river. This is most significant under morning inversions.

Kamloops –Vavenby – Blue River – Tête Jaune Cache



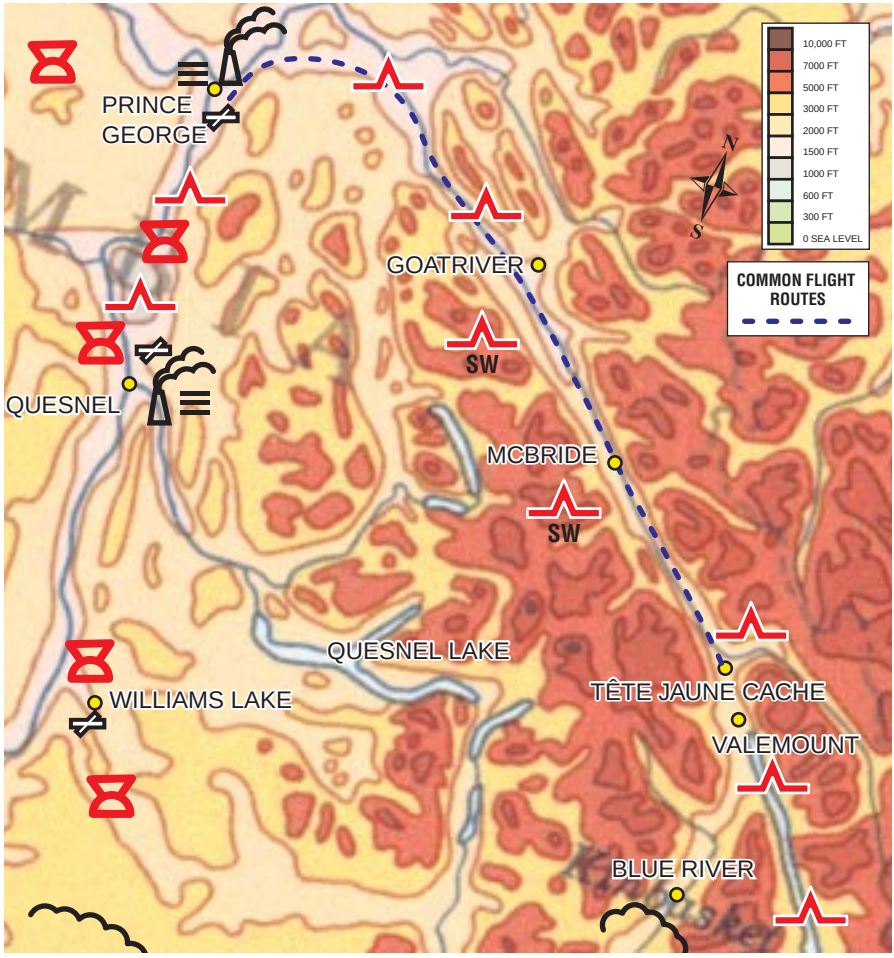
Map 4-42 - Kamloops –Vavenby – Blue River – Tête Jaune Cache

Two routes are commonly used between Kamloops and Vavenby. The first follows Highway 5 up the North Thompson River through Barrière and Clearwater to Vavenby. The second follows the South Thompson River east from Kamloops to Little Shuswap Lake and then turns north up the Adams Lake and River. North of Adams Lake it traverses a narrow pass to emerge into the North Thompson River valley just east of Vavenby. Once north of Vavenby the route follows the North Thompson River past Blue River. The long narrow valley climbs gradually to cross a north/south divide just south of Valemount, where it turns northwest up the Rocky Mountain Trench to Tete Jaune Cache. Here it meets the east-west route which links north central BC with Alberta via Prince George and Jasper, basically following Hwy 16, the Yellowhead Highway.

Both routes from Kamloops to Vavenby can see some low cloud especially during and after precipitation. Just to the north of Adams Lake, the combination of low cloud over rising ground and narrow passes can be quite hazardous. Depending on the moisture and the time of year, ceilings can be right down onto the lake. It should be noted that Adams Lake remains open all year.

North of Blue River tends to be somewhat drier. It should be noted that the Blue River weather observation does not usually report the low cloud that forms over the rising ground just to the south. Note that mountain peaks on both sides of the valley are between 5 and 6 thousand feet south of Blue River while those along the narrow valley to Tete Jaune Cache, are in the range of 8 to 10 thousand feet. North of Blue River, strong winds aloft (6 to 12 thousand feet) out of the west or southwest can cause considerable turbulence in the valley.

Tete Jaune Cache - Mcbride - Prince George



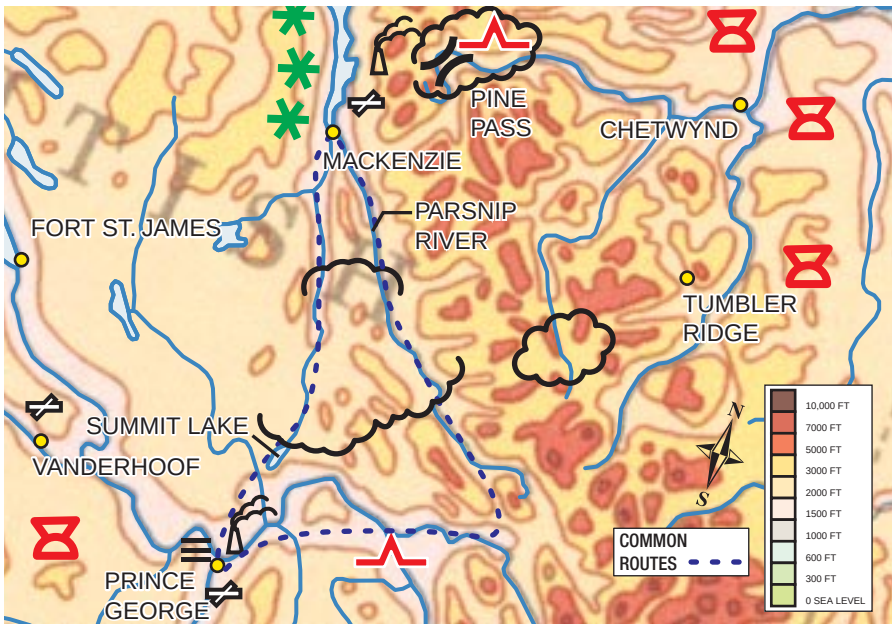
Map 4-43 - Blue River – Valemount - Tete Jaune Cache – Goat River – Prince George

The Rocky Mountain Trench creates a natural route from Tete Jaune Cache to the northwest. The route follows the Fraser River up the Trench to a point about 30 miles east of Prince George then turns west directly to the airport.

Summer convective cloud is common along both sides of the Trench over the higher ground. Severe turbulence often results when strong winds aloft cross the mountains from the southwest. This turbulence does not generally extend above the terrain height, 6,000 to 8,000 feet. Severe turbulence is normal on summer afternoons over the glaciers to the northeast.

In winter low cloud and precipitation move through with frontal disturbances, drying slowly behind them. As is usual in the north, the position of the Arctic Front is pivotal, as there are commonly flurries where there is any moisture along the front and it tends to be colder and drier to the north of the front.

Prince George to Mackenzie



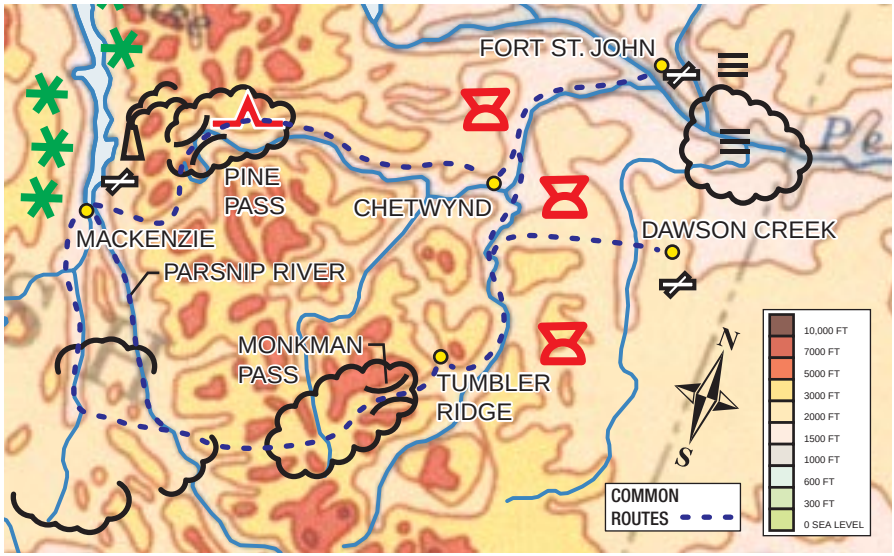
Map 4-44 - Prince George to Mackenzie

Following Highway 97 north, this route passes Summit Lake and continues up the Rocky Mountain Trench to McLeod Lake and Mackenzie. An alternate route leaves Prince George and follows the Fraser River to the north-northeast and then over the hills to enter the Parsnip River Valley. This valley runs parallel and just to the east of the first route, merging with it at Mackenzie.

Low cloud and fog are often encountered near Summit Lake, especially in the fall and spring. Poor conditions will at times extend as far as McLeod Lake. Winds and turbulence are generally light along this route. Low cloud and fog are commonly encountered along the Parsnip River Valley, especially in the fall and spring and often in association with frontal precipitation.

Pilots will sometimes follow the Parsnip River Valley south from Mackenzie, then east along the Fraser River into Prince George.

Crossing the Rockies: Mackenzie to Dawson Creek/Fort St. John



Map 4-45 - Crossing the Rockies Mackenzie to Dawson Creek/Fort St. John

There are two main routes across the Rockies at this point. There is a southern route via Tumbler Ridge and the more direct route via the Pine Pass and Chetwynd following Highway 97. This route climbs the upslope side of the Rocky Mountains to the narrow Pine Pass. It then follows the Pine River out of the mountains onto the plains near Chetwynd. The worst section along this route is near Pine Pass where low cloud, turbulence and very heavy snow are common. The Powder King Ski Hill near Pine Pass receives approximately 1,200 centimetres of snow each winter. This heavy snow occurs in a band from Pine Pass to McLeod Lake. In summer, the Pine Pass area is also prone to thunderstorm activity. As with other locations just east of the Rockies, lee wave turbulence is to be expected in the Chetwynd area when there is a strong southwesterly flow aloft

Thunderstorms often form along the foothills in summer months along a line just east of Chetwynd. These convective lines tend to remain relatively stationary while developing in the early afternoon, then tend to begin to move in the direction of the upper level (approximately FL180) winds late in the day.

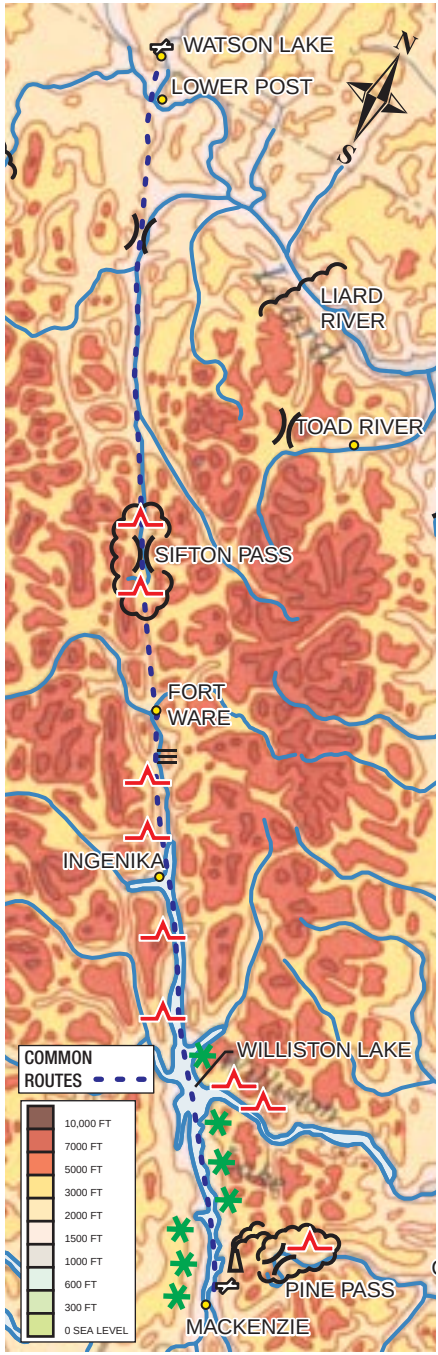
When flying via Tumbler Ridge, most pilots choose to take the route along the Murray River and the Monkman Pass. Between Tumbler Ridge and points southeast, a route via the McGregor River to Monkman Pass (Monkman Lake), then along the Murray River, is utilised. There are, however, several dangerous canyons that can be

mistaken for the main route. When using this route, look for strong turbulence near Monkman Pass. The onset of turbulence can be very abrupt when approaching from the east.

The Murray River and Monkman Pass area generally experiences drier and calmer weather than Pine Pass, throughout the year.

Turbulence in this region is worst in north to south oriented valleys, when the winds are blowing across the mountains from west to east. These winds tend to be strongest in spring and autumn, with associated mechanical turbulence usually below 1,000 feet AGL.

Mackenzie to Watson Lake along the Rocky Mountain Trench



Map 4-46 - Mackenzie to Watson Lake along the Rocky Mountain Trench

Mackenzie lies at the south end of Williston Lake, a long narrow body of water which fills this section of the Rocky Mountain Trench. North of Williston Lake, the terrain begins to rise and the valley narrows. The Trench continues in a near straight line to the northwest past Fort Ware, over the Sifton Pass and on, eventually descending and widening into the basin of Watson Lake.

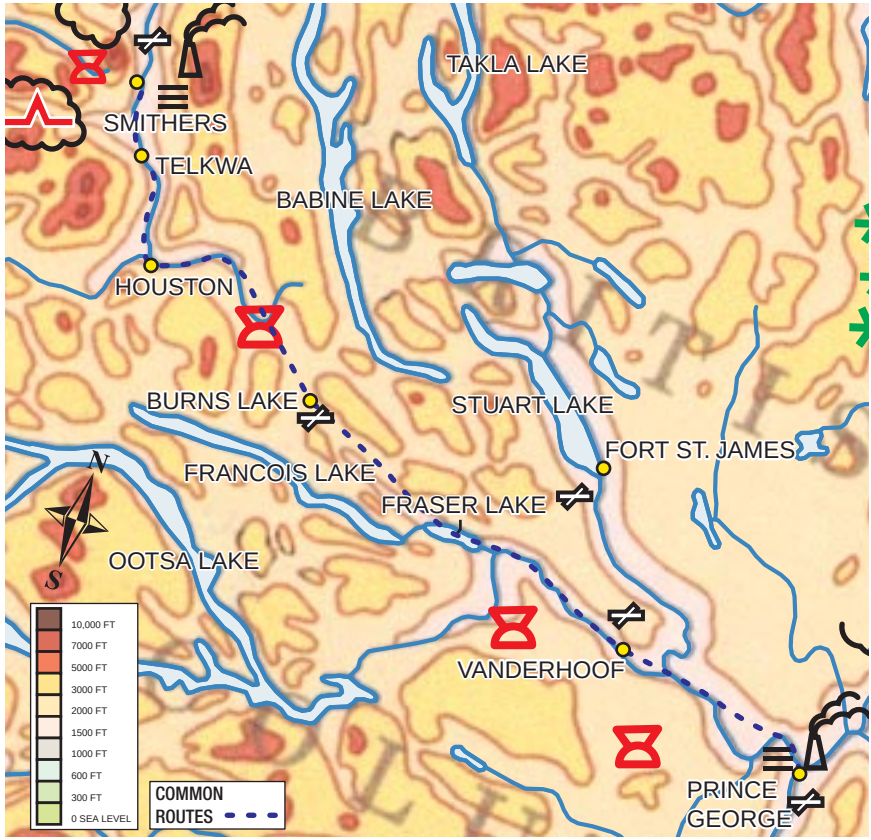
Mackenzie, and the high ground to the east and west of Mackenzie, is located in one of the snow belts of the interior of BC. Smoke from the mills near the Mackenzie Airport can induce the formation of low cloud in the area. Likewise, low cloud and fog are prevalent near and over Williston Lake, particularly from late summer to early winter. Between the north end of Williston Lake and Fort Ware, fog is common in summer and autumn, especially near Finbow. This section, north of Williston Lake, has a higher frequency of low cloud, and the Sifton Pass area, reputedly the worst spot along the Trench, is frequently reported by pilots to be turbulent or have cloud down to the treetops.

Lee wave activity and subsiding air currents are common along the west side of the Trench, due to airflow off the high ground into the valley. The east side can be better, but turbulence can be severe particularly about mid way up Williston Lake, around the entrance and into the Peace and Ospika Arms.

North of the Sifton Pass, southbound pilots must exercise caution not to mistake the Gataga River Valley, which angles off to the southeast, for the Trench. Similarly, northbound pilots often mistake the Kechika River for the more westerly route to Watson Lake.

Though this is a long stretch of territory there are only weather observations available at each end: the one from the automatic weather station at Mackenzie and that from Watson Lake.

Prince George to Smithers



Map 4-47 - Prince George to Smithers

This route follows Highway 16 from Prince George to Vanderhoof, then on through Fraser Lake, Burns Lake, Houston, and the town of Telkwa to Smithers.

Being east of the coastal mountain range, this route is in the generally drier inland climate region. The lakes are at the lowest points, especially Burns Lake, which sits in a bowl relative to the higher ground all around it. As a result cold air pools there and it is always one of the coldest spots in the region. It freezes over early in the winter and is subject to fog.

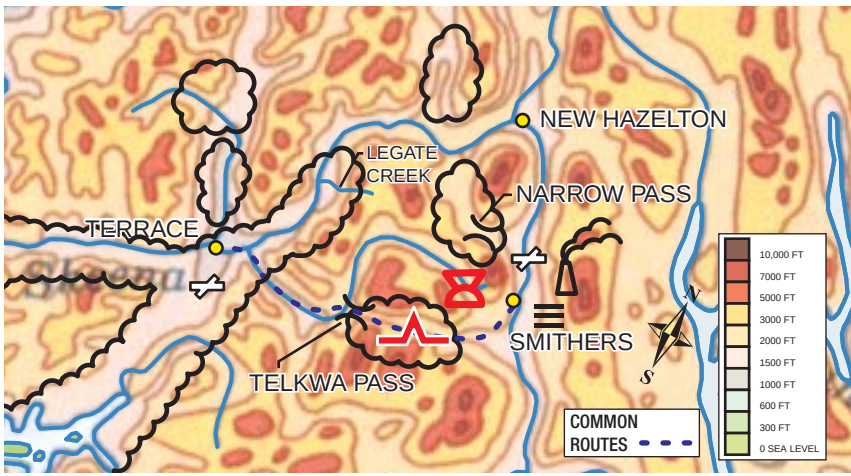
This route is fairly dry in the summer, especially between Burns Lake and Smithers. That being said, some of the strongest convection in the BC Interior can be found between Prince George and Burns Lake. Large thunderstorms with strong winds and hail occur, with the occasional report of a funnel cloud or tornado.

Areas of low cloud and fog are a common occurrence along the route between Fraser Lake and Bulkley Lake, during the fall and spring. Strong westerly winds will

often result in turbulence between Telkwa and Smithers. In addition, gusty westerly crosswinds often make landings tricky at Burns Lake.

Weather can change very quickly as cloud invades through the valley at Telkwa. Precipitation and westerly winds are more frequent at Telkwa and over the town than at the Smithers Airport. Due to the river just south of the field, fog often lingers, at times almost randomly drifting across the airport. Fog also forms over the small lake to the west and can drift over the airport

Smithers to Terrace via Telkwa Pass



Map 4-48 - Smithers to Terrace via Telkwa Pass

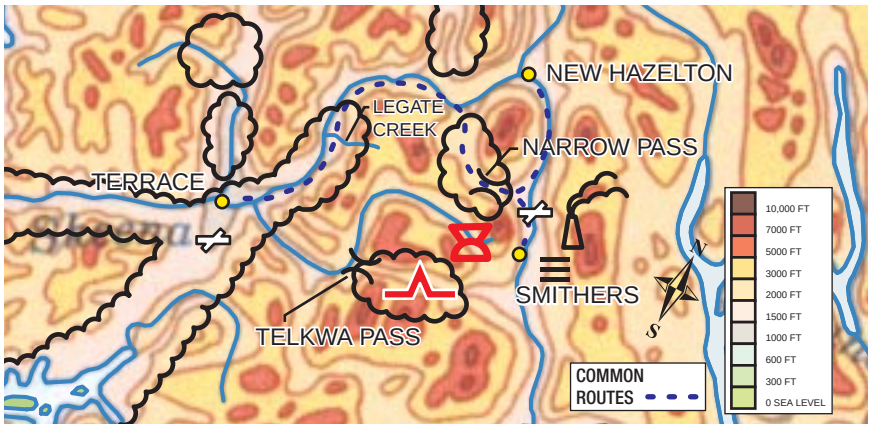
The Telkwa Pass route is the most direct route between Smithers and Terrace. Westbound it starts just south of Smithers and follows the Telkwa River up to the spectacular Telkwa Pass and then follows the Zymoetz or Copper River to where it joins the Skeena just east of Terrace.

The route through Telkwa pass is another of BC's masterpieces during good weather, with hanging glaciers on both sides of the valley. At the pass the valley floor rises to almost 3,000 feet ASL. The peaks on either side of the pass range from 8,000 to 8,500 feet and are part of the north-south range which separates the wetter coastal region from the drier interior region.

When westbound through the Telkwa Pass with low cloud or freezing levels, sudden snow squalls or rapidly lowering cloud can reduce ceiling and visibility to near zero almost instantly. The low cloud or snow will often make dead-end passes appear to be the main route. This pass should be avoided in any weather conditions likely to obscure the route. Note that poor conditions in the pass are usually not observable from either Telkwa or Terrace.

In summer, strong inflow winds can combine with Katabatic winds from the glaciers to cause significant mechanical turbulence. Severe turbulence is also reported to occur during inflow conditions along the ridge, just east of the town of Terrace.

Smithers to Terrace via the Bulkley / Skeena River Valleys and the Shorter Route via the Kitseguecla Valley



Map 4-49 - Smithers to Terrace via the Bulkley Valley and Kitseguecla Valley

By following the Bulkley River Valley up toward New Hazelton and then following the Skeena River Valley to Terrace, a pilot can avoid flying over any higher terrain. This is the longest of the three routes between Smithers and Terrace and because of the lower levels involved, is usually the only option when conditions are marginal.

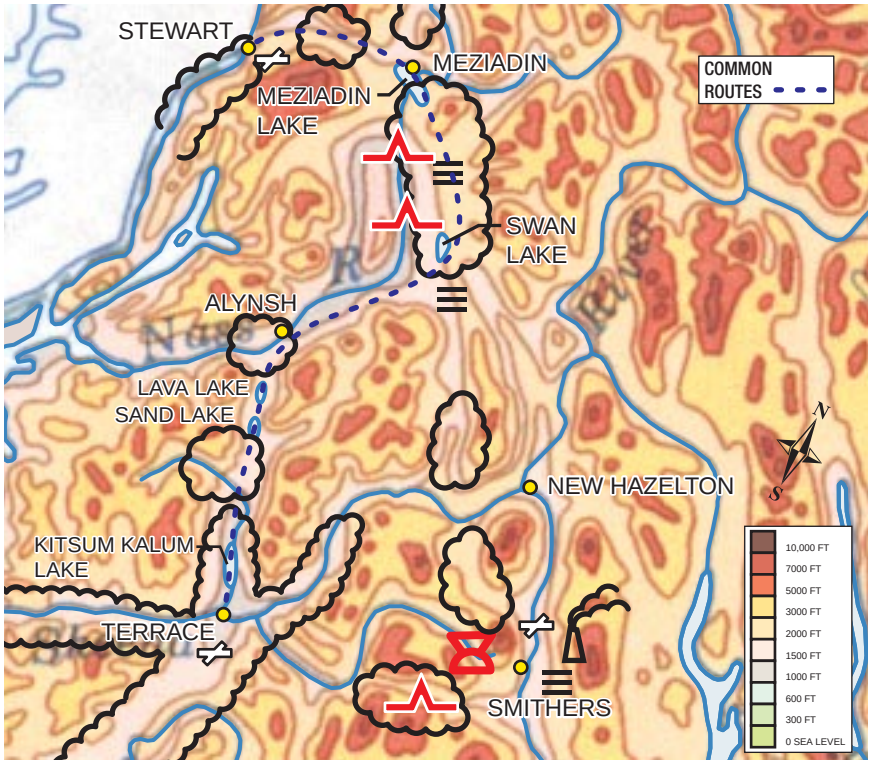
A short cut can be made on this longer route which cuts between the Bulkley and Skeena Valleys well south of New Hazelton. Though shorter than the full valley route it is still considerably longer than the Telkwa Pass route, and it still requires climbing over terrain at 2,200 ft ASL to traverse the Kitseguecla Pass (usually referred to as Kits Pass).

Both the Bulkley Valley and Kits Pass routes provide relatively good weather routes to or from Smithers. The mountains to the west act as barriers to the pacific moisture. Thus there is a significant change in the precipitation regime along the Skeena River. Typical coastal forests change to drier interior varieties just south of Woodcock (southwest of New Hazelton). Low cloud often extends up the Skeena, with Legate Creek a known bad spot. The Terrace Airport weather is generally representative of that up the valley.

This route is sometimes drier and smoother than the Telkwa Pass option, but both routes can deteriorate quickly near Terrace. Intrusions of low cloud and fog with inflow winds are the main weather hazard and, although more frequent in winter, can occur throughout the year. The airport at Terrace is more prone to low cloud due to its elevation, approximately 500 feet above town.

When winds aloft at 6,000 feet exceed 30 knots, moderate turbulence is common throughout the region. Rounding Copper Mountain at the confluence of the Copper (Zymoetz) and Skeena Rivers, there is often a wall of wind giving sudden and unexpected turbulence. This usually occurs when strong inflow winds are experienced at the Terrace Airport.

North from Terrace to the Nass River Valley



Map 4-50 - North from Terrace to the Nass River Valley

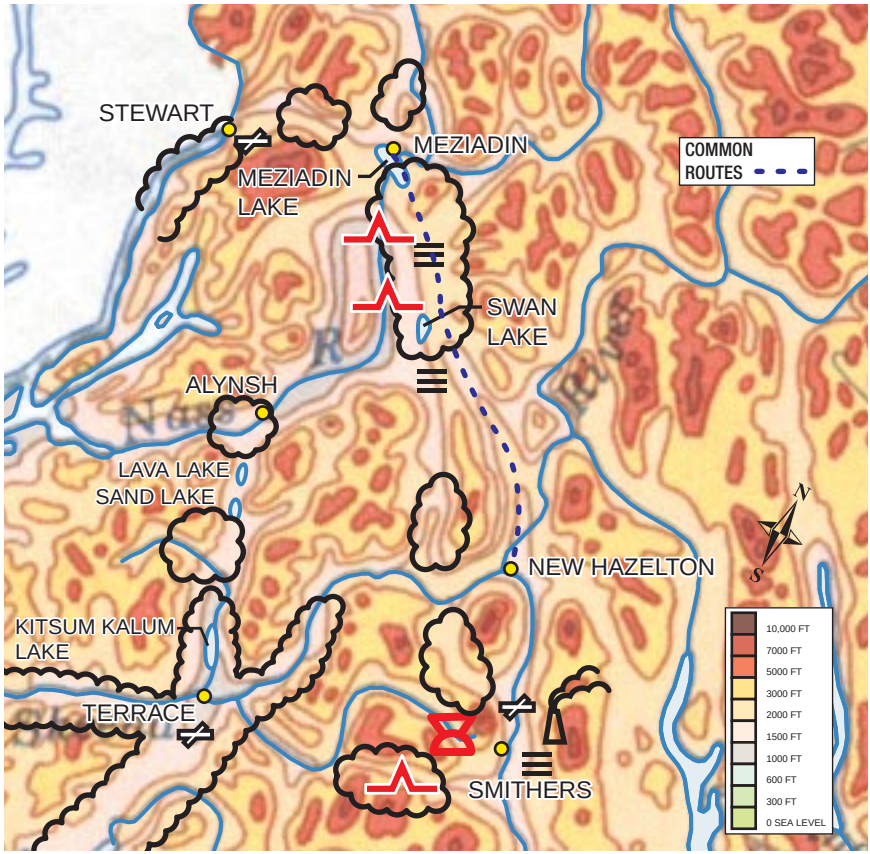
This route follows the Kalum River to Kitsumkalum Lake, then further north up the valley to Sand Lake and Lava Lake, before opening into the broad east-west Nass River Valley south of New Alyansh.

This route is prone to low ceilings. Due to the rise in terrain levels north bound, a southerly flow creates upslope conditions. If even a scattered layer of low cloud below 700 feet is reported at the Terrace Airport when they are reporting a light southerly wind, the Kalum River Valley is likely socked in up to Kitsumkalum Lake. Low cloud also tends to plug this route where the same effect occurs just north of Sand Lake.

The broad Nass River Valley, while generally offering good flying conditions, is subject to low ceilings and poor visibility under a moist southwest flow off the Pacific.

With inflow up the Nass Valley, expect to encounter poor flying conditions just south of New Aiyansh where the route from Terrace enters the Nass Valley.

New Hazelton to Meziadin via the Kispiox River Valley or the Kitwanga River Valley



Map 4-51 - Hazelton to Meziadin via the Kispiox River Valley or Kitwanga River Valley to Dease Lake to Watson Lake

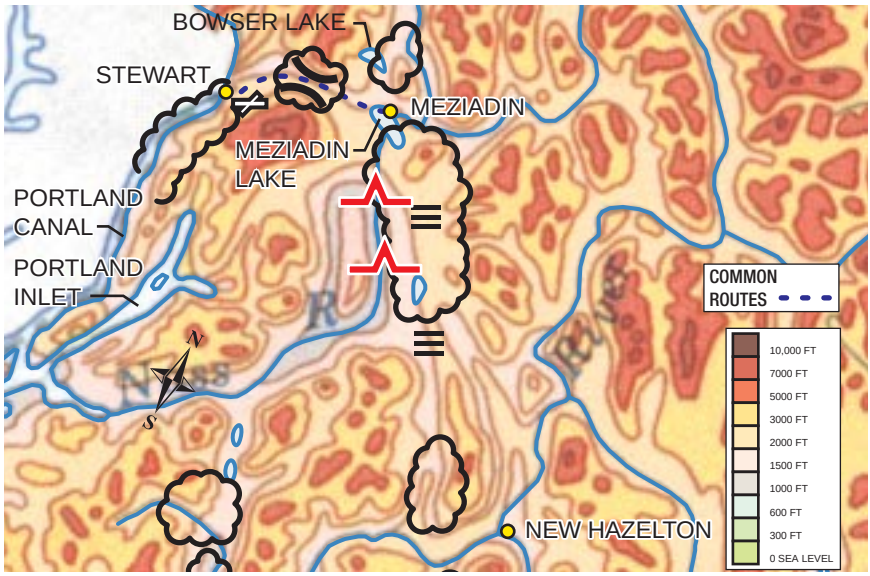
The route goes directly north from New Hazelton follows the Kispiox River Valley to where it joins the Nass River Valley near Swan Lake. The Kitwanga River Valley route starts north from the Skeena River Valley approximately 20 n. miles west of New Hazelton and joins the Nass Valley in the same area. The weather along both the Kispiox River Valley and the Kitwanga River Valley (the route of Highway 37) is relatively uniform, both topographically and meteorologically. Both routes usually offer good flying conditions; however, the area just south of Kitwancool Lake (in the Kitwanga Valley), has been singled out as more prone to low cloud, under a southerly upslope flow.

Both routes north merge in the Cranberry Junction, Swan Lake area of the Nass

Valley. Here the Nass Valley continues north to Meziadin Lake. The terrain is generally flat and fairly swampy and the route is susceptible to low cloud.

The frequent invasions of pacific moisture flowing up the Nass Valley from the southwest, particularly in the fall, often bring low ceilings and poor visibility. Radiation fog is common in autumn, but its frequency diminishes as sources of open water begin to freeze over with the approach of winter. Except in times of dry cold outflow, low cloud is an almost constant problem in fall and winter.

Meziadin to Stewart



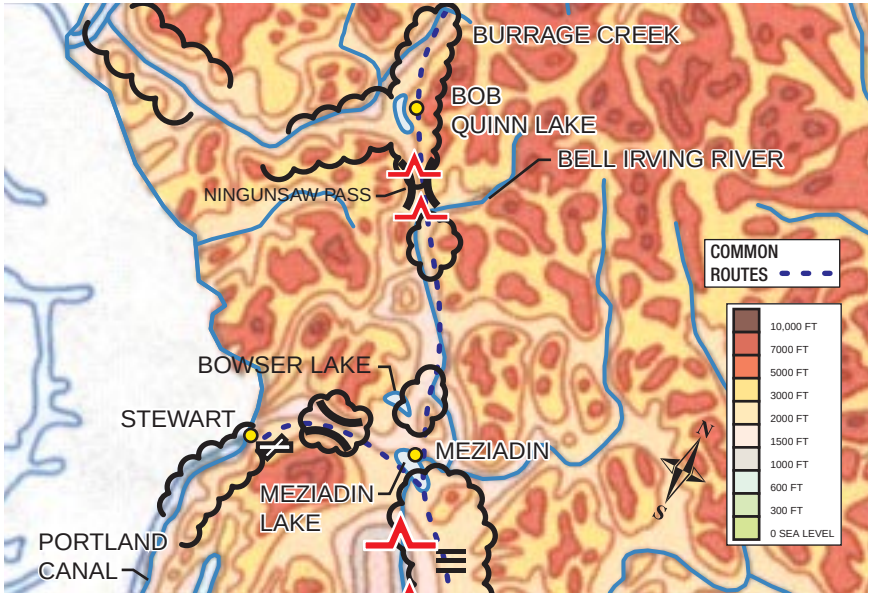
Map 4-52 - Meziadin to Stewart

Though well inland from the coast, Stewart lies just above sea level at the north end of the long Portland Canal. Between Meziadin and Stewart the Bear River Valley cuts through the Coast Mountain Range with peaks either side to almost 9,000 feet ASL.

The Bear River Valley (the route of Highway 37A) from Meziadin Lake to Stewart is spectacular, but, unfortunately, it is often filled with low cloud and fog, as is the Portland Canal south of Stewart. The Bear Pass itself is also very narrow. Fixed wing aircraft cannot usually turn around in the pass and, especially when west bound, should be confident of conditions at the west end of the pass before entering. When there are strong inflow or outflow winds, turbulence should be expected, especially between American Creek and Meziadin,

Weather observation at Stewart should be examined for an idea of conditions near Meziadin.

Meziadin to Bob Quinn Lake



Map 4-53 - Meziadin to Bob Quinn Lake

North of Meziadin the route leaves the Nass Valley and joins the Bell Irving River Valley north to the Ningunsaw Pass. The Ningunsaw River flows down from the pass to the northwest to join the Iskut River Valley just west of Bob Quinn Lake.

Low cloud often closes the route just north of the Meziadin Junction, as well as in the Ningunsaw Pass south of Bob Quinn Lake. Low cloud and fog will frequently linger in the vicinity of Bowser Lake, especially in the fall.

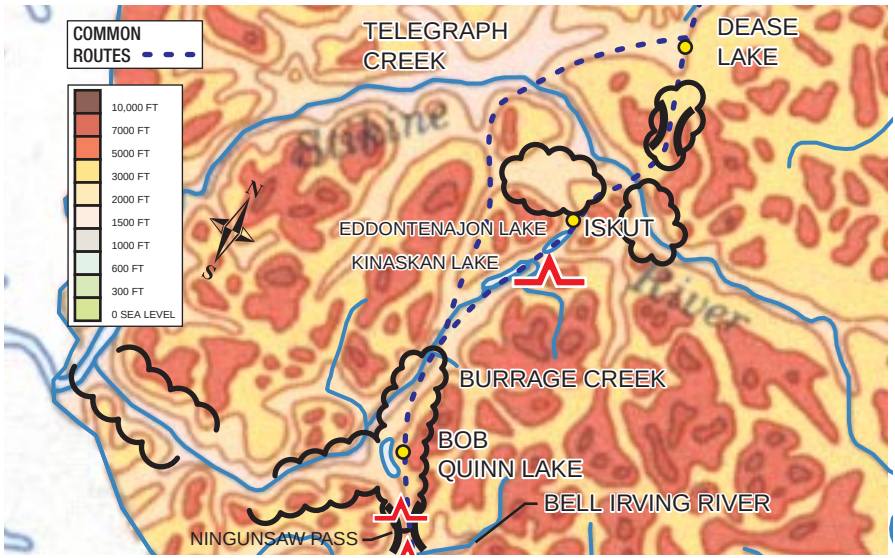
The higher terrain across the Nigunsaw Pass, between the Bell Irving River Valley and the Iskut River Valley, can be a bottleneck along this route due to low ceilings and poor visibility. This usually occurs in conjunction with an inflow of moist pacific air up the Iskut River Valley from the coast.

Pilots usually refer to the two road bridges across the Bell Irving River as Bell 1 and Bell 2, with Bell 1 being the one further south. The valley north of Bell 1 to, and including the Nigunsaw Pass, is in a very heavy snowfall belt. In winter it has been know to receive some of the heaviest snowfalls in northwest BC.

Under inflow conditions, low cloud will often plug the Iskut River Valley south of Bob Quinn Lake and sometimes extend as far north as Burrage Creek, closing the route west to Wrangell. The low cloud tends to envelop this area before it reaches Smithers or even Terrace.

The weather observations at Stewart and Wrangell, though well west of the route, are the only indicators of weather conditions for the route. Any precipitation usually closes these northern valley routes.

Bob Quinn Lake to Dease Lake



Map 4-54 - Bob Quinn Lake to Dease Lake

North of Bob Quinn Lake, the commonly used air route follows the broad flat Iskut Valley north on a gradual climb past Burrage Creek to Natadesleen Lake. The route then branches either to the northeast along Highway 37 to Kinaskan and Eddontenajon Lakes and through Iskut, or north-northwest to meet the Stikine River north of Telegraph Creek.

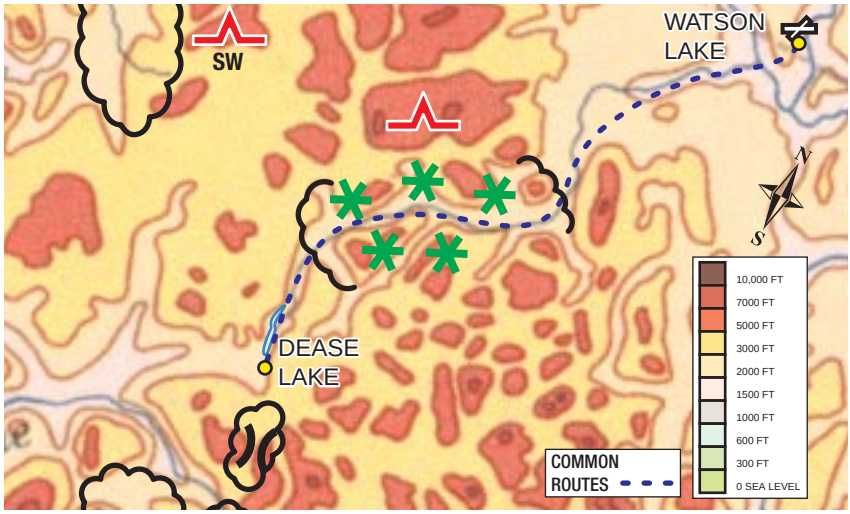
The route north climbs over a pass just north of Iskut and then crosses the east-west Stikine Valley. On the north side of the valley it once again climbs over a pass and drops into the valley at Dease Lake. The more westerly route turns east when it meets the Stikine River and follows its valley and the Tanzilla Valley to Dease Lake.

Inflow up the Iskut Valley often leads to upslope low cloud at Bob Quinn Lake and up the valley to Burrage Creek. The steadily rising terrain along the Iskut route causes ceilings to lower while flying north. Low cloud and fog are frequently encountered in the vicinity and just north of the higher elevation pass, north of Iskut. The high pass just south of Dease Lake can be closed by low cloud with little or no cloud in the surrounding areas. This route is rarely open in marginal conditions.

The alternate route from Natadesleen Lake to just north of Telegraph Creek, then northeastward along the Stikine and Tanzilla River Valleys, is lower in elevation and often avoids the lower cloud and fog blocking the passes.

The weather report from Ketchikan Airport, Alaska can give some idea of the weather in the region of Meziadin. If there is low cloud at Ketchikan along with a westerly wind component, both routes are likely closed.

Dease Lake to Watson Lake



Map 4-55 - Dease Lake to Watson Lake

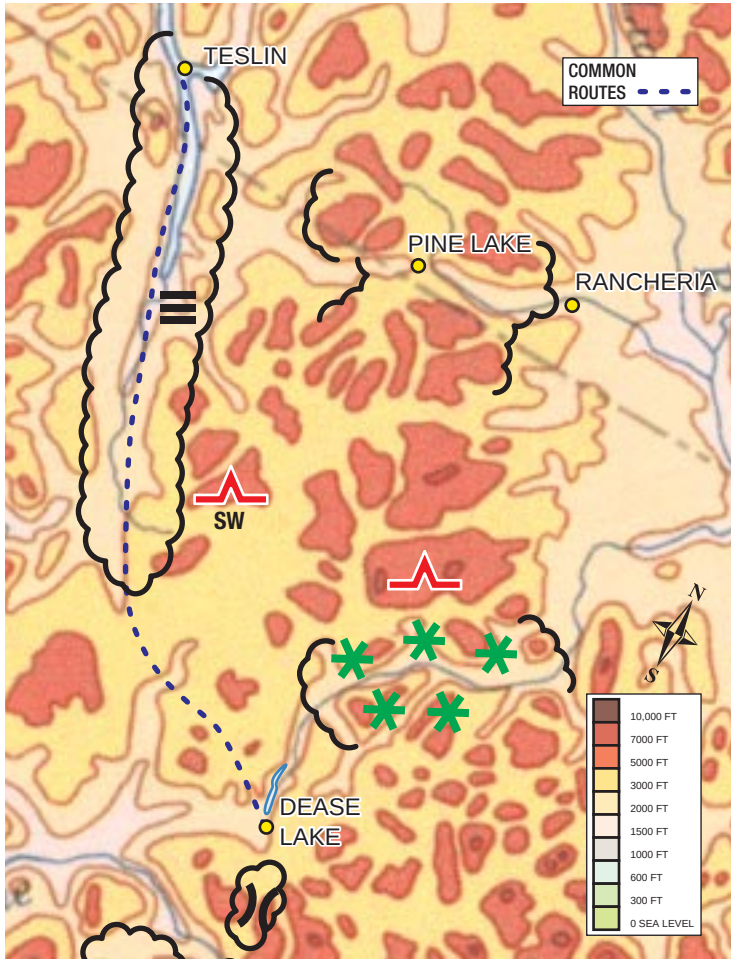
Following the Dease River north, this route climbs over a major upslope regime on the southwest side of the Cassiar Mountains. At the junction of the Cottonwood and Dease Rivers the route follows Highway 37 north as it climbs over the ridge of the Cassiar Mountains. Most aircraft, however, follows the much wider Dease River Valley more to the northeast through the mountains and then curling back to the northwest and out on to the plateau near Watson Lake.

Low cloud and fog are common over Dease Lake in the autumn. With systems tracking in from the west and southwest, heavier precipitation and more frequent cloud are generally experienced in the upslope area on the western side of the Cassiar Mountains. Also a strong southwest flow aloft can generate significant turbulence to the lee of higher terrain just north of Dease Lake, in the area between Joe Irwin Lake and the Cottonwood River.

North of the mountains, near Four Mile River, the floor of the Dease River Valley becomes wide and flat as it opens into the plateau. Fog and low cloud are common over these flat lands and right up to Watson Lake, especially in the fall. However, they occur much less frequently after freeze up.

There is little or no weather information along this route. Any system activity arriving from the Gulf of Alaska will likely cause precipitation in the mountains and close the route.

Dease Lake to Teslin

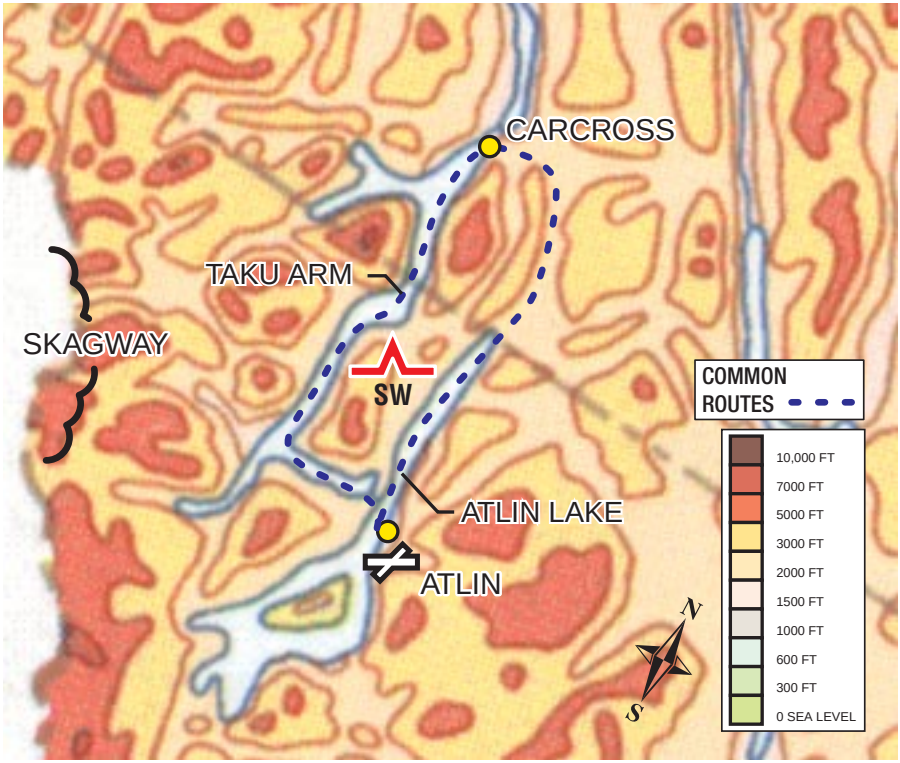


Map 4-56 - Dease Lake to Teslin

Under fair weather conditions, this section of northwestern British Columbia can be scenic and beautiful; however, under poor or deteriorating weather conditions, the daunting reality is that this vast, sparsely populated wilderness area has few airports or roads and little or no reported weather.

Weather permitting, pilots will sometimes fly from Dease Lake northwest to the Teslin River Valley, then northward along the Teslin valley to the community of Teslin. Moisture from the numerous lakes and rivers that dot the Teslin River Valley contribute to frequent low cloud and fog in the fall and spring. Strong west or southwest winds can generate significant turbulence to the lee of the Coast Mountains and higher interior terrain.

Atlin north to the Yukon Border

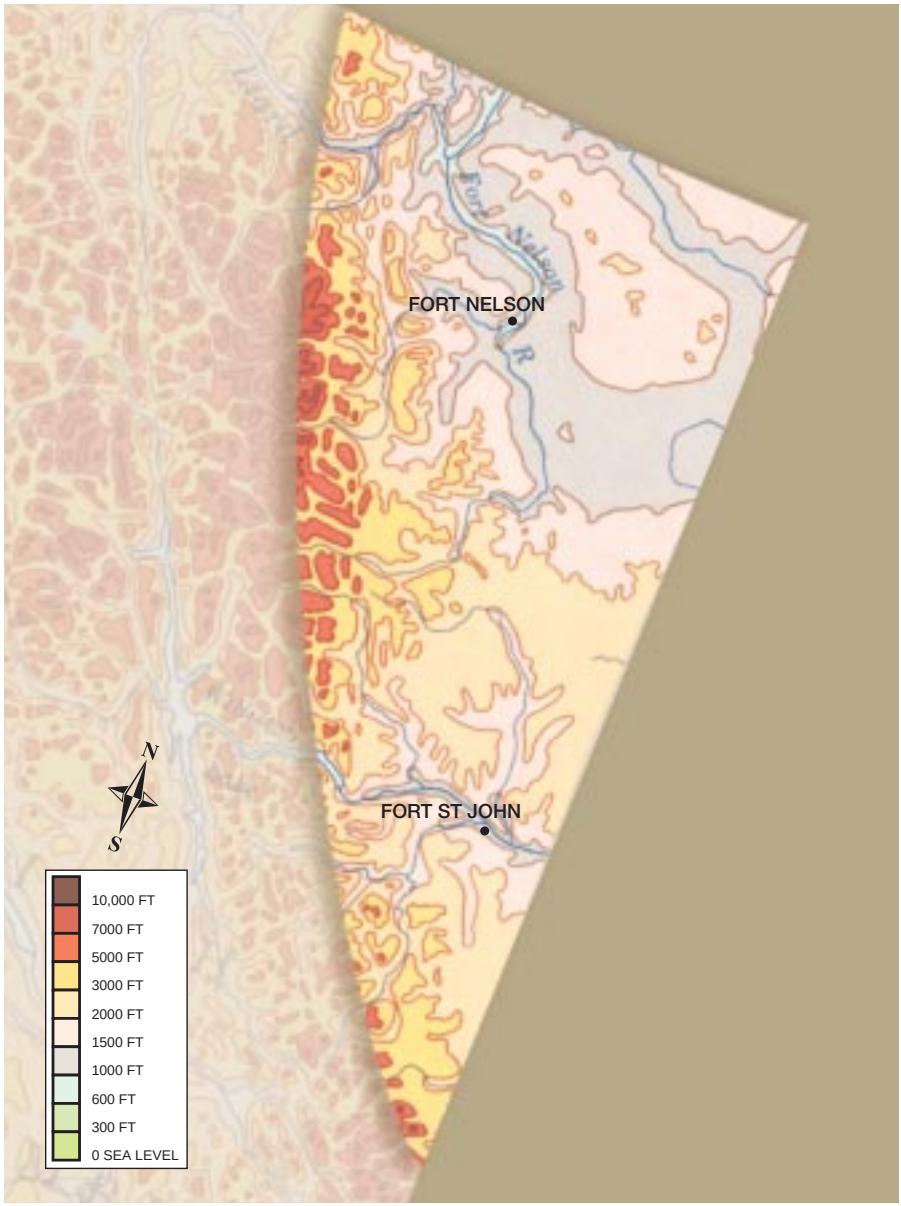


Map 4-57 - Atlin north to the Yukon Border

This route follows the highway north along Atlin Lake to the Yukon border or, alternately, northwest across the pass at Jones Lake to Taku Arm. These large lakes are subject to strong winds and rough surface conditions.

A strong southerly flow does not generally produce significant turbulence; however, a strong southwest flow will usually result in areas of moderate turbulence to the lee of higher terrain along the west side of the Atlin Lake, especially near Atlin Mountain and Mt. Minto.

Northeast British Columbia



Map 4-58 - Northeast British Columbia

Northeast British Columbia is an extension of the Canadian Prairies. As such it experiences weather which can vary between typical mountain weather to Prairie conditions, depending on the overall flow pattern.

(a) Summer

The best flying occurs in the late spring to early fall months. During this period, the weather in general is consistently good for flying. The most prolonged periods of bad weather will often occur when a cold low moves across the Central Interior of BC, producing an easterly upslope flow over the area. At these times, widespread low ceilings and prolonged precipitation will occur and at times will last for twenty-four hours or more.

This area is also marked by frequent thunderstorms which, due to the plateau type of terrain, often reach their full intensity. While airmass thunderstorms still remain the predominant type, frontal thunderstorms and nocturnal thunderstorms are common. The typical scenario would see the beginning of thunderstorm activity early in the afternoon and for it to persist well into the night. Most often the thunderstorms move toward the northeast and, given the right conditions, their intensity can reach the severe level. The normal thunderstorm season for both areas is June to August.

Another phenomenon, which is typical to the prairies, is the development of a low-level nocturnal jet. (Most common in spring and summer months, this feature occurs on clear nights following strong, gusty winds in the previous afternoon.) As the sun sets, a low-level temperature inversion forms. The strong winds remain several hundred feet off the ground while surface winds become calm. In some cases, the winds just above the ground can be stronger than the afternoon gusts. The inversion will often deepen during the night to as high as 1,000 feet above ground, before eroding away the following morning.

(b) Winter

Winter flying conditions can be quite variable. The northeast section of British Columbia is subject to widespread valley cloud only during the early part of the season, usually until the lakes and rivers freeze over completely. Of particular note is the Peace River near Fort St. John, which can remain open for prolonged periods during the winter, resulting in low cloud and fog that can move into the airport with little notice.

Fronts arriving from the coast tend to move across the area and weaken due to subsidence to the lee of the Coastal Mountains. They will; however, still give steady or intermittent precipitation whose type will vary depending upon local temperatures. Accumulation of precipitation is usually light in comparison to the coast. In situations where warm air is overruning entrenched cold air on the surface, status cloud tends to form, often becoming both widespread and reluctant to lift. Patchy freezing rain or drizzle occurs on occasion during the winter months, usually developing east of the mountains, especially near the arctic front when it lies along the Continental Divide.

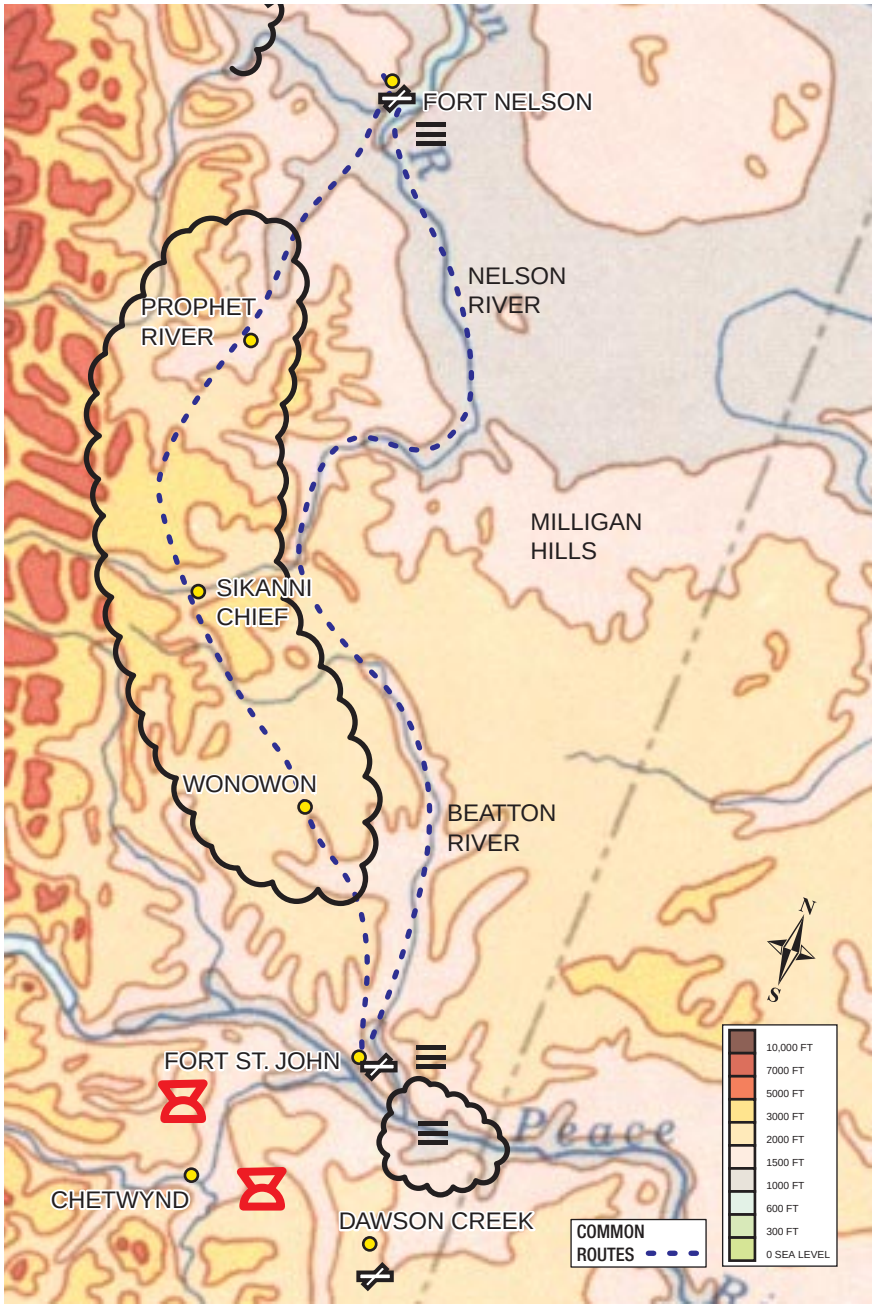
During winter, strong areas of high pressure form in the very cold air over Alaska, the Yukon and the northern end of the Mackenzie River Valley. This cold arctic air moves southeastward across the prairies. Depending on the strength of the arctic front, winds can shift abruptly to the northwest following the frontal passage and be gusty for several hours. This, coupled with local snowfalls, can produce blizzard conditions. Once an arctic ridge is established over the area, widespread clear, cold weather will prevail except for some localized problems with ice fog.

The southern half of this region can experience Chinook conditions, similar to those developing across southern Alberta and northern Montana. The effect is often most pronounced and occurs with greatest frequency close to the Rockies, near Chetwynd. When an arctic high-pressure system lies to the east of the Rockies, an intense shear zone can develop as strong southwesterlies aloft blow over surface based easterly winds. Across the shear zone there is usually a very sharp temperature inversion. In some cases, surface temperatures can be twenty degrees colder than those found several hundred feet above ground. In such cases, even in clear air, frost can form on the plane, particularly on the cockpit windows, while ascending into the warmer air aloft. Chinooks seldom occur in the Fort Nelson area as the arctic air is usually well entrenched. Some of the sharpest low level temperature inversions occur over Fort Nelson in winter, sometimes as much as a 30 degree change in less than one thousand feet. This can cause significant fog or frost on exterior surfaces on ascent. Pilots have reported parallax errors on descent. As you lower through the inversion, the line of sight becomes distorted, with the view appearing to shift and magnify.

The strong southwesterly flow aloft that produces the Chinook conditions also produces lee waves and associated turbulence. However, given that the mountains are slightly lower and the range is considerably wider, these lee waves possess less energy than those found over Southern Alberta. Despite this, the ride will often be very rough, up to approximately 8,000 feet, if winds across the mountains exceed 25 knots. This lee wave activity does not generally extend north of 59 degrees north latitude due to the fact that the mountains lose their linear characteristic.

(c) Local effects

Dawson Creek to Fort Nelson



Map 4-59 - Dawson Creek to Fort Nelson

There are two commonly used routes between Dawson Creek and Fort Nelson. The more easterly one follows the railway line via Beatton River and runs mostly across open plains. The more westerly route via Highway 97 climbs onto a ridge at Wonowon, runs north past Sikanni Chief and then drops back to the plain south of Fort Nelson at Prophet River.

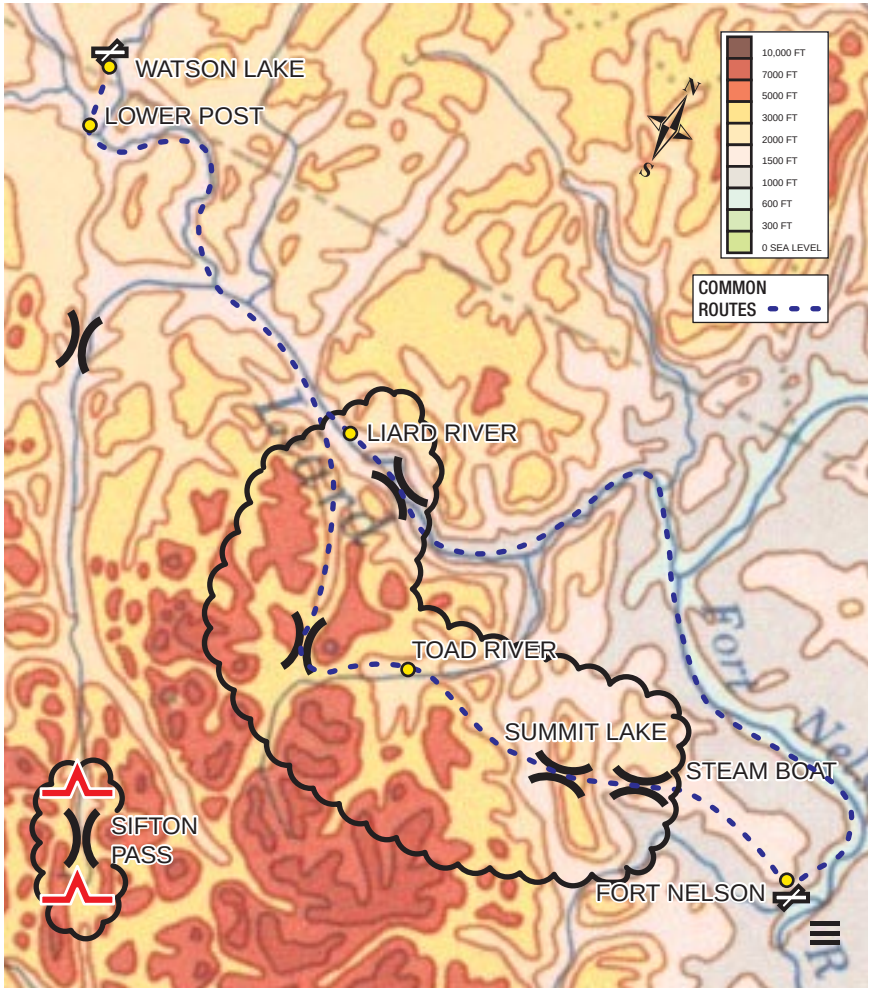
The gently rising terrain 10 to 15 miles south of Fort St. John will at times become shrouded in low cloud. Morning fog, which often forms along the Peace River Valley, tends to be more frequent at Fort St. John than surrounding airports. The fog usually extends to just north of the Fort St. John Airport.

North of Wonowon, the route following Highway 97 runs along the rising ground to the southwest of the open plains. This section is much more prone to low cloud when there is a low-level flow from the northeast quadrant, as these winds cause orographic lift along the upslope terrain. As a result, the high ground between Wonowon and Prophet River may be obscured while Fort St. John and Fort Nelson both report clear conditions.

Hills to the east and mountains to the west form a natural lowland area along the more easterly route via the Beatton River and the railway to Fort Nelson. Many pilots choose this route when the surface winds are from the north to east quadrant, to avoid the conditions of upslope flow further west.

The Fort Nelson Airport is in a hollow at the confluence of three rivers and, thus, experiences more frequent fog than surrounding areas. It also tends to have lighter winds than the surrounding region. However, expect moderate turbulence in the area when the airport reports strong westerly winds.

Fort Nelson to Watson Lake



Map 4-60 - Fort Nelson to Watson Lake

There are two routes commonly used between Fort Nelson and Watson Lake. The one following the Alaska Highway runs west from Fort Nelson into the hills and climbs over a pass at Steamboat of 3,500 feet ASL and then another of over 4,600 feet just west of Summit Lake. It then winds its way through the hills over two lower passes at about 3,600 feet, before joining the Liard River Valley.

The other route follows a northwesterly heading out of Fort Nelson along the Fort Nelson River to where it meets with the Liard River. Pilots then follow the river to Liard River crossing and the highway to Watson Lake. This route avoids the higher passes and is the preferred route when the higher terrain is obscured. Though the preferred route in marginal weather, it passes through very narrow valleys east of Liard

Hot Springs. As it is difficult to turn around in these valleys, pilots should not enter them if they cannot see through them.

Along the highway route, the weather between Steamboat and Liard River often bears little resemblance to that at either Fort Nelson or Watson Lake. If low cloud is present at Fort Nelson or Watson Lake, this route is almost certainly closed. Even with clear skies at both ends, the route may be impassable. Some of the worst weather is typically encountered between Summit Lake and the pass west of Toad River.