CASCADE PASSES

AVALANCHE ATLAS

Part 2

Stevens Pass and Tumwater Canyon

Prepared for
Washington State Highway Commission
Department of Highways
and in cooperation with
U. S. Department of Transportation
Federal Highway Administration

by

Geophysics Program and Department
of Civil Engineering
University of Washington
Seattle, Washington

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Cascade Passes Avalanche Atlas

Part 2

Stevens Pass and Tumwater Canyon

Part 2 continues the Cascade Passes Avalanche Atlas; Part 1 was published in August 1974 and covers avalanche hazards on Chinook, Cayuse, White and Snoqualmie Passes.

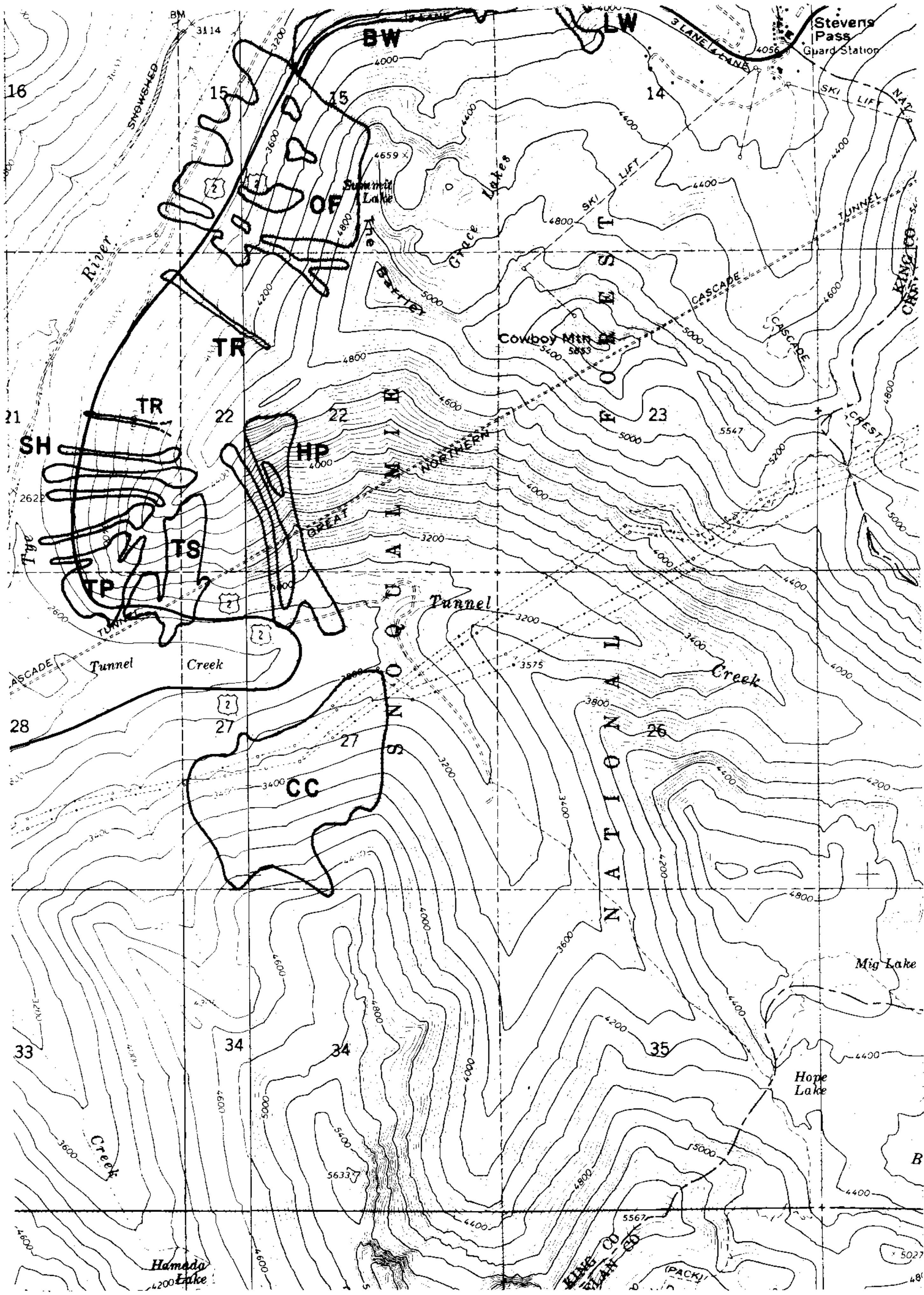
The documentation of hazards at Stevens Pass includes only those avalanche paths which directly or potentially affect the highway, U.S. 2. There are numerous other adjacent avalanche paths--Lichtenberg Mountain is a good example--which are prominent in the vicinity of the Pass but which do not present any real likelihood of reaching the highway under foreseeable avalanche conditions. These latter paths are not delineated on the maps or photos, although many do appear within the mapped areas.

There is a long history of avalanche occurrences at Stevens Pass, stemming both from railroad and highway experience. Most of the earlier history is unrecorded. A considerable amount of anecdotal knowledge for recent years is available from Highway Department personnel with long experience in the area. The historical record has drawn heavily on this experience.

The primary compilation of data for Part 2 of the Cascade Passes Atlas was done by Len Miller during his tenure as a contract avalanche consultant for the Highway Department. This compilation has subsequently been amended and extended through the cooperation of the Department avalanche crew at Stevens Pass under the leadership of Steve Reister. The nomenclature and

system of numbering for the avalanche paths adopted in this Atlas is that developed by Miller and Reister. Final compilation, editing and field check were by Edward R. LaChapelle.

This Atlas has been prepared under the provisions of Washington State Department of Highways contract Y-1301 with the University of Washington. Edward R. LaChapelle, Colin B. Brown and Roger J. Evans are Co-Principal Investigators.



Stevens Pass
Guard Station
BW
LW
OF
TR
TR
SH
HP
TS
TP
CC
Summit Lake
The Barrier
Grace Lakes
Cowboy Mtn
SKI LIFT
CASCADE
TUNNEL
GREAT NORTHERN
SNOWSHED
Tye
River
Tunnel
Creek
Tunnel
Creek
Creek
Mig Lake
Hope Lake
Hamada Lake
SNOQUALMIE
NATIONAL
FOREST
KING CO
CHELAN CO
(PACK)

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Little Windy (LW-1 and 2)

Hazard: High during major storms

Map: Stevens Pass 7.5'

Location: Milepost 63.8 Station _____ Other _____

Elevation of starting zone: 4000' and 4200'

Vertical fall: LW-1, 100'; LW-2,200' Length: 120' and 250'

Description:

LW-1: This is really a small bank slide, but it collects very deep amounts of new snow, which is mainly wind deposited slab. The bank is bare dirt with a small rock bench about 2/3 the way up the bank. West winds are the main source of trouble. The slide will usually just fill the inside 1 or 2 lanes but during prolonged storm periods the slide can cross the road with depths to 5'.

LW-2: The starting zone for this slide is a small rock outcrop that forms a pillow on its east side. The starting zone is about 100' across and narrows to about 50' at the road. It only slides once or twice a year and usually does not reach the road. During major storms the slide has reached across the road and down the fill slope.

Effect on Highway:

These two slides will block the road during major storms. They should be considered dangerous because they can do a lot of damage for their size.

History:

During January '74 two men were injured by a slide from LW-1 while inside their pickup. The truck was very badly damaged. Other incidents have been noted in the past by the DOH personnel.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Big Windy (BW)

Hazard: High-frequent

Map: Stevens Pass 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 3600-3800'

Vertical fall: 20' to 50' Length: 30' to 100'

Description:

This cut bank extends 4000' from OF-1 toward the summit. The angle is steep, bare dirt and rock. The area serves as an excellent indicator slope for stability evaluation. When the BW area begins to sluff the OF slide paths are soon to follow. This has served in the past as a real aid to the DOH plow drivers. Wind velocity on the Big Windy curve is typical of ridge wind speeds. This wind creates considerable slab formations along the cut banks. As overloading occurs the inside 2 lanes of the road are blocked. The area does not slide all at once, but large lengths of the area have been noted to fill the road.

Effect on Highway:

Sluffing will normally occur with every storm. Large volumes of snow may be generated during deep snowfalls. The highway can be completely blocked with depths to 2'.

History:

Avalanching since the highway opened, but a marked increase since the road was widened and the height of the cutbank increased.

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Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Old Faithful (OF-1)

Hazard: Moderate to high

Map: Stevens Pass 7.5'

Location: *Milepost 62.6-63-1 Station _____ Other _____

Elevation of starting zone: 4600'

Vertical fall: 1500' Length: 2900'

Description:

Driving west from the summit this is the first of the Old Faithful paths. The starting zone is a brushy convex slope at the end of the ridge running from the Barrier. Loading is from west and east winds. A finger of mature timber on the south side of the zone aids in the accumulation of snow during west winds. Considerable slab formation can occur during east winds, but the snow pillow forms lower down than with the west winds. The track is not well defined. Brush covers the upper 1/3 then open rock talus followed by more brush and then as the slope steepens the track pours over the rock out at the highway and drops about 40' to the road. From the road, observation of this slide is not possible until it drops over the cut. Wet and dry avalanches occur with the major deposition taking place on the road. The majority of avalanches contain small volumes of material and never reach the road. Most of the slides reaching the road contain just enough volume to block 1 or 2 lanes. The slides that block the entire road are usually dry in nature, but it must be kept in mind that these slides are free falling from 40' above in addition to their flow velocity. This path will reach the road 3 or 4 times per winter and may completely block it once. The path is controlled by the W-3 gun tower.

Effect on Highway:

Potential of blocking the road at least once during the winter with numerous partial blockages after about 60" of snowpack has accumulated.

History:

Avalanches occur with every snowfall, reaching the road at least once a year.

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*Milepost entry applies to Old Faithful 1-10.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Old Faithful (OF-2)

Hazard: Moderate to high

Map: Stevens Pass 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4600'

Vertical fall: 1500' Length: 3000'

Description:

The starting zone is a rocky broken cliff with many small crevices, which collect snow from both east and west winds. At the base of the cliff a slab may form during east winds. The track is covered with brush and descends across the same rock talus slope as OF-1 but further to the south. The slide intersects the road about 50 yds. south of OF-1. Dry snow slides will block the road with a slightly greater frequency than OF-1. Considerable avalanching takes place during storm periods with the majority of the slides stopping above the old railroad grade, and on the talus slope. Slides from this starting zone must negotiate a turn at the top of the talus slope. Usually they will move straight into the timber without making the turn. Only avalanches with large enough volume will be able to turn and flow on down to the road. The area is controlled by W-3.

Effect on Highway:

Occasional blockage of 1 or 2 lanes during moderate to large storms. Full closure may occur once or twice a year, with depths to 6'.

History:

Very active path with every storm. It reaches the road once or twice a year.

BW

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Old Faithful (OF-3)

Hazard: High--moderately frequent

Map: Stevens Pass and Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4600'

Vertical fall: 1500' Length: 2750'

Description:

This path has numerous starting points and is difficult to control, because you never know for sure where to place explosives. The uppermost portion of the path is a steep rock cliff that will form a small pillow on top near the edge in a shallow depression just right of center. There are a few trees just to the south of this area that act as a wind screen. This pillow has been found with both east and west winds. At the base of the cliff 3 or 4 small areas produce unstable slab formations under east wind conditions. Further down slope, convex and concave slope forms create pockets of unstable snow. The track begins with an open broad cliff which is broken by crevices and small ledges to a short talus slope of large rock, bordered by a short line of trees on each side for about 300'. A large rock rib on the south side of the track can contribute additional snow to the slide at this point. At times this is the only point that a slide may be released. The track now enters open talus rock for about 100 yds. then brush 6-10' high covers the track to the top of the road cut. The road cut for this slide is a large V-shaped notch that has a tendency to divert the flow down the road. The cut is 40-50' high and the slide cannot be seen from the road.

Effect on Highway:

This path will run to the road 2-3 times each winter. Deposition will be deep on the inside of the road and taper to the shoulder at the fill side. Depending upon the number of slides to the road the inside depth may reach 30'.

History:

Avalanching will occur with every storm, but only moderate to large storms will produce slides to the road. Numerous incidents involving the DOH personnel have occurred in this area.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Old Faithful (OF-4)

Hazard: Very high and very frequent

Map: Stevens Pass and Scenic 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 4600'

Vertical fall: 1600' Length: 3000'

Description:

This is the original Old Faithful avalanche, which the area is named after. The starting zone is in second growth timber and rock outcrop, which on the north end faces south and changes to west as the terrain moves south. There are numerous eroded gully-like features that serve as snow collectors. Unstable snow is also deposited in the sparsely scattered trees. East and west winds deposit unstable snow in the starting zone. There is one point on the south end of the zone which is more active than the rest of the area. The track is talus and brush and follows a narrow creek straight to the road. About half way down the track it becomes well defined by trees on both sides. The last 100 yds. to the road cut is brush. The slide flows over the cutbank and falls about 40' to the road. A large cone-shaped deposition forms on the highway and is present all winter. The slide will usually be active more than once during a storm and is usually the first of the OF group to slide. Control is via W-3.

Effect on Highway:

The path will block the road almost every storm and sometimes more than once. Deposition on the inside will be to the height of the rock cut and establish the slope angle of the track across the highway to the fill slope, where it may reach a depth of 15-20'. Considerable clearing problems are to be expected from the path. A relatively safe zone exists just below this path on the road for about 200'.

History:

This path has buried 3 or 4 DOH personnel in the 40's and 50's, pushed vehicles up and down the road, buried trucks, Sno-Go's, and even totally destroyed a large Sno-Go by picking it up and carrying it over the fill slope. The public is involved every winter in some sort of incident with this slide path. It should be approached with extreme caution.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Old Faithful (OF-5)

Hazard: High--very frequent

Map: Stevens Pass and Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4600'

Vertical fall: 1600' Length: 3000'

Description:

The starting zone is in a small opening in mature timber covered with second growth trees and brush. The growth of the young trees is slowly eliminating this as a direct source of unstable snow. The terrain below and to the south which is open talus and brush-covered slope is becoming the prime contributor to avalanches in this path. The track follows an even slope covered with brush and outlined by islands of trees on both sides. The slope broadens about 3/4 the way to the road and at times may trigger OF-6,7. The rock cut at the road is about 20' high but the slope is about 1:1 which allows the flow to enter the road more smoothly and sometimes be diverted down or up the highway. The path extends over the road and down the fill slope to the old highway. Volumes of snow are usually just enough to block the inside two lanes. Control is from W-3. Both east and west winds load the starting zone. Dry loose snow avalanches are most commonly observed in the road.

Effect on Highway:

Avalanches may be expected with every moderate to large storm. This path will usually only cycle once per storm but can be expected to recycle with each 6-10" of new snowfall. Volumes in the road will run to 10' and cover 100' of centerline.

History:

There are numerous incidents of motorists being surprised by this slide and driving up onto it. Spring slides constantly deposit snow in the inside two lanes.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Old Faithful (OF-6 & 7)

Hazard: High-frequent

Map: Stevens Pass and Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4200-4400'

Vertical fall: 1200-1400' Length: 2300-2600'

Description:

These two slides begin in heavy timber and follow very narrow tracks to open talus slope at the 3800' level. Brush covers about half of this slope and timber covers the lower left 1/4 of the area. OF-9's track travels through an island of timber to the rock cut above the road. OF-10's track follows the open slope to the road and descends a smooth dirt cutbank at the head of the narrow upper track, while west winds create large unstable areas in the upper portion of the open slope. Avalanches may begin in either area. Control is via W-3.

Effect on Highway:

Both paths can deposit snow on the road at least once a year. Deposition can be expected with every major storm. Volumes are sometimes large at OF-10.

History:

Avalanching has been observed every year in both paths.


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Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Old Faithful (OF-8)

Hazard: Moderately high-moderately frequent

Map: Stevens Pass and Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4900'

Vertical fall: 1900' Length: 3200'

Description:

The starting zone is a large opening in mature timber on the south side of a creek bed that forms the track. West winds are the prime contributor to unstable snow conditions. A deep pillow forms next to the trees in the upper right corner of the clearing. There is some indication that the gulley above and to the left of this clearing may contribute to this path. The clearing is controlled by W-3, but the upper portion of the gulley would not be controllable by this gun tower. The track is well defined by trees to a point about 150 yds. above the road, where the slope opens and becomes brushy and difficult to follow. Just above the rock cut at the road, a small island of trees indicates the point where the track and the creek intersect the road. The deposition is normally confined to the road, but large avalanches will carry across the road to the fill slope below.

Effect on Highway:

Depths run 5-15' and 20-100' of centerline covered. The path runs at least once a year.

History:

Frequent avalanches, but not as frequent as OF-7.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Old Faithful (OF-9 and 10)

Hazard: High-moderately frequent

Map: Stevens Pass and Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4600'

Vertical fall: 1600' Length: 2500'

Description:

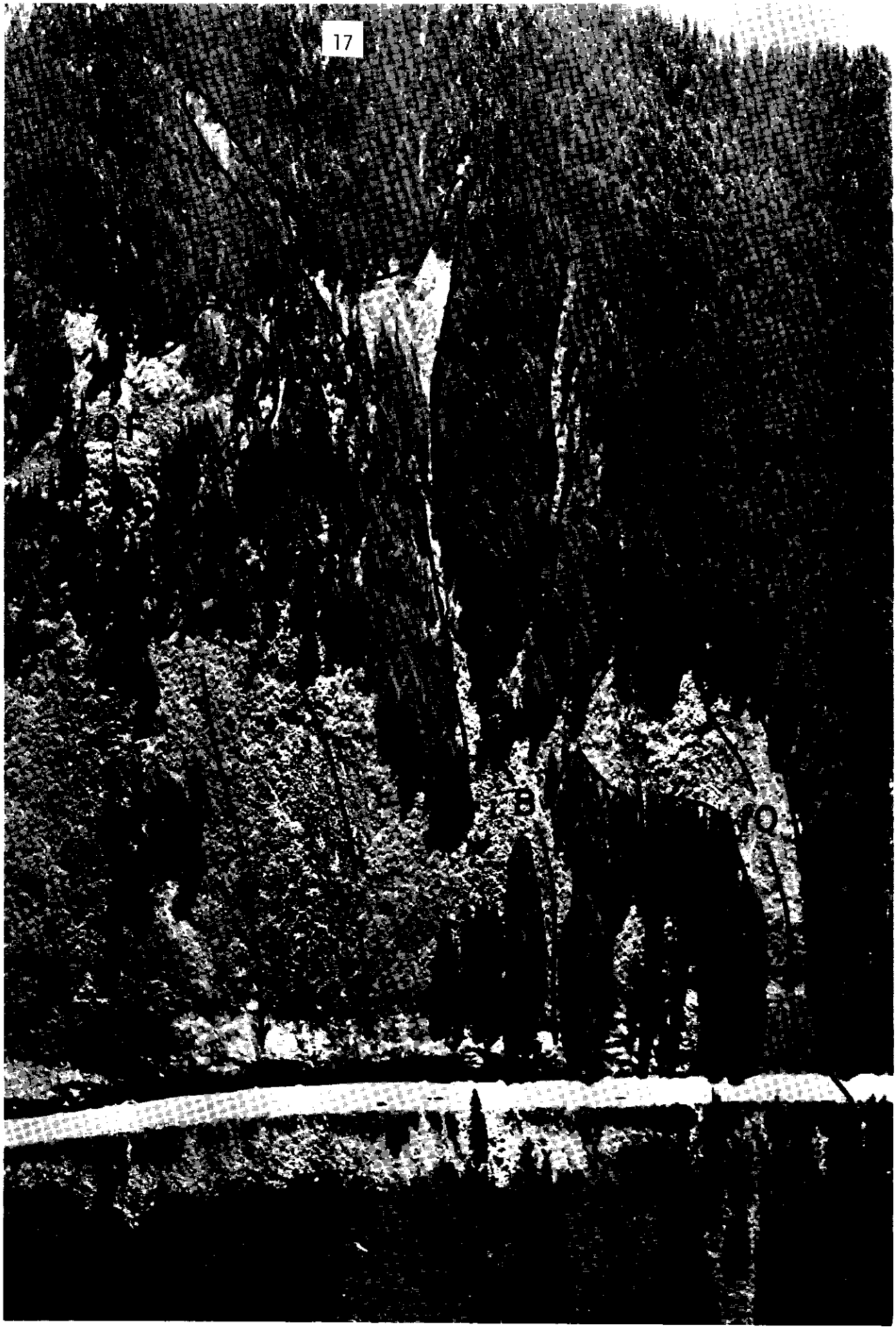
These two slides begin in heavy timber and follow very narrow tracks to open talus slope at the 3800' level. Brush covers about half of this slope and timber covers the lower left 1/4 of the area. OF-9's track travels through an island of timber to the rock cut above the road. OF-10's track follows the open slope to the road and descends a smooth dirt cutbank. West and some east wind create unstable snow conditions in the starting zone at the head of the narrow upper track, while west winds create large unstable areas in the upper portion of the open slope. Avalanches may begin in either area. Control is via W-3.

Effect on Highway:

Both paths can deposit snow on the road at least once a year. Deposition can be expected with every major storm. Volumes are sometimes large at OF-10.

History:

Avalanching has been observed every year in both paths.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Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Tye Road (TR-1 and 2)

Hazard: Moderate-infrequent

Map: Stevens Pass and Scenic 7.5'

Location: Milepost 1)62.5 2)62.0 Station _____ Other _____

Elevation of starting zone: #1 - 4600'; #2 - 4200'

Vertical fall: #1 - 1400';#2-1100' Length: #1 - 1700'; #2 - 2500'

Description:

Very narrow, shallow creek bed bordered on both sides by heavy timber. Visibility up the path from the highway is about 100'. The starting zone is in a small opening in dense timber. This description is the same for both paths. TR-1 is located about 100 yds. above the Tye Road junction and TR-2 about 100 yds. below the junction. Dry loose snow avalanches are the only type that have been observed.

Effect on Highway:

These paths will run across the highway when there are snowfalls of 3 to 4 feet. The highway has been blocked each time these paths have been observed to run. Debris in the highway covers about 40' of centerline and is about 4 to 5 feet deep.

History:

Both paths reached the highway in January 1974 with dry loose snow avalanches. In 1971 they may have also run, but there was no record made of the event. The foreman is the only source of much of the information concerning these slides. They appear to run about every 5 years. There were observations in the early and late 60's, and in the 40's and 50's.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Sand House (SH-1)

Hazard: Moderate-infrequent

Map: Scenic 7.5'

Location: Milepost 61.4 Station _____ Other _____

Elevation of starting zone: 3900'

Vertical fall: 900' Length: 1300'

Description:

Very narrow track in dense mature and second growth timber. The starting zone is a small opening in the timber with rock outcroppings that reduce the growth of vegetation. Avalanches are primarily dry loose snow type.

Effect on Highway:

The slide reaches the highway at least once a year. The deposition is about 3' deep at the centerline and about 20' wide. It usually does not cross the road, but has done so during deep cold snow falls.

History:

Men and equipment have not been involved in this slide. It is a difficult path to find and should be approached from above with caution. It has been controlled in the past by hand charges, but is presently uncontrolled. It can be controlled by Avalauncher from the highway.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Sand House (SH-2)

Hazard: High-moderately frequent

Map: Scenic 7.5'

Location: Milepost 61.4 Station _____ Other _____

Elevation of starting zone: 4200-4600'

Vertical fall: 2100' Length: 3000'

Description:

Narrow, Y-shaped path in dense mature timber. The starting zone is ill defined in low second growth timber just under a ridge line. The path faces west. Deposition is from east and southwest winds. The southwest winds move parallel to the slope and load the starting zone from the side. The southern arm appears to be the most active, while the northerly arm is probably loaded only during east wind conditions. Observed avalanching is dry loose in character with an occasional wet slide during rain-snow storms.

Effect on Highway:

Avalanches will reach the road 2 or 3 times each winter. Avalanches will cross the road once every 2 years but should be expected every year with large storms and deep snowfalls. Deposition in the road can be 8-10' deep and 30-100' wide.

History:

Numerous close calls have been experienced by highway maintenance men at this path. A Sno-Go was buried in the early 60's.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Sand House (SH-3)

Hazard: Low-infrequent

Map: Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 3900'

Vertical fall: 900' Length: 1200'

Description:

This path is extremely narrow in dense mature and second growth timber, in places about 10' wide. The starting zone is a small opening in the timber. The track runs to the highway and is very difficult to see from the road. Avalanching is primarily confined to the upper part of the track, but during large, heavy storms with large amounts of cold snow, avalanches will run to the highway. Similar activity is possible with rain-soaked new snow.

Effect on Highway:

In the past, avalanches ran to the highway about once every 5 yrs. Activity has increased in recent years. Deposition is small and will only rarely reach across the road: 1-2' deep at centerline and 5-20' wide.

History:

Ran to road in 1971, 1972, and 1974. In 1974 reached about halfway across the road.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Sand House (SH-4)

Hazard: High-frequent

Map: Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4200'

Vertical fall: 1400' Length: 1800'

Description:

Narrow path in dense mature timber with small second-growth trees in the path. The starting zone is a steep short cliff and open rocky slope in timber. It lies just to the west of and below a descending ridge. The path is loaded by east and south winds primarily, but does receive some loading from west winds. Avalanches run frequently with almost every storm, with most of them stopping just above the road. During large storms the path will deposit snow across the road. The path is controlled by the W-2 gun tower.

Effect on Highway:

Will reach the road at least once a year. It can cross the road with deposition at centerline of about 5' and a width of about 50'.

History:

Reached road twice in 1974, covered about half the roadway once and blocked road once. Blocked road in 1971 and 1972 and often in previous years.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Tunnel Point (TP-1) (Upper Tunnel Point)

Hazard: High-frequent

Map: Scenic 7.5'

Location: Milepost 61.2 Station _____ Other _____

Elevation of starting zone: 3800'

Vertical fall: 1000' Length: 1100'

Description:

Narrow track in mature timber with a width of about 20'. The starting zone is a small roll above the timber. Loose dry snow avalanches and wet slabs are the most common types of slides. The area is controlled by the W-2 gun tower.

Effect on Highway:

This path will deposit a small amount of snow at the edge of the road with every sizable storm. It can cross the highway with a narrow shallow finger of deposition during larger storms. It is definite hazard to both maintenance crews and the public.

History:

Has reached the road every year, occasionally blocking the highway.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Tunnel Point (TP-2 and 3) (Middle and Lower Tunnel Point)

Hazard: High-frequent

Map: Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: up to 3800'

Vertical fall: 1000' Length: up to 1300'

Description:

Broad open slope above vertical rock cut (about 40' high). The slope is broken by a short cliff band and is covered by low brush and small second growth trees. The slope lies on the end of the ridge extending from the Barrier south. Avalanching is primarily small slab, loose snow, and wet snow slides. All of the terrain is controlled by the W-2 gun tower. The terrain faces WSW around to south.

Effect on Highway:

Continuous avalanching occurs with every storm. Most of the slides are deposited in the borrow ditch on the inside of the road, while the larger slides extend across the road. The paths have been altered by the road design and all of the avalanching will now be retained by the road bed.

History:

There is something happening in this area every year and with every storm. The rock and snow avalanches are extremely dangerous, causing many close calls and road closures.


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Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Tunnel Shoulder (TS-1, 2 and 3)

Hazard: High-frequent

Map: Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 3600'

Vertical fall: 700' Length: 1100'

Description:

Very narrow paths that begin in an open steep rock outcrop facing south. The tracks descend the upper 2/3 of the slope, then enter some small second-growth timber where the paths become difficult to find unless you are right under them. The tracks leave the trees at the top of the cut bank and fall about 40' to the roadway.

Effect on Highway:

There is continuous avalanching during storms. The amount of material is small but dangerous to the motorists. After the borrow ditch is full of snow, the slides cross the roadway. The deposition in the road presents little or no problem to travel.

History:

In 1974, the avalanche crew encountered the slides twice in action, one car hit, one pickup hit, no damage.
Numerous avalanches recorded each year.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Tunnel Shoulder (TS-4)

Hazard: Low-infrequent

Map: Scenic 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 3600'

Vertical fall: 700' Length: 1000'

Description:

Ill-defined path with scattered mature trees and second growth small trees. Path has a long narrow triangular shape descending to the top of the rock cut about 40' above the roadway. Avalanches usually are confined to the slope above the road. The slope faces south and receives a large amount of solar radiation. The starting zone is not well defined, with deposition primarily from west winds. The path is uncontrolled.

Effect on Highway:

Deposition is usually confined to the ditch with small amounts of snow occasionally covering one or two lanes. The depth is minor, 6"-1'.

History:

Small amounts of snow have been observed running every year from this path.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Tunnel Shoulder (TS-5, 6, and 7)

Hazard: High-frequent

Map: Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 3400'

Vertical fall: 550' Length: 800'

Description:

The division between TS-4 and TS-5 is marked by the end of rocky terrain and a talus slope. The paths are defined by mature timber and brush. They descend from a prominent rock outcrop and rock rib to the top of the cutbank for the highway, and on across the highway. The paths are loaded by west and east winds, but seem to be more active when the wind velocity is low (5-10 mph). Higher velocities seem to hit the slopes perpendicular and help to stabilize them. These slides are controlled by the W-1 gun tower.

Effect on Highway:

Avalanches are encountered with every storm with more than one cycle occurring during a storm. Most slides are small and just reach the edge of the road, but during large storms the roadway can be blocked with deposition 3-4' deep and 10-100' wide.

History:

Consistent avalanching since the highway was opened.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Pole Pile (PP-1)

Hazard: High-frequent

Map: Scenic 7.5'

Location: Milepost 60.9 Station _____ Other _____

Elevation of starting zone: 4200'

Vertical fall: 1400' Length: 2100'

Description:

The starting zone of this path is an open rocky, brushy slope with a few scattered trees, beginning at the ridge line and ascending diagonally to the track and away from it. The lower 3/4 of the path are defined by trees and a shallow gulley. The path is loaded by west winds, but the stabilizing effect of the higher velocity winds is also noted. There are numerous fracture line locations for this path and it is difficult to know where to place explosives when blind firing. The best results seem to be obtained when the shots are placed at the highest portion of the starting zone under a rock cliff. Snow slides through the trees to the left of the head of the tree-defined gulley and avalanches can be triggered in this area. The path is controlled from W-1.

Effect on Highway:

The path will run to and across the road during moderate to heavy snowfalls. Deposition can be 10-20' deep and cover 100-200' of centerline.

History:

Avalanching has occurred since the highway opened. Numerous incidents have occurred involving the public and DOH personnel. The highway has been blocked at least once a year.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Pole Pile (PP-2)

Hazard: High-frequent

Map: Scenic 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 4400'

Vertical fall: 1600' Length: 2480'

Description:

The starting zone is open rocky slope with some trees and brush scattered across the slope. The upper 1/3 of the track has a number of places for avalanching to begin from. Target selection is difficult in this area. The lower end of this slope is defined by a short rock cliff and the beginning of more dense timber. At this time the track becomes well defined by the trees. The lower 1/3 of the track is defined by a second rock cliff. As the track continues the path broadens onto a brushy open slope just above the highway and continues below the highway. The path joins with PP-3 and 4 at the highway.

Effect on Highway:

Avalanching occurs with every storm. Deposition will usually occur on the two inside lanes and blockage will occur with larger storms. Spring avalanching is heavy from this path. Deposition amounts will vary with the type of snow, but when the highway is blocked during large storms the amounts will be considerable, 10-30' deep and 100-300' of center-line covered.

History:

The history is the same as PP-1.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Pole Pile (PP-3)

Hazard: High-frequent

Map: Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 3200'

Vertical fall: 400' Length: 600'

Description:

The release zone is just below the lower cliff band for the Pole Pile series. It appears possible for avalanches to begin above this zone, but none have been observed. The track is well defined by timber to the runout zone where it joins with PP-2 and 4. This is a very low elevation starting zone and it usually releases early and often. It is affected by warm air early and can be used as an indicator for release during warm type storms.

Effect on Highway:

Avalanching occurs with every storm and will reach the road with good volume almost every storm. It can cross the road with depths of 3-5'.

History:

Same as for PP-1.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Pole Pile (PP-4)

Hazard: High-frequent

Map: Scenic 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4500'

Vertical fall: 1700' to highway Length: 2780'

Description:

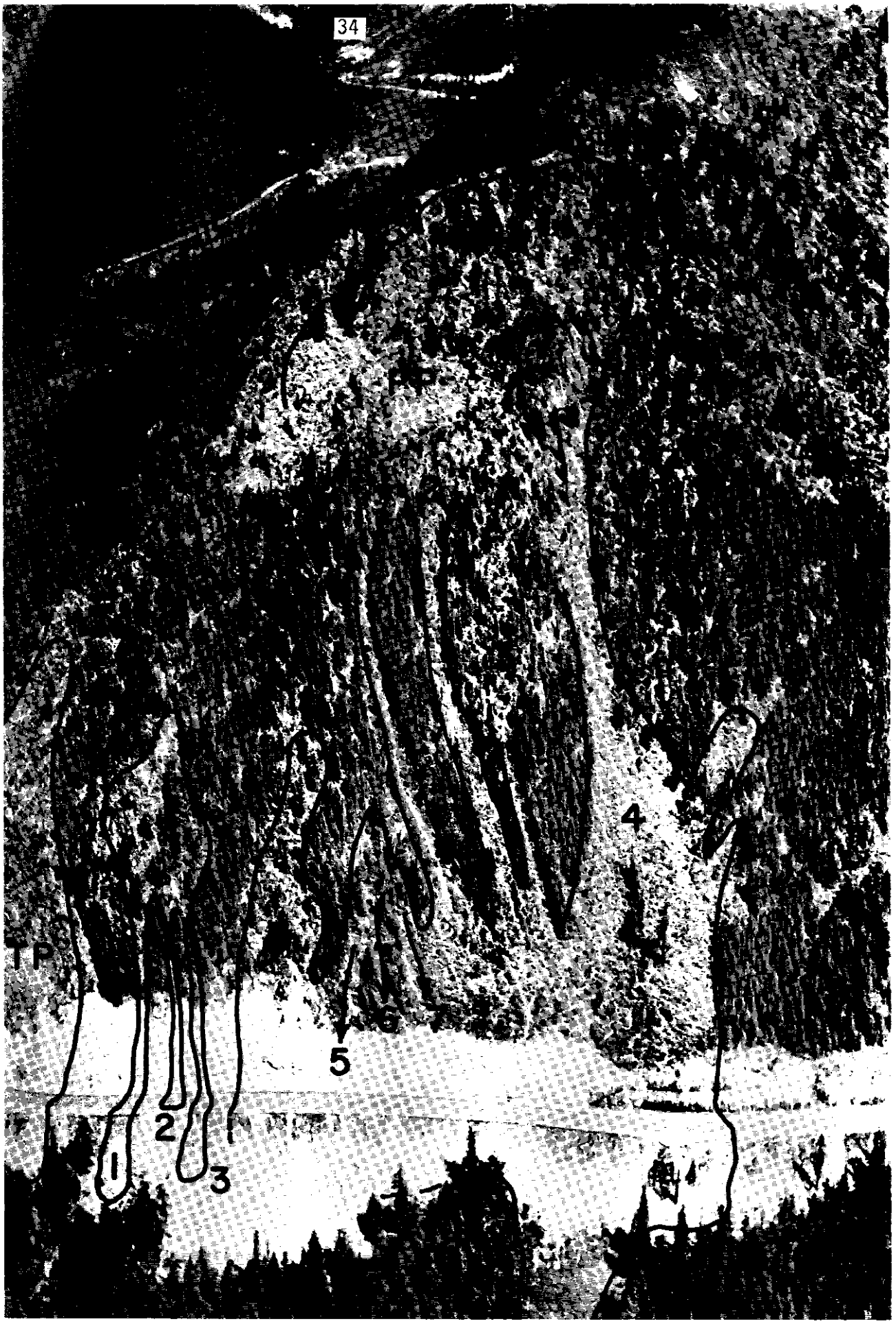
This path is the first major, frequent avalanche encountered on the highway when traveling from west to east. The highway crosses the path about 2/3 the way down the runout zone. The starting zone begins at the ridge line under a cornice. A secondary fracture line is sometimes present below a short cliff at about the 4000' level. This is also the beginning of the well defined portion of the track. The track at this point is defined by heavy mature and second growth timber. The main starting zone is broken rock outcroppings and scattered trees. The track below the secondary fracture is covered by low brush all the way to the highway. West winds tend to load the path with unstable snow across a fairly broad portion of the upper slope. The path is controlled by the W-1 gun tower.

Effect on Highway:

The highway serves as a good catchment area for this avalanche. Numerous deep (1-30') depositions can be expected depending on the type of storm. The road will be blocked at least once each winter. A number of smaller slides will reach the road covering 1-3 lanes at other times.

History:

Avalanching each winter since the highway opened. Numerous cars and trucks stuck in slides, the latest being in January of 1974, when a gasoline tanker was hit by the edge of the slide.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Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Hair Pin (HP-1 and 2)

Hazard: Low-very infrequent

Map: Stevens Pass 7.5'

Location: Milepost 60.5 Station _____ Other _____

Elevation of starting zone: 4600-4800'

Vertical fall: 2100' Length: 1, 3600'; 2, 4500'

Description:

HP-1: The release zone is just below the ridge line and slightly above PP-4 with scattered trees and brush on a rock outcropping. West wind deposition is the prime cause of loading. The track becomes well defined about 1/4 the way down and is lined by heavy timber. The track is covered by brush and trees of about 5-10' in height. The path terminates on a shallow bench which extends to Tunnel Creek and the highway. The highway bridge crossing Tunnel Creek is on the edge of the path.

HP-2: This is the largest of the two slides. The starting zone is a large open slope covered with brush and scattered trees. The path is well defined by heavy timber on the east side. A small island of trees is present 2/3 the way up on the left. The track is divided for a short distance by this island. At the beginning of the runout zone the path joins HP-1 during wet slide cycles, while the main path continues to the creek.

Effect on Highway:

HP-1 deposits snow in the highway only on rare occasions, and then it may just barely reach the edge of the road. It has the potential to cross the highway and appears to have done so in the past.

HP-2 will only reach the highway when it turns across the short junction with HP-1 during wet snow slide cycles.

History:

No record of the slides ever blocking the road. Debris was observed in the spring of 1972 at the edge of the road.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Clear Cut (CC)

Hazard: Low-rare

Map: Scenic and Stevens Pass 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4600'

Vertical fall: 1600' Length: 3000'

Description:

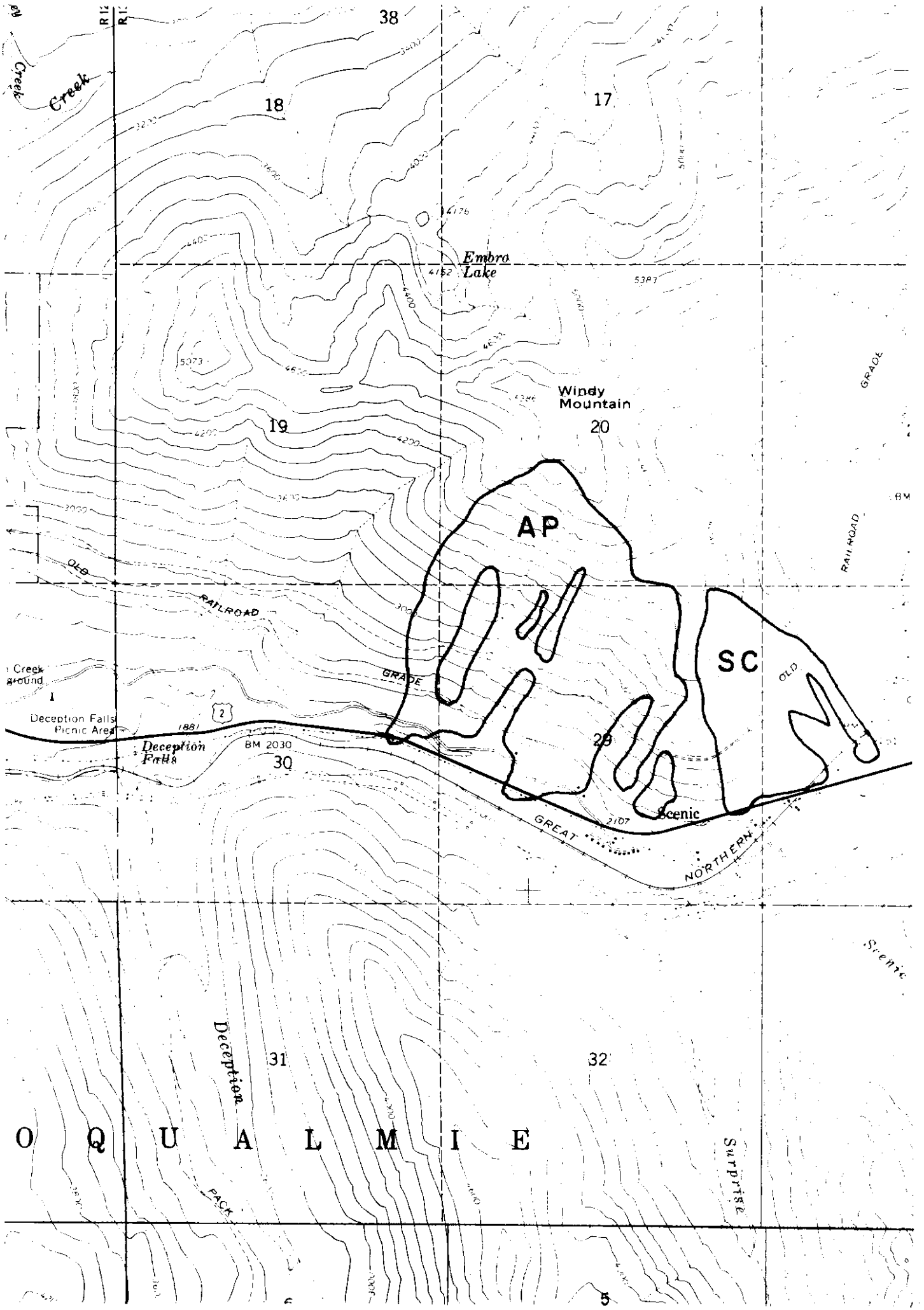
This path begins in a small opening in the timber above a broad open clear-cut slope. The track is confined to a shallow gulley during most avalanching but has expanded to incorporate large portions of the open slope during highly unstable conditions. Two power transmission lines traverse the slope near the bottom. The real problem with this avalanche area is the distinct possibility of the entire slope being unstable with a deep snow fall. The potential is present for a large avalanche to descend, destroying the stand of mature timber and continuing on to the highway and Tunnel Creek. This area should be closely observed during prolonged storm periods such as occurred in 1910. Deep snow and rain will probably be the key to the type of avalanche necessary to do the damage described. The slope is uncontrolled. It faces a NNW direction and is loaded by west and east winds.

Effect on Highway:

No current effect on the highway.

History:

Since the slope was clear-cut the avalanche activity has been observed to increase.


AP
SC
Windy Mountain
Embro Lake
Deception Falls Picnic Area
Deception Falls
BM 2030
OLD RAILROAD GRADE
GREAT NORTHERN
Scenic
Deception
Surprise
PACK
O Q U A L M I E
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Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Scenic (SC-1, 2 and 3)

Hazard: Low-infrequent

Map: Scenic 7.5'

Location: Milepost 58.8-59.9 Station _____ Other _____

Elevation of starting zone: 3000-4200'

Vertical fall: 560-1760' Length: 1700-3350'

Description:

This slope faces SE with only brush for cover. There are some small second-growth trees in a finger between 1 and 2. The entire slope has been burned over in the late 1800's and the avalanche activity has not allowed the vegetation to grow back. SC-3 begins on the ridge line and the rock cliff from near the old railroad tunnel entrance and descends the slope to the creek and the highway. SC-2 crosses the creek, sometimes takes out the railroad bridge, and then begins to ascend the slope just below W-2 gun tower. SC-1 slides down slopes north of the finger of trees and closes the west portal of the Cascade Tunnel of the railroad.
The entire three paths are controlled at the railroad's request by the W-2 gun tower. Avalanching occurs with every storm, but most slides are small and do not descend the entire track. Only major storms bring large avalanches.

Effect on Highway:

The only path to affect the highway is SC-3. Only minor deposition has been observed.

History:

In January, 1974, the entire slope, SC-1, 2 and 3 slid at once, completely clearing the SC-2 path of a sizeable stand of aspen and alder. The slide also took out the railroad bridge, which was deposited just below the W-2 gun tower.
During the early 1940's a man was killed at the mouth of the Cascade Tunnel.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass West

Name of Path: Alpine (AP-1 through 6)

Hazard: Low-infrequent

Map: Scenic 7.5'

Location: Milepost 57.2-58.3 Station _____ Other _____

Elevation of starting zone: 5200'

Vertical fall: 3200' Length: up to 6100'

Description:

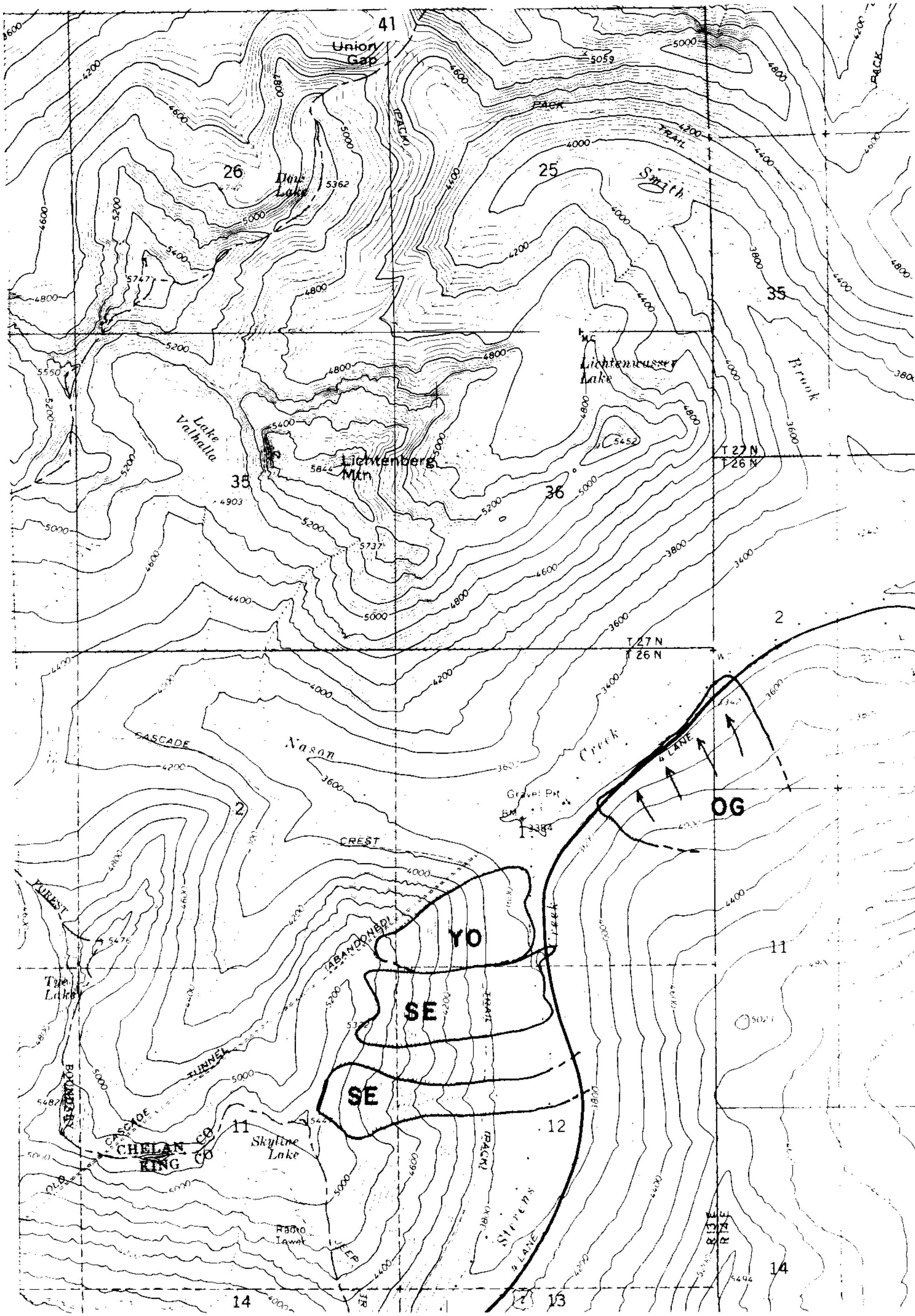
This group of avalanches comprises the entire south slope of Windy Mtn. The slope is a series of large and small gulleys and rock outcroppings. The upper portion is brush and open rocky slopes and the lower half is rock, brush, fingers of fir and cedar trees, and alders in the runout zone. There are some cabins built in the runout zone, but to date none has been affected by avalanche. The westernmost path, AP-5, reached the fill slope of the highway in 1972 as a result of a large wet snow avalanche. Avalanching occurs with every storm, but major cycles are confined to deep snow-rain storms. Vegetation in the runout zone indicates about a 20-30 year cycle for major avalanching.

Effect on Highway:

The highway will only be affected on rare occasions during major storms. If a large avalanche does descend this slope, the highway would likely be covered with a lot of alder trees mixed with the snow.

History:

Avalanching every year. Last known slides near the highway were in 1971 and 1972.


Union Gap
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Lake Valhalla
Lichtenberg Mtn
Lichtenwasser Lake
Smith
Brook
PACK TRAIL
T 27 N
T 26 N
Nason
Creek
Gravel Pit
CASCADE
CREST
FOREST
BOUNDARY
Tye Lake
TUNNEL
(ABANDONED)
CHELAN CO
KING CO
Skyline Lake
Radio Tower
Stevens
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Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Skyline Ridge East (SE)

Hazard: Low-rare

Map: Labyrinth Mountain 7.5'

Location: Milepost 65.9-66.4 Station _____ Other _____

Elevation of starting zone: 5200'

Vertical fall: 1600' Length: 3650'

Description:

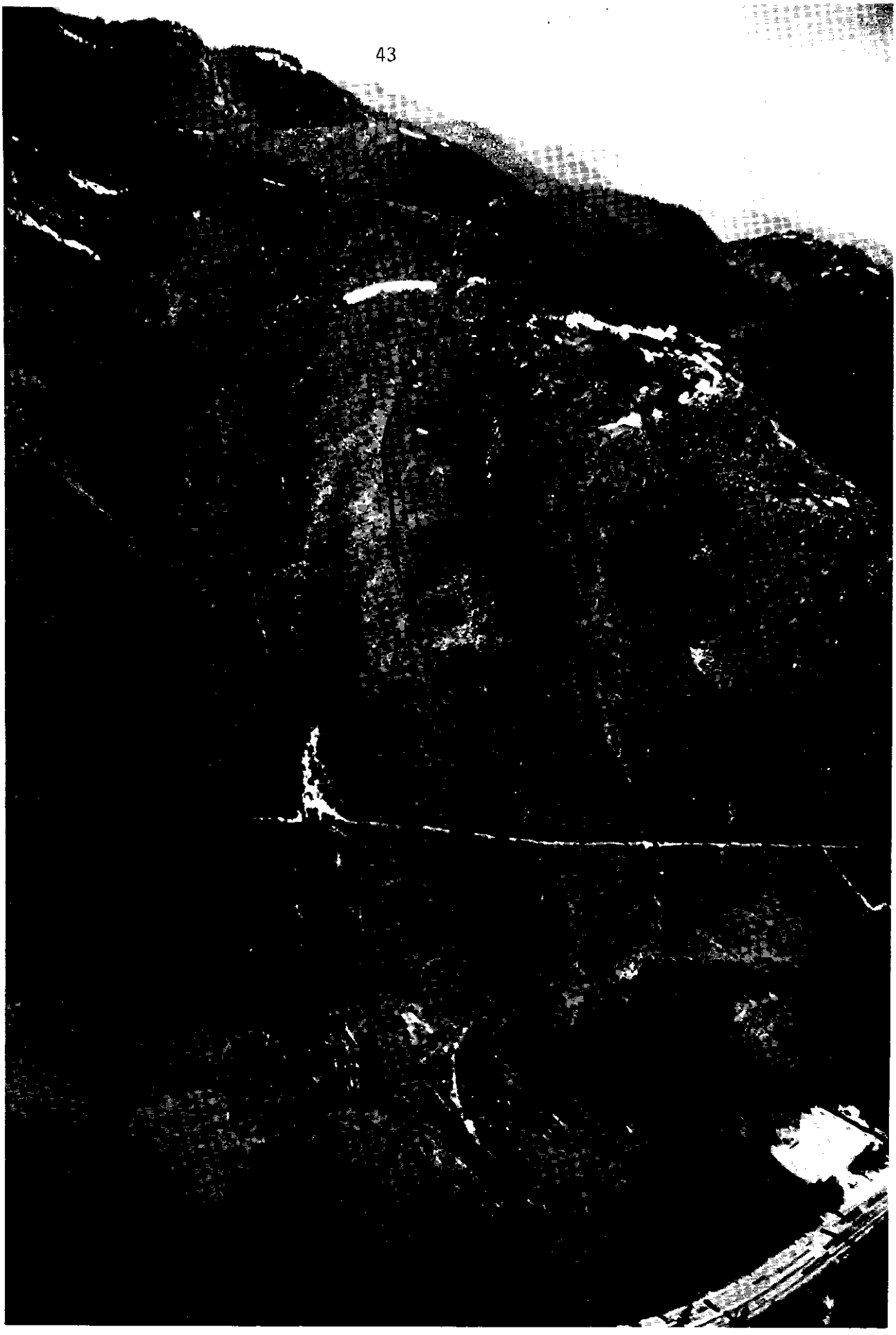
This is an east-facing slope just opposite the sandhouse 1 mile east of the summit. Loading is primarily from west winds. The area is not controlled. The entire slope is open with some brush cover. A creek bed on the south edge is the location of the largest individual path. There are four more smaller paths to the north. Individual slides do not appear to be a problem to the highway. The potential of the entire slope sliding is the greatest danger to the highway.

Effect on Highway:

The highway is at the very extreme edge of the runout zone. The highway has been closed north of the sandhouse by avalanches from this slope.

History:

A highway closure in the early 1940's and one in the early 1950's, plus other unsubstantiated stories of avalanches reaching the highway.



Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Yodelin (YO)

Hazard: Low-rare

Map: Labyrinth Mountain 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 5200'

Vertical fall: 1600' Length: 2800'

Description:

Large open slope above the Yodelin residential area. The area is loaded by cross slope winds from both east and west. The majority of avalanches are small and flow into the subdivision. Large slides have been observed into the creek and onto the edge of the highway. Vegetation indicates that the slope has a major cycle about every 20 to 30 years.

Effect on Highway:

Considerable debris with trees up to 1' in diameter can be expected if a slide reaches the highway.

History:

An avalanche from the Yodelin slopes crossed Stevens Creek and crossed the highway in 1948. In 1957 or 1958, a broad avalanche fell from these slopes and in places reached Stevens Creek. A similar avalanche was reported early in the 1950's. In January of 1971 extensive avalanching in this area caused property damage and fatalities among the houses but did not reach the highway.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Olsen Grade (OG-1 through 9)

Hazard: High-infrequent

Map: Labyrinth Mountain 7.5'

Location: *Milepost 66.8-67.3 Station _____ Other _____

Elevation of starting zone: 4000'

Vertical fall: 600' Length: 1000'

Description:

The starting zone for these nine slides is a short steep slope at the 4000' level. The upper half of the slope is clear cut while the lower half to the road is timbered. The nine tracks are difficult to see from the road and are easy to overlook. Avalanche activity affecting the road occurs when a large cold-type storm dumps 3-4' of snow over the area. There is frequent activity in the starting zone but the heavy timber impedes flow to the road. When avalanches do run to the road the road is blocked completely. Access to the starting zone is via the Yodelin ski lift. Loading comes primarily from west wind.

Effect on Highway:

High degree of hazard when 3-4' of new cold snow has fallen. Avalanches block road completely when they do run to the road. Any further timber cutting in this area can seriously increase the amount of avalanching snow which can reach the highway.

History:

1971--750' of road blocked by slide just before group of buses arrived heading eastbound. 1974--road closed by avalanching.

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*Milepost entry applies to Olson Grade 1-9.

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Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Nason Ridge (NR)

Hazard: Low-rare

Map: Labyrinth Mountain 7.5'

Location: Milepost 69.2 Station _____ Other _____

Elevation of starting zone: 5200'

Vertical fall: 2000' Length: 4500'

Description:

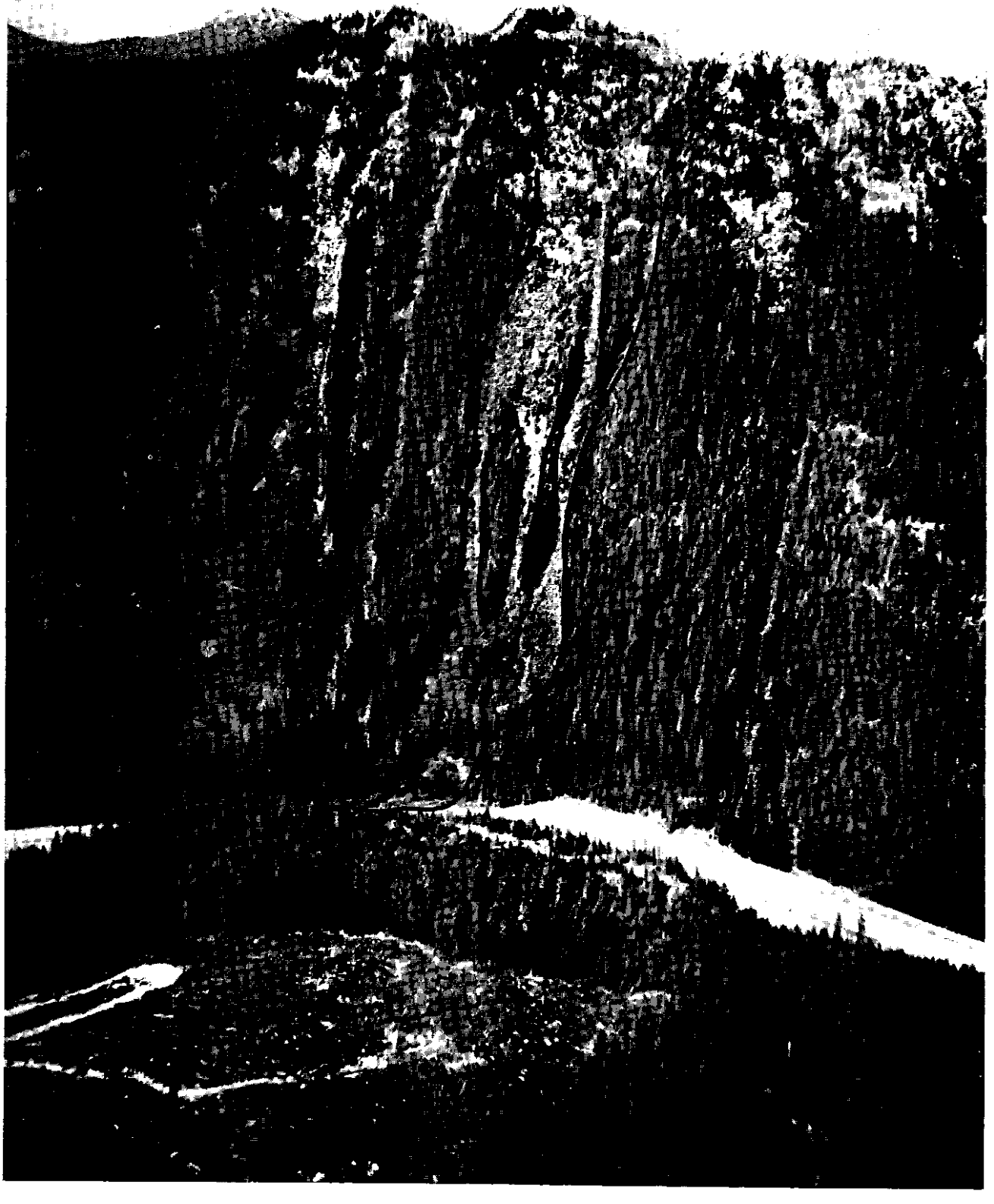
The starting zone is series of three narrow chutes in heavy timber just below the ridge top. The tracks are well defined and spread out on a smooth grassy and brush-covered runout zone just above Nason Creek. The path faces SW and is loaded by north and west winds. Avalanches are observed with every storm.

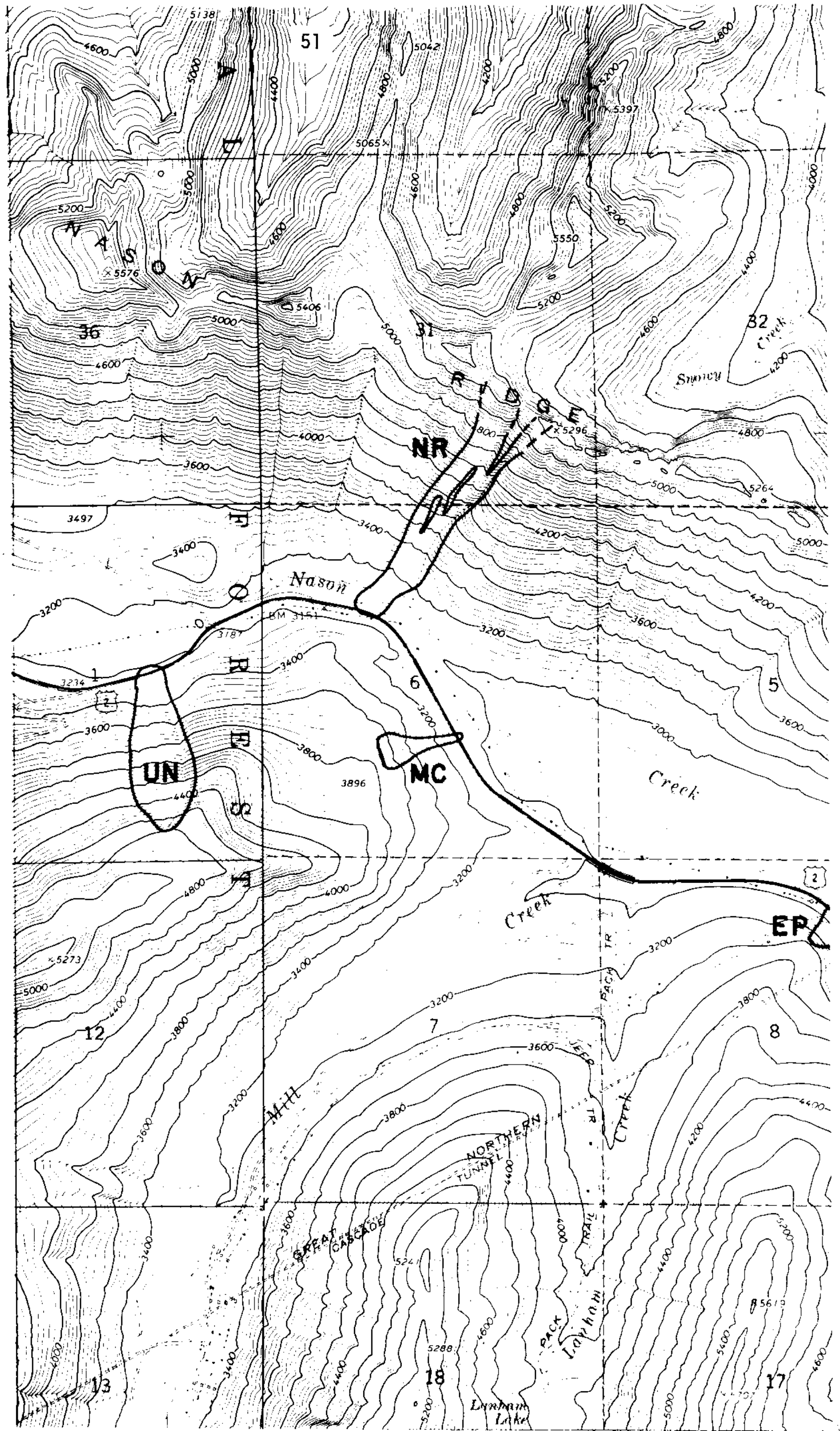
Effect on Highway:

The slide has the potential of depositing small amounts of dry snow in the west bound lanes.

History:

Was observed across the creek and to the edge of the road in 1972.

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NASON RIDGE
NR
Nason
UN
MC
EP
Creek
Snowy Creek
Mill Creek
Lanham Lake
GREAT NORTHERN CASCADE TUNNEL
PACK TRAIL
JEEP TR
BM 3151
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FOREST

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: University (UN)

Hazard: Moderate-infrequent

Map: Labyrinth Mountain 7.5'

Location: Milepost 68.3 Station _____ Other _____

Elevation of starting zone: 4600'

Vertical fall: 1400' Length: 2700'

Description:

The starting zone is an open rough rock talus slope below a short rock cliff. The majority of the avalanches do not reach the road. The track is separated into a number of narrow fingers through heavy timber. Some wet snow slides reach the power line right-of-way just above the road. The only slides observed to reach the road are dry, loose snow types. Loading is from west and east winds.

Effect on Highway:

At least two lanes of the road can be expected to be blocked once every 5 years.

History:

Last observed in road in 1972. Appears to follow about a five-year cycle. Avalanches are observed every year above the road.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Mill Creek (MC)

Hazard: Low-rare

Map: Labyrinth Mountain 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 3700'

Vertical fall: 600' Length: 1100'

Description:

The starting zone is a rock talus below a cliff on the end of the ridge separating Mill Creek and Nason Creek. The path faces east and is loaded by west winds. Avalanches have been observed in the starting zone, but none has ever been observed to reach the road. The track is through dense second-growth timber. A narrow well defined track is present to the rock cut above the east bound lanes.

Effect on Highway:

Potential of depositing a small amount of snow in the road from dry snow avalanches.

History:

No records.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: East Portal (EP)

Hazard: High-frequent

Map: Labyrinth Mountain 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 3400'

Vertical fall: 500' Length: 780'

Description:

This path is an open talus slope with boulders up to 3' in diameter. The starting zone is in trees and smooth rock slabs. Early season slides from the starting zone are checked by the rough slope until the boulder field is smoothed over, then avalanches run to the road in about 5 places. These vary from year to year and depending upon the wind conditions. Loading is from both east and west winds. Control is possible from the road and can be accomplished by Avalauncher. The slide is located just above the east portal of the Cascade Tunnel.

Effect on Highway:

Slides will block the inside lane regularly and both lanes during major storms. Depths are 1-5' and can be 300' long.

History:

This slide has blocked the road almost every year with an occasional vehicle being involved.

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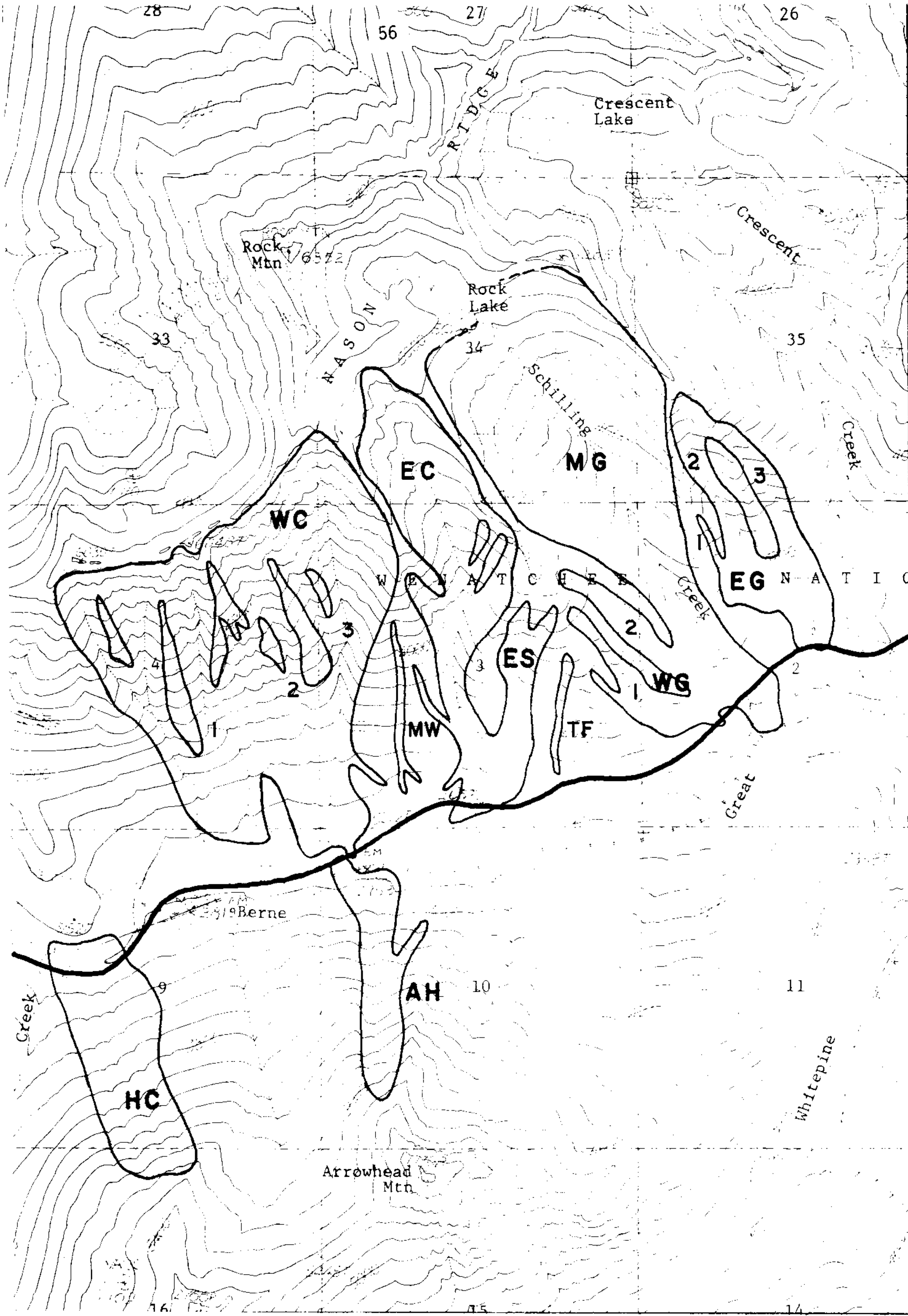

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NASON RIDGE
Crescent Lake
Rock Mtn 6552
Rock Lake
Crescent
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Schilling
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WENATCHEE NATIO
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MW
TF
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Berne
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Creek
AH
HC
Whitepine
Arrowhead Mtn

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Henry Creek (HC)

Hazard: Low-infrequent

Map: Chiwaukum 2 SW 7.5' advance sheet

Location: Milepost 71.5 Station EB 362-371 Other _____

Elevation of starting zone: 5400'

Vertical fall: 2300' Length: 4800'

Description:

The starting zone is sparse second growth timber covering four shallow gullies across a 1000' fracture zone. Avalanches are confined to the gullies. The area was burned over in the early part of the century. This resulted in some very large slides until the trees were able to reestablish themselves. The path faces NNW and is loaded by west and east winds. It is uncontrolled although the E-1 gun tower could control the area if necessary. It is unlikely that large avalanches will be generated from this area again, but the possibility of another large avalanche falling over a wide front cannot be discounted during exceptional winter storm and snow conditions.

Effect on Highway:

The only avalanches presently affecting the road are wet snow slides being released by heavy rain. They will reach to the road and sometimes block one lane.

History:

A large avalanche occurred in 1937, depositing 90' of snow in the road, creek, and railroad. The last large avalanche was observed in 1943. Wet snow slides are observed every two or three years near the road edge.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Arrowhead Mountain (AH)

Hazard: Low-rare

Map: Chiwaukum 2 SW 7.5' advance sheet

Location: Milepost 72.5 Station EB 413 Other _____

Elevation of starting zone: 5300'

Vertical fall: 2600' Length: 4800'

Description:

The starting zone is near the apex of the peak in steep rocky terrain and lower down in small depressions sheltered by timber. The track is defined by trees and a rock rib on both sides. The path runs to the railroad fill at least once a year. Loading is from east and west winds. The path is not controlled. Control would be possible from the E-1 tower.

Effect on Highway:

The slide has not been observed to hit the road but the potential and vegetative evidence seem to indicate that it is possible. The avalanche would have to flow over the railroad tracks to reach the road.

History:

No records.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: West Camp (WC-1, 2, and 3)

Hazard: Moderate to high-frequent

Map: Chiwaukum 2 SW, 7.5' advance sheet

Location: Milepost 72.5 Station WB 410 ± Other

Elevation of starting zone: 5000-6200'

Vertical fall: 3500' max. Length: 8000' max.

Description:

WC-1 and 2: The starting zones are a series of interconnecting gullies, separated by rock ribs and some fingers of trees. The tracks are mostly rock with some soil and brush. The runout zone is talus covered by brush. The area is controlled by E-1 gun tower. Loading is from west, east, and north winds. Large dry soft and hard slab avalanches are generated.

WC-3: The starting zone follows the ridge line around the rim of a deep long ravine. Slides are released from a number of locations around the upper portion of the zone and at various other locations such as rock outcrops, benches, etc. The terrain is talus, smooth rock, and dirt. Some trees and brush are scattered in the upper reaches of the path. The track is a creek bed with a dog leg to the right as the avalanche flows down the track. Loading is from west, east, and north winds. Large dry slab avalanches are generated by prolonged wind transport. The DOH ammunition dump is located on the edge of this path and is exposed to possible overrun by a large avalanche.

Effect on Highway:

WC-1 and 2: The effect on the present road is minimal but the proposed new westbound lanes would be affected with each major storm.

WC-3: This slide is the most dangerous of the three to the highway. It stopped short of the ammunition dump by 50' in 1972. A finger of this avalanche forged its way through the timber to within a few hundred feet of the Berne Snow Camp.

History:

Avalanches occur with every storm. WC-3 has crossed the highway in 1949, 1950, and 1969. In 1972 it stopped at Nason Creek just short of the highway.


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Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Midway (MW-1 and 2)

Hazard: Moderate-frequent

Map: Chiwaukum 2 SW, advanced sheet 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 1 = 4400', 2 = 3600'

Vertical fall: 1 = 1700', 2 = 900'Length: 1 = 3500', 2 = 1850'

Description:

These two slides begin in the timber just behind the Berne Snow Camp of the DOH. Unstable snow is deposited by east and west winds in a small opening in the trees. The MW-2 track is short and narrow with brush and grass. The slide terminates just short of the duplex on the east end of the camp. The track for MW-1 is long and narrow and splits in the runout zone and turns toward the camp on the west end. There is evidence that the slide has run into the camp area numerous times in the past. Presently, the NW corner of the shop building is in the path of this avalanche. Both paths are not controlled.

Effect on Highway:

Does not reach the highway.

History:

Avalanche debris was observed in the area that the camp was constructed upon when the clearing crews began work.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: East Camp (EC)

Hazard: High-infrequent

Map: Chiwaukum 2SW, advance sheet 7.5'

Location: Milepost 72.9 Station _____ Other _____

Elevation of starting zone: 5200-6000'

Vertical fall: 2500-3200' Length: 5100' to 8600'

Description:

The starting zone for this path is difficult to define. One area is a rough rocky bench just under the ridge on the west side of the mouth of the canyon that is considered to be the main track. The track is very narrow and steep sided. Avalanches are released from both sides all the way to the head of the canyon. The only portion that is controlled is the rocky bench at the mouth of the canyon. This is done with the E-2 gun tower. The track moves out onto a broad talus and alluvial fan which is crossed by a power line and the highway. Avalanches occur with every storm, but are confined to the canyon unless the storm is large or major in size. Wet snow slides present problems to both the Berne Snow Camp and the highway. As long as the track is not filled in at the mouth of the canyon, the slides will run straight for the highway, but if it is filled in the slides have a tendency to turn toward the camp.

Effect on Highway:

This slide can be expected to run to the highway with every major storm. Rock and mud flow are also a problem in this area. Blockage of the highway is usually major when it does occur.

History:

The highway was closed in 1956, 1969, 1971, and 1972. In the early 1950's the road was closed for 3 days by a rock and mud flow. Considerable vegetation was destroyed in 1969, 1971, and 1972. In 1971 a finger of a slide came within 60 feet of the duplex building at the camp. A 30 foot pile of debris was cleared from the duplex site before the camp was built. The debris was from an avalanche the winter before.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: East Camp Shoulder (ES)

Hazard: High-infrequent

Map: Chiwaukum 2 SW, advance sheet 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 4600'

Vertical fall: 1900' Length: 3850'

Description:

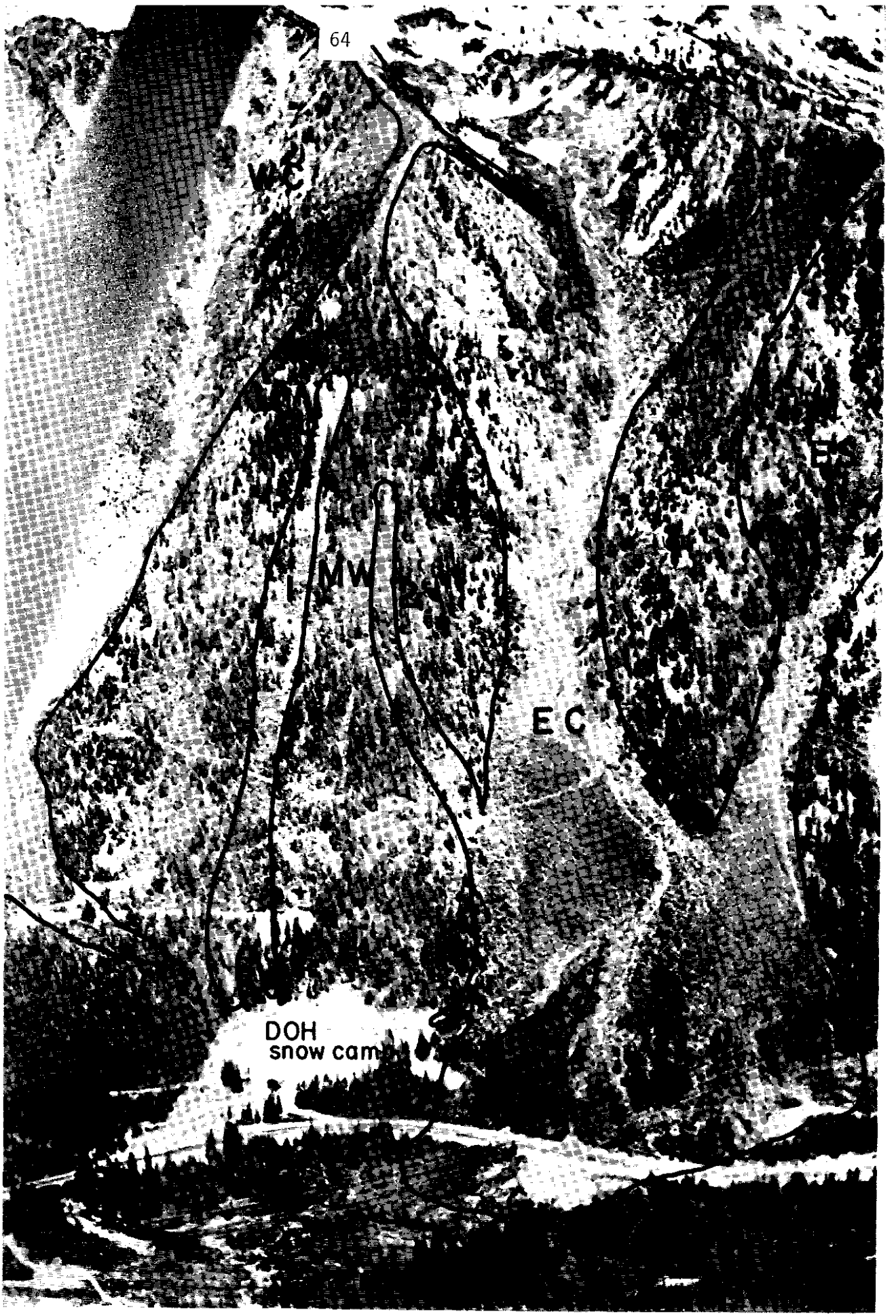
This path lies on the shoulder to the east of EC and is a deep rocky ravine that splits into a Y near the upper portion of the track. Snow loading is from west and east winds. The track is rough and smooth rock breaking out onto an alluvial fan with grass, trees and brush. It joins the track of EC and runs onto the highway. Control is by E-2. Wet snow slides are the largest problem.

Effect on Highway:

Will affect the highway in major storm periods, especially when it rains.

History:

Observed to slide with every storm, but usually stops well short of the highway. Has joined in with EC to run all the way to the highway.


WC
MW
EC
E
DOH
snow cam

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Tree Farm (TF)

Hazard: Low-frequent

Map: Chiwaukum 2 SW, advance sheet 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4100'

Vertical fall: 1400' Length: 2700'

Description:

This is an old slide path that is slowly being overgrown by trees and brush. The starting zone is in an area of smooth rock benches and ledges with scattered trees and some brush, but mostly open rock slabs. Numerous slides have been released from this area and control will continue from E-2. At some time in the past (40-50 years) this path crossed the road. With sufficient snowfall, and some rain to help it, the path could easily remove the new growth of trees in the lower track. West and east winds load the area.

Effect on Highway:

Potential of crossing the highway under major storm conditions.

History:

Avalanche crossed road many years ago.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: West Gaynor (WG-1)

Hazard: Low-frequent

Map: Chiwaukum 2 SW advance sheet 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 4600'

Vertical fall: 1900' Length: 3700'

Description:

The starting zone is at the apex of a broad shoulder at the end of the ridge dividing EC from MG. The slope is fairly smooth with scattered mature trees on the upper portion. The lower part of the path falls over a cliff and is funneled onto the runout zone by a depression in the cliff. The runout is broad and generally contains the avalanche. The path is loaded by both west and east winds. Avalanching occurs with every storm. Control from E-3.

Effect on Highway:

Only affects the highway on rare occasions. Artificial release can reduce this frequency even more.

History:

Wet slides have reached the highway in the past.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: West Gaynor (WG-2)

Hazard: Moderate-infrequent

Map: Chiwaukum 2 SW advance sheet 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4600'

Vertical fall: 2000' Length: 3650'

Description:

This path begins just east of WG-1 on a smooth steep slope exposed to the wind from the east. West winds load the slope, which follows a shallow depression to the runout zone. There are scattered short trees and brush on the running surface. The track joins MG at the mouth of the canyon. Avalanches are frequent during storms.

Effect on Highway:

Runs to the highway once every five years on the average. Often joins with MG or runs shortly after. Has helped to close the road. It has a tendency to block the mouth of MG and cause it to deflect to the east and cross the highway at irregular locations.

History:

See MG.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Main Gaynor (MG)

Hazard: High-moderately frequent

Map: Chiwaukum 2 SW advance sheet 7.5'

Location: Milepost 73.9 Station _____ Other _____

Elevation of starting zone: 5000' to 6200'

Vertical fall: 2400' to 3600' Length: 5500' to 9500'

Description:

This is a very large drainage with release zones on both sides and at the head of the drainage. The entire area may release at once or it may release in segments. Numerous tracks lead to the main track, which is a steep-sided canyon. Scrub trees and brush cover the terrain with occasional islands of timber in the upper portions of the west side. The starting zones are loaded by west, east, and north winds. Different areas are loaded with each wind condition. Control is from the E-3 and 4 gun towers. The runout zone is broad and flat. It is brush covered all the way to Nason Creek and upslope on the other side of the valley to the railroad tracks. Avalanching occurs with every storm, but the road is only reached during major storms. In the past few years the path has become more active than the five year cycle of the past.

Effect on Highway:

Will block the highway with many major storms. Blockages will usually be severe and may close the highway for a number of days.

History:

1949--6 day closure, slid across road, creek, and onto railroad tracks. 90' deep; 600' of center line covered.
1952--buried Cat-tractor
1956, 71, 72, 74--On January 11, 1972 it reached the road four times in 12 hrs., twice with depths of 6-15' and covering 300-400' of center line.

It has slid to the upper edge of the road on numerous occasions in other years, but the only slides remembered are those crossing the road.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: East Gaynor (EG-1, 2, and 3)

Hazard: Low-infrequent

Map: Chiwaukum 2 SW advance sheet 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 1-- 4100'; 2-- 5300'; 3--5100'

Vertical fall: 1--1200'; 2--2600'; 3--2400' Length: 1--2100'; 2--5300'; 3--5200'

Description:

EG-1 is a minor slide that does not reach the highway. It is a well-defined path with trees on both sides of the track. The starting zone is a small opening in the trees and the runout a smooth brushy slope.

EG-2 is the largest of the three slides. The starting zone is the apex of a rocky ravine extending to the top of the East Gaynor Ridge.

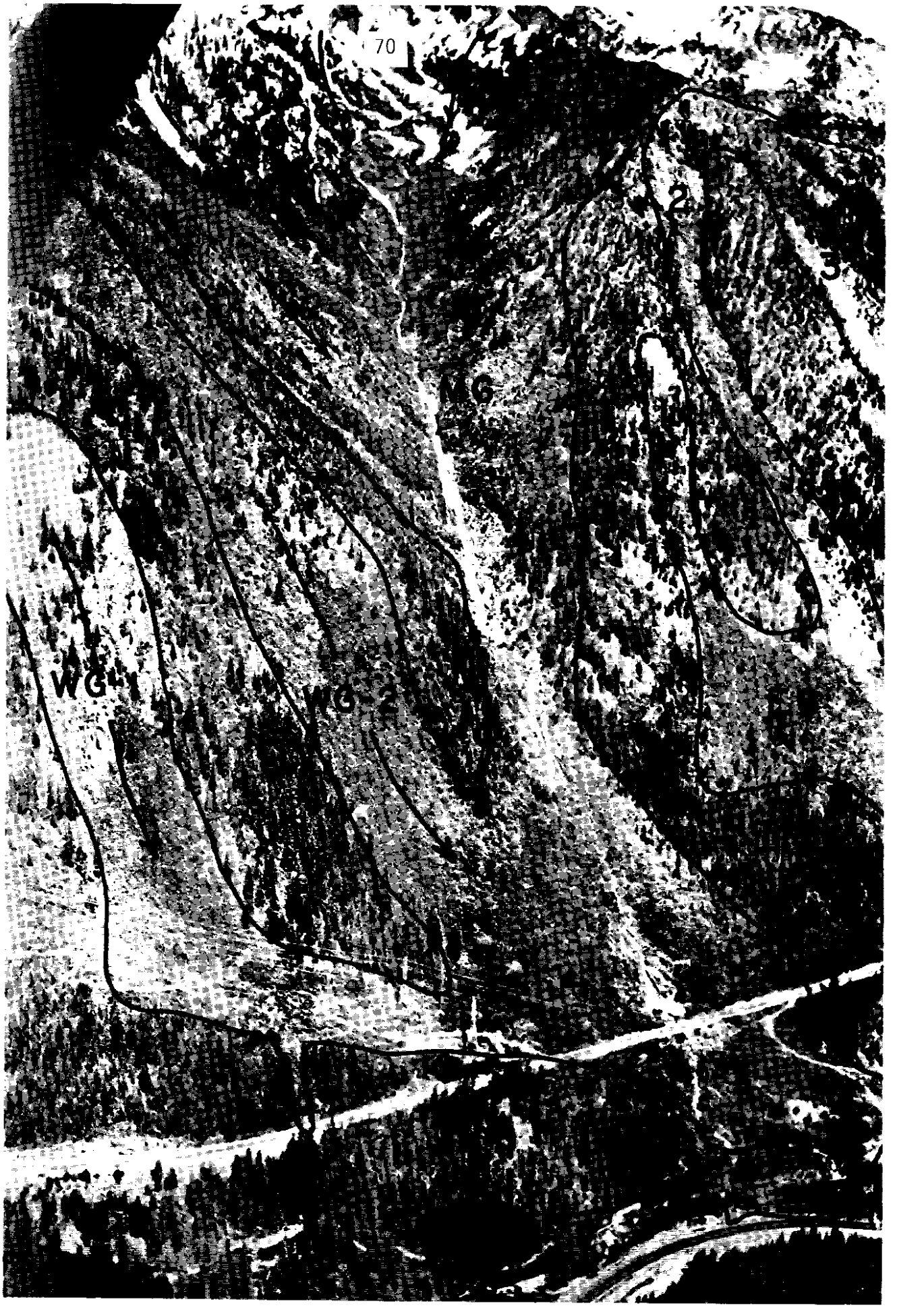
EG-3 is just east of EG-2 but does not extend to the same height as EG-2. The starting zone is a steep rock slope at the head of a rocky ravine. A large rock rib with trees and brush separates the two slides in the upper portions. They join tracks at the top of the run-out zone and extend across the highway. The paths face SE and are loaded by east and west winds. Control is by E-4.

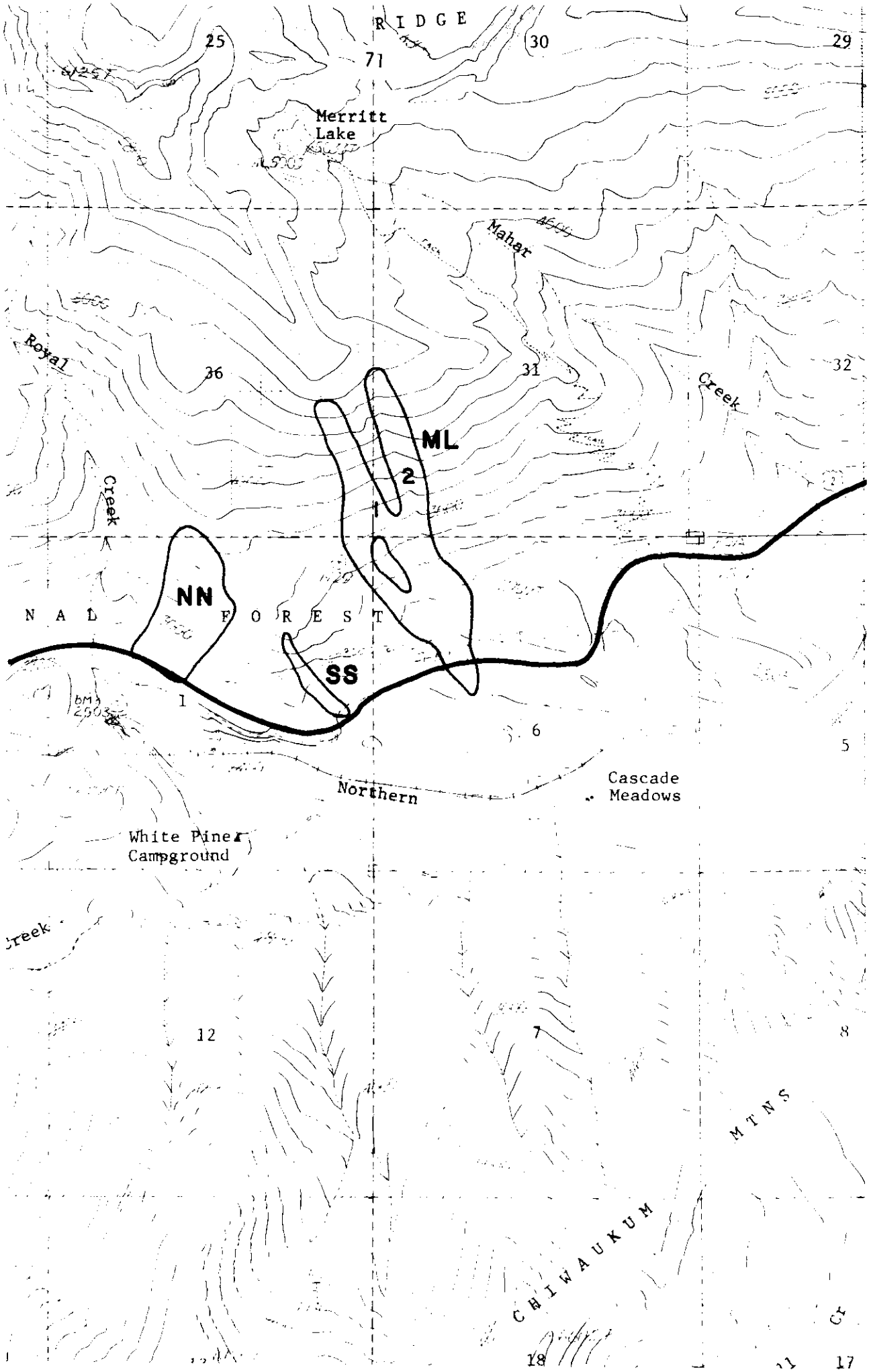
Effect on Highway:

EG-2 and 3 can reach the road and have in the past. EG-1 could possibly join with MG.

History:

Vegetation evidence indicates the slides ran across the road in the 1930's or 40's.


WG 1
WG 2
WG
2
3


RIDGE
25
30
29
71
Merritt
Lake
Mahar
Royal
36
31
32
Creek
Creek
ML
2
1
NN
N A L
F O R E S T
SS
1
6
5
Northern
Cascade
Meadows
White Pine
Campground
12
7
8
MTNS
CHIWAUKUM
18
17

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: No Name (NN)

Hazard: Low-rare

Map: Chiwaukum 2 SW advance sheet 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 3800'

Vertical fall: 1100' Length: 2550'

Description:

This is an old slide with no activity in recent time. It is a steep smooth slope with brush and grass cover. Vegetation indicates it has been active in the past. The slope faces SW and is loaded by west and east winds. It is possible that the inactivity is due to the lower snowfall experienced east of the Cascade crest. Control would be possible from the road by Avalauncher.

Effect on Highway:

Could block the highway during unusual snow conditions on the east slope.

History:

No record of reaching highway.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Small Shot (SS)

Hazard: Low-rare

Map: Chiwaukum 2 SW advance sheet 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 3200'

Vertical fall: 600' Length: 1431'

Description:

This is a small slide in mature timber and on a brushy rib of rock that faces ESE. Loading is from the west. The area is not controlled, but could be from the road. Avalanching occurs with major storms.

Effect on Highway:

Negligible effect at present. Could become a problem if future construction widens the highway.

History:

No record.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Merritt Lake (ML)

Hazard: Low-infrequent

Map: Chiwaukum 2 SW advance sheet 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 5200'

Vertical fall: 2600' Length: 6100'

Description:

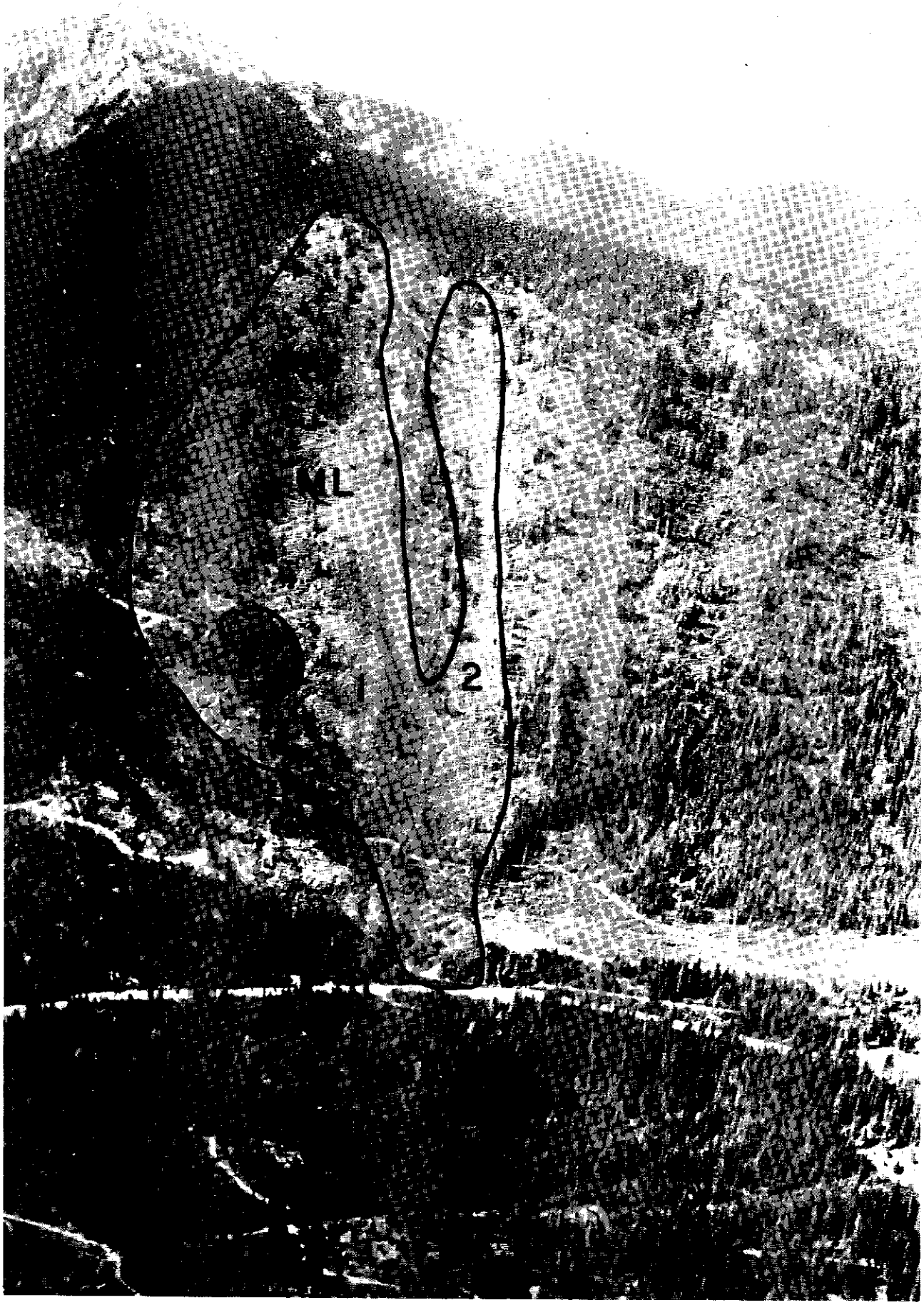
There are two starting zones associated with this path which combine about half way down the track. The starting zones are shallow gullies with a small rock outcrop at the head. The track is grass, brush, and a very few trees; the terrain is smooth. Loading is from west and north winds. Major storms would produce large enough avalanches to reach the highway. The slope faces SE and receives considerable solar radiation. Avalanching occurs with every storm, but the highway is rarely reached.

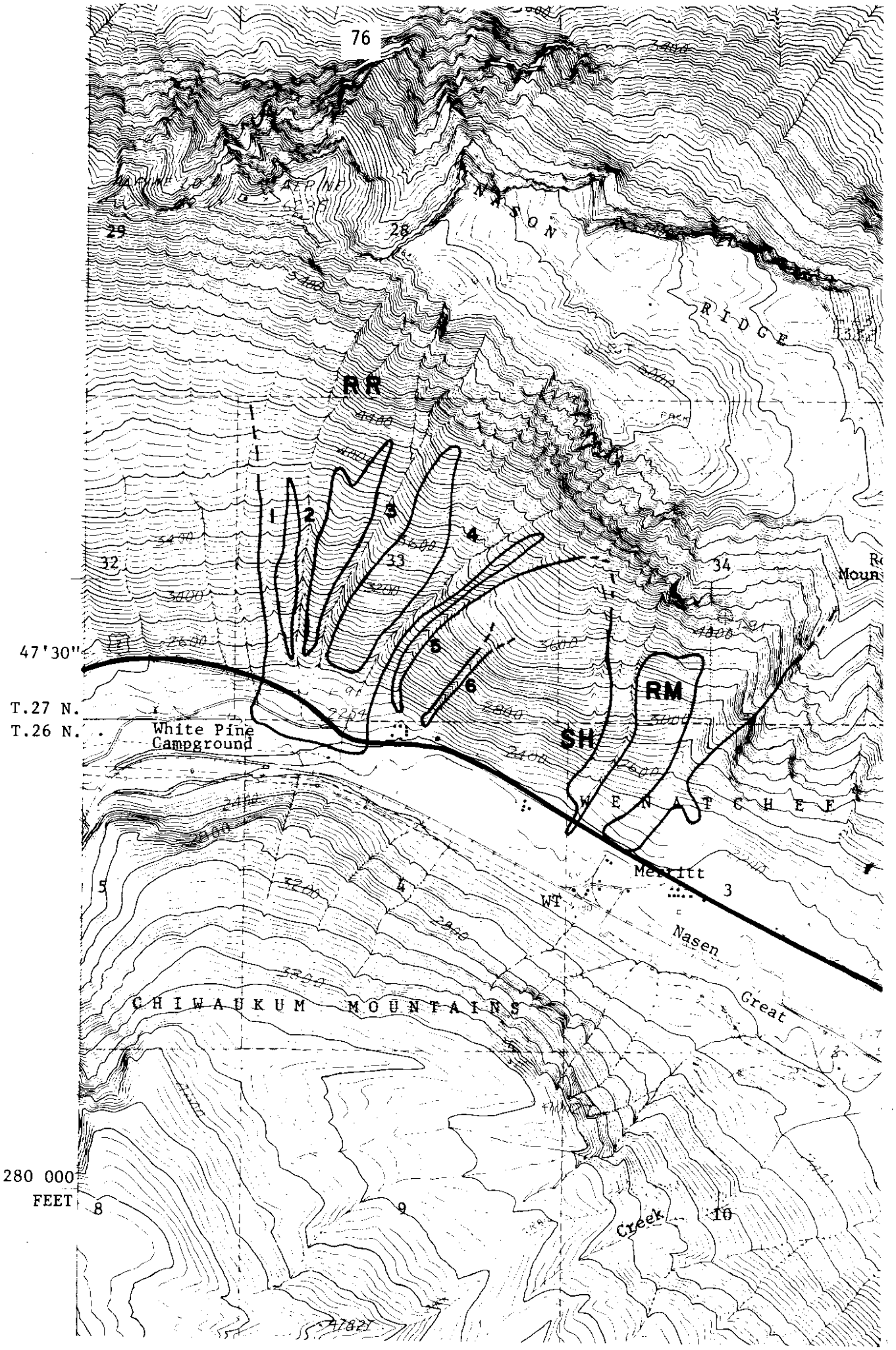
Effect on Highway:

Will block the highway about every 20 to 30 years. There may be considerable debris in the deposition.

History:

The slide crossed the road in 1949 and reached within 100' of the road in 1972.


ML
1
2


RR
RM
SH
1
2
3
4
5
6
RIDGE
White Pine
Campground
Merritt
Nasen
Great
CHIWAUKUM MOUNTAINS
WENATCHEE
Creek
47'30"
T.27 N.
T.26 N.
280 000
FEET

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Ray Rock (RR-1 through 6)

Hazard: Low-rare

Map: Chiwaukum 2 SE advance sheet 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 6000'

Vertical fall: 3800' Length: 7900-8800'

Description:

The starting zone for all of these slides is a steep cliff area with many small narrow gullies. West winds deposit snow in this area,which continually sluffs to the lower slope at the base of the cliff. These gullies gather together, as the slope descends, into six large gullies that descend to the runout zone, which begins just above the highway. The tracks are well defined by mature timber on all sides to the runout. The runout is covered by alders and brush. In the more active areas the slope is grass and low brush. North and east wind do contribute to the avalanche activity. Each storm sees considerable activity in the cliff area while major storms create situations that can cause the flow to reach and cross the highway. The area is uncontrolled. RR-5 does not run directly to the highway, but runs toward the back of the Ray Rock settlement.

Effect on Highway:

The last avalanche to cross the road occurred in 1965. It carried considerable debris with it. Other slides have been observed but the dates are not available. There is potential for and evidence that this could be the largest avalanche on SR-2, extending to the flats below the highway.

History:

1965--crossed highway
Vegetation--major event to valley floor around the turn of the century, large cycle about every 30-40 years. Apparently events took place in 1924 and 1949.
Considerable damage done to alders above highway in 1972.


RR
1
2
3
4
5
6

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: School House (SH)

Hazard: Low-rare

Map: Chiwaukum 2 SE, advance sheet 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 6000'

Vertical fall: 3800' Length: 7000'

Description:

This slide is just east of the RR area and the starting zone begins in a more pronounced gully, which appears to trap more snow from west winds. The track flows out across a bench and then over a small cliff before reaching the runout zone. The runout is cover by brush and trees with a definite trim line to and across the road. North and east winds can create hazard situations in this path, but the majority of the avalanches will be confined to the top of the runout zone. A major storm could create sufficient snowfall for the slide to reach across the road.

Effect on Highway:

Can cross the highway with considerable power. Depths could run to 20' and 150' of centerline covered.

History:

Last crossed the highway in 1950. Destroyed the school house, which was unoccupied at the time. Deposited a piano and 500 gal. oil tank in the highway.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Stevens Pass East

Name of Path: Round Mountain (RM)

Hazard: Low-rare

Map: Chiwaukum 2 SE, advance sheet 7.5'

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 5400'

Vertical fall: 3200' Length: 7400'

Description:

This is the last avalanche on the east end of Nason ridge that can affect the highway. It starts in a large steep basin that is loaded by west and north winds. East winds may play a role also, but this has not been observed. Avalanching will occur with every storm, but only a major storm would generate sufficient snow to release an avalanche that could cross the road. The track runs over a lower cliff before it dissipates on the runout zone. The starting zone faces south and southwest. The area is not controlled.

Effect on Highway:

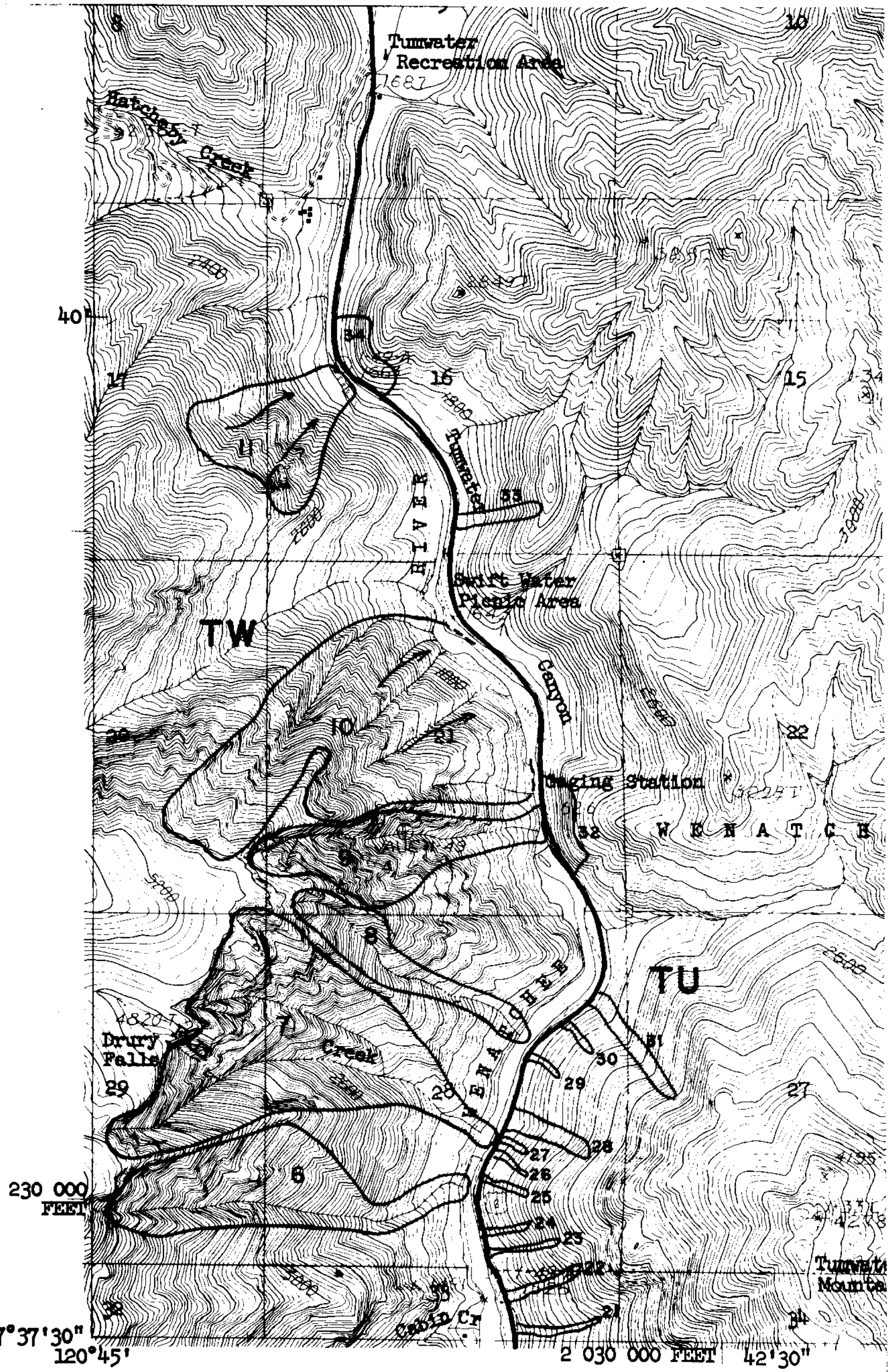
Has reached the highway in the past, but this was as least 30 to 40 years ago.

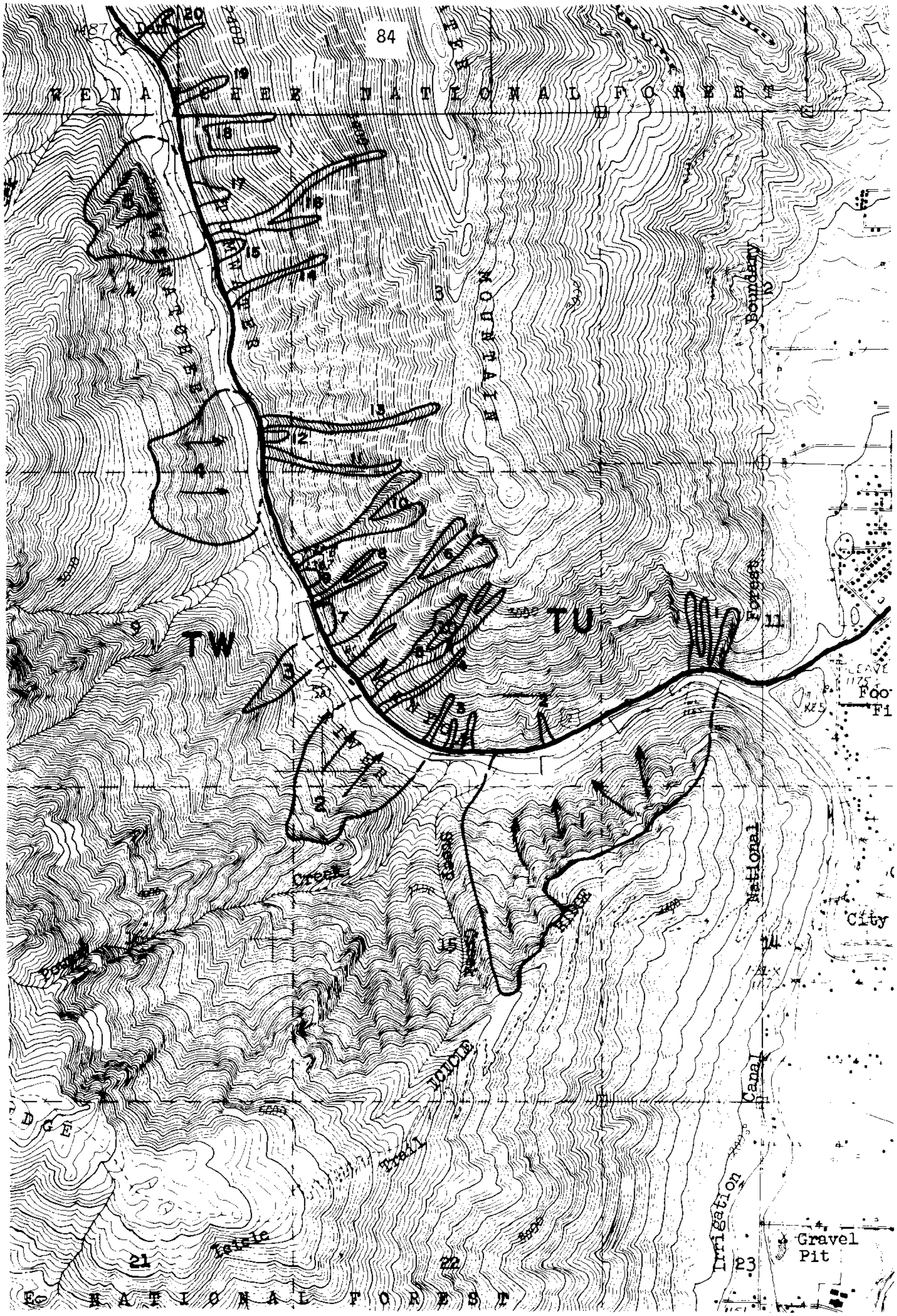
History:

No record.

TUMWATER CANYON

Tumwater Canyon extends from the outskirts of the town of Leavenworth to the Wenatchee River Bridge just above Hatchery Creek. The steep walls of this canyon produce frequent avalanching from both sides. The east side, where the highway is located, involves many small avalanches, most of them with starting zones a relatively short distance above the highway. On the west side of the canyon, a number of large avalanche paths fall several thousand feet to the Wenatchee River. Most do not affect the present highway. These latter paths are also identified and described in some detail in this Atlas because a possible routing of additional highway lanes on the west side of the canyon has been discussed, and such a survey was requested by the Department of Highways. Present plans appear to favor a route different than Tumwater Canyon for a four-lane highway, but the survey information obtained in the meantime is retained here for future reference.


Tumwater
Recreation Area
Hatchery
Creek
40'
Tumwater
RIVER
Swift Water
Picnic Area
TW
Canyon
Gaging Station
W E N A T C H
TU
WENATCHEE
Drury
Falls
Creek
Cabin Cr
Tumwater
Mountain
230 000
FEET
47°37'30"
120°45'
2 030 000 FEET
42'30"


WENATCHEE NATIONAL FOREST
MOUNTAIN
Boundary
TW
TU
Forest
11
Creek
City
National
Canal
Irrigation
Trail
Icicle
Gravel
Pit
21
22
23
NATIONAL FOREST

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Tumwater Canyon

Name of Path: Tumwater (TU-1 through 34)

Hazard: Low to high-frequent

Map: Chiwaukum 4 NW and SW 7.5', advance sheets

Location: Milepost_____Station_____Other_____

Elevation of starting zone: up to 3600'

Vertical fall: up to 2200' Length: up to 4000'

Description:

The east side of the canyon has many avalanches of various sizes. The highway follows the river. The slopes are generally made up of smooth sloping rock, open cuts, gulleys, timbered expanses with open bare ground mixed in. The majority of the avalanching occurs along the lower reaches of the slope, usually the first 500 feet of slope distance. There are some avalanches that begin higher, but they are rare. Short-running sluffs along the cut banks and from the more open short gulleys are the major cause of avalanche activity in the canyon. Activity usually occurs when there has been a heavy snow followed by warming. Although this kind of activity has been the more spectacular in the memory of the highway crews, there have been other types of avalanche activity in the past. The more outstanding activity occurs when a snowfall consists of a large percentage of needle crystals (F4), which seems to occur on the east slope of the Cascades often. This may be the result of storms coming up from the southwest through the Columbia River gorge and hitting the mountains from the east.

Effect on Highway:

Large numbers of small to medium slides, some closing the road, during the heavier snowfalls. Most avalanche cycles are accompanied by rock and some dirt. Large heavy slides will occur when heavy snowfalls are followed by rain.

History:

The highway has been closed numerous times by avalanches. Men and equipment have been involved in numerous snow avalanches. A fatality due to avalanche activity once occurred in the vicinity of TW-5 to 10.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Tumwater Canyon

Name of Path: Tumwater West (TW-1)

Hazard: Moderate to high-frequent

Map: Chiwaukum 4 SW, Wash., Chelan County unedited

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 2400-3600'

Vertical fall: up to 2400' Length: up to 3000'

Description:

High, steep cliff with one pronounced gully. Frequent sluffing with an occasional large slide from the gully. During heavy snowfalls the cliffs will cycle several times. The cliff area is very rough and broken in character. The actual location of fracture lines will vary with each storm and the depth of the snowpack. The starting zones will load readily with an east wind.

Effect on Highway:

This slide area does not affect the present highway. If a future highway is built on the west side of the canyon, this slide zone would have considerable effect on the highway user. Both snow slides and rock fall would be major problems.

History:

No record.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Tumwater Canyon

Name of Path: Tumwater West (TW-2 and 3)

Hazard: Moderate to high-frequent

Map: Chiwaukum 4 SW 7.5', advance sheet

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: up to 2800'

Vertical fall: up to 1500' Length: up to 2000'

Description:

Numerous short gullies and cliffs. The area will produce many small, frequent avalanches. During large sustained storm periods there is a possibility of a moderate sized avalanche.

Effect on Highway:

No effect on the present highway. West side of highway would have frequent small slides in roadway with an occasional moderate size slide in road.

History:

No record.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Tumwater Canyon

Name of Path: Tumwater West (TW-4 and 5)

Hazard: Moderate to high-frequent

Map: Chiwaukum 4 SW 7.5', advance sheet

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: up to 2600'

Vertical fall: up to 1200' Length: up to 1000'

Description:

These two slide areas encompass a series of steep broken cliffs and rock slabs extending 1200' in elevation immediately above the river. There are no clearly defined slide paths, but the whole area can produce a series of sluffs and small slides running close to the river with almost every major storm. Undercutting the toe of these slopes with a highway would allow the avalanche snow to deposit on the road instead of running to the river. The roadway would become the collection zone for all of the sliding snow from the cliffs above.

Effect on Highway:

No effect on the present highway. A new road would have considerable hazard at this point from falling rock and slides. May be a good location for a snow shed of some sort.

History:

No record.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Tumwater Canyon

Name of Path: Tumwater West (TW-6)

Hazard: High-infrequent

Map: Chiwaukum 4 NW 7.5', advance sheet

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 4400'

Vertical fall: 2900' Length: 6000-7000'

Description:

Major avalanche path running to the river. There are two release zones with the one to the north being the largest. It originates along a steep rocky cliff extending to the ridge top. This slope is probably loaded by the prevailing west winds during storm periods. Avalanching occurs with each significant snowfall, but large slides only happen once or twice a year. These large slides will run to the river.

Effect on Highway:

If a very large slide ran, it might possibly reach the present highway. A new highway on the west side would have high hazard problems. This avalanche would create problems in control and clearing. The starting zone would be difficult to reach with artillery.

History:

Large wet snow avalanches have been observed in the river when heavy snowfalls have been followed by rain: 1971 and 1972 both produced large January avalanches. The trim line was altered by both cycles.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Tumwater Canyon

Name of Path: Tumwater West (TW-7) (Drury Creek)

Hazard: High-infrequent

Map: Chiwaukum 4 NW 7.5', advance sheet

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 4400'

Vertical fall: 2600' Length: up to 6000'

Description:

This is the largest slide in the canyon and runs into the river. It begins from a large, open expanse of cliff. The track is made up of two creek beds that join about two-thirds the way down the track into a common channel. Avalanche debris is commonly observed in the lower portion of this track. There are numerous starting points for avalanches as the starting zone covers more than half a mile of ridge line. Avalanches are funneled into a narrow runout zone and then on into the river when they are large. The path produces a number of slides with each storm. The large slides occur when the heavy snowfalls are followed by rains.

Effect on Highway:

The avalanche has never been observed to hit the present highway, but the potential is certainly there. A westside road would be subject to large avalanches at least once a year. Control would be difficult,

History:

Has slid into the river numerous times in the last thirty years, the most recent being winters of 1971 and 1972.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Tumwater Canyon

Name of Path: Tumwater West (TW-8)

Hazard: High-infrequent

Map: Chiwaukum 4 NW, Wash., advance sheet 7.5'

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 4700'

Vertical fall: 3100' Length: 5000'

Description:

Steep rocky starting zone with many probable starting points. The path is well-defined along its lower portions. Large avalanches run to the river. It is active with each storm but runs to the river only during large storms usually associated with rainfall.

Effect on Highway:

Does not presently affect the highway, but would have considerable effect upon a westside road.

History:

No record.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Tumwater Canyon

Name of Path: Tumwater West (TW-9)

Hazard: High-infrequent

Map: Chiwaukum 4 NW 7.5' advance sheet

Location: Milepost_____Station_____Other_____

Elevation of starting zone: 4700'

Vertical fall: 3000' Length: 5000'

Description:

This slide path begins in a steep, rocky cliff area, which is drained by a small stream. The north side is near vertical while the south side, being steep, has a bulge in the southerly direction. There appear to be two general starting zones on the south side divided by a narrow rib of rock. Avalanches descend onto a short narrow talus slope and on into the river. As with the other large slides on the west side, the track is very narrow, forcing the snow to be concentrated into a narrow high velocity mass. The slide hits the river at a narrow restriction in the canyon, which increases the chance of the slide hitting the present road.

Effect on Highway:

Potential hazard to the present highway is high, especially during heavy snowfalls. Rain on top of a heavy snowfall will produce large wet slides that could partially dam the river for a short time. A dry avalanche would probably create more of a hazard to the present highway. A westside highway would have avalanche debris on the road at least once a year and possibly more often.

History:

Avalanches are observed every year with deposition location varying in elevation from year to year, depending upon the amount of rain and the elevation of the snow line. In 1971 and 1972, avalanches reached the river.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Tumwater Canyon

Name of Path: Tumwater West (TW-10)

Hazard: Moderate to high-frequent

Map: Chiwaukum 4 NW 7.5', advance sheet

Location: Milepost_____Station_____Other_____

Elevation of starting zone: up to 3800'

Vertical fall: up to 2200' Length: up to 4000'

Description:

There are three slides starting from a rock slab area and falling through well-defined tracks to the river. The tracks run through timber in the lower reaches of the paths. There is also a path to the north that begins higher, but its hazard to the road is questionable. Avalanching occurs with significant storms and large avalanches occur when heavy snow and rain combine. The paths run to the river at least once a year and during heavy snow years probably run numerous times to the river.

Effect on Highway:

These paths do not involve the present highway, but would present a high degree of hazard to the westside route.

History:

No record.

Cascade Mountain Passes

Avalanche Summary Sheet

Area: Tumwater Canyon

Name of Path: Tumwater West (TW-11)

Hazard: Moderate to high-frequent

Map: Chiwaukum 4 NW 7.5', advance sheet

Location: Milepost_____ Station_____ Other_____

Elevation of starting zone: 2800'

Vertical fall: 1200' Length: 1000'

Description:

This is an area of steep slopes with scattered trees and a series of irregular cliffs cut by gullies. In the center of the cliffs is a pronounced gulley, which shows debris and trimline evidence of slides running to the river.

Effect on Highway:

Small slides running through the trees and amongst the cliff gullies can easily reach a new highway on the west side. General avalanching would be similar to that already encountered on the eastside of the canyon. The present highway is not affected by this slide.

History:

No record.