Open-File 86-04

Surficial - Geologic and Slope Stability Study of the Douglas Pass Region

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Colorado Geological Survey
1985

DOI: https://doi.org/10.58783/cgs.of8604.vhik9692

Folio #3 Geomorphic Features

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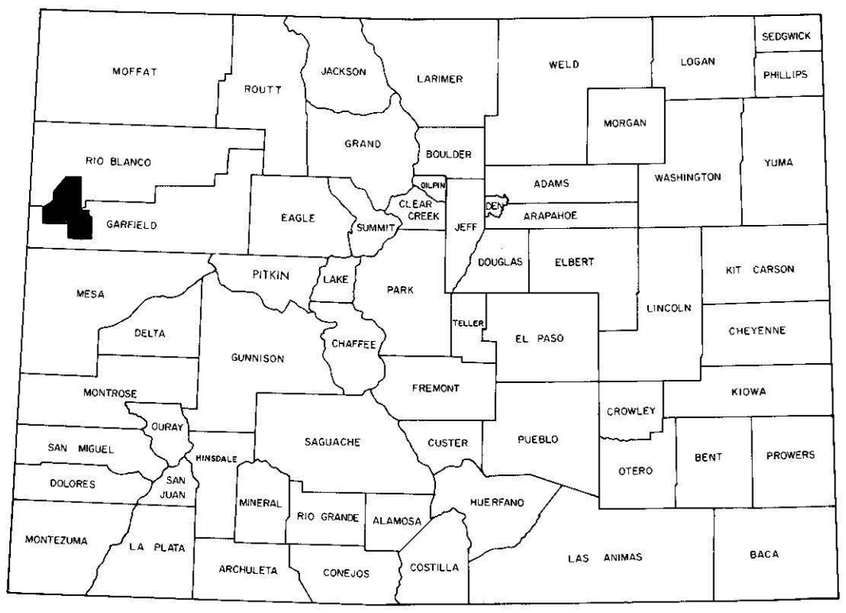
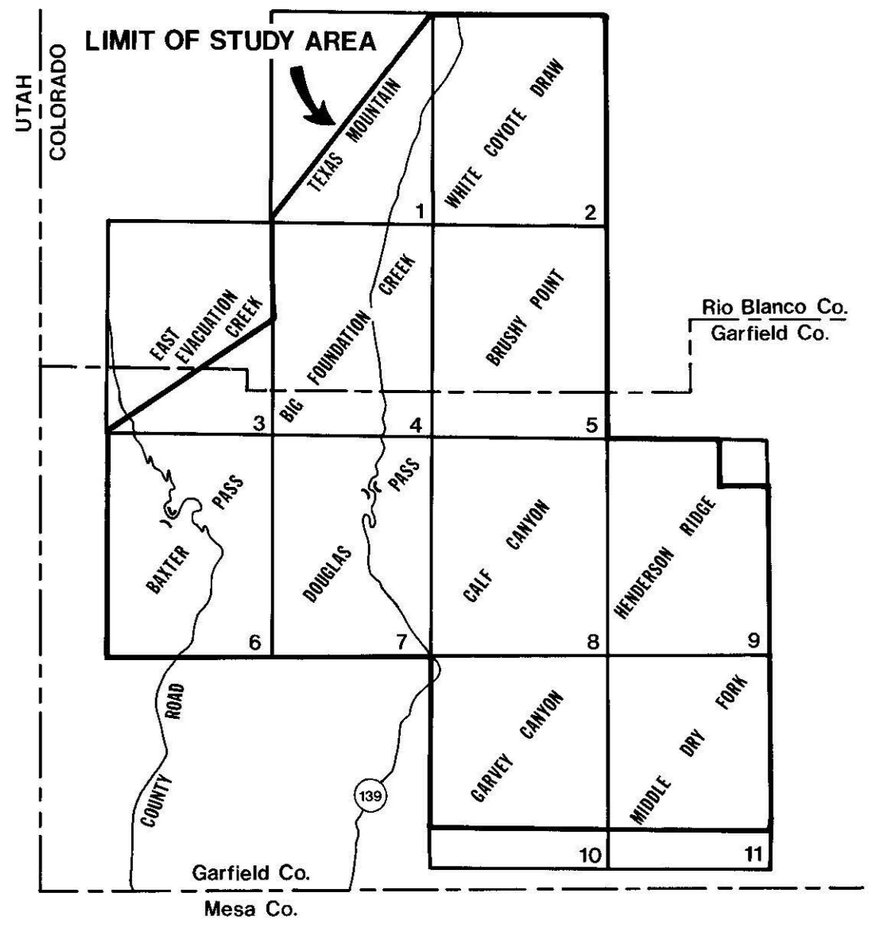
Location Map



Topographical Location Map



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Notes on Use and Limitations of These Maps

NOTES ON USE OF THESE GEOMORPHIC FEATURES MAPS

These maps depict morphogenetic features developed or developing from late Pleistocene to the present. They can provide insight into the type and intensity of the formative process, the distribution or general frequency of incidents in the recent past, and estimates of the type and thickness of surficial deposits that are associated with each unit.

Morphogenetic features data is used in preparing the Geologic Hazards Maps, and as such can provide supplementary information to the professional user from other disciplines. Used in conjunction with the other maps of this report, they can aid in locational studies and assist in selection of preliminary designs or mitigation. In later stages of project development they can help in selecting appropriate special geotechnical studies that may be required.

Explanation

TF **Terraces and Floodplains**
Alluvial plains or nearly flat and level surfaces adjacent to principal streams. Includes modern flood plains, younger terraces immediately adjacent to streams, and higher, presumably older surfaces composed of floodplain alluvium unquestionably derived from an associated stream. Most of the alluvial valley floors in the Douglas Pass Area have been deeply incised by stream downcutting so that only a narrow channel within the alluvial fill is subject to flash flooding. Severe erosion and bankcaving is occurring in most areas of this landform adjacent to streams and creeks.

F **Alluvial Fans and Aprons**
Deposits, commonly nearly triangular-shaped in plan, of stream-transported material usually consisting of silt-to-boulder-size clasts derived from the drainage basin of the stream that transported them. Individual alluvial fans may coalesce to form alluvial aprons. Alluvial fans mapped as **Rdf** and parts of those mapped as **af** on the surficial geologic maps are active depositional areas.

OTR **Old Terrace Remnants**
Areas underlain by surficial deposits of older, weathered, stream-derived sands and gravels that are found above modern streams. These are the remains of ancient floodplains that have been isolated above the modern stream regimen. Frequently covered by a veneer of loess up to 2m thick.

COLLUVIAL LANDFORMS

LS **Earthflows, Translational Landslides, Slumps, and Complex Slope - Failure Terrain**
Areas that have undergone mass slope movements during the Quaternary and/or that are undergoing such movements at the present time. These areas have distinctive hummocky topography, closed, poorly drained depressions, fresh or healed landslide scarps and pressure ridges, and disrupted drainage. In the case of active slope failures, movement of man-made structures or cultural works may be evident.

T **Talus Apron**
Larger accumulations of rock rubble below steep bedrock cliffs that are formed by repeated rockfalls and rock slides. Shown only in a generalized fashion in most areas. Only larger areas are mapped.

CO **Colluvial Aprons and Wedges**
Accumulations of material on or below moderate to steep slopes that have formed as the result of mass wasting and sheetwash of loose, poorly consolidated slope-derived debris from upslope areas.

DF **Debris Fans**
Steep, cone-to-wedge-shaped deposits of talus-flow, debris-flow and/or mudflow-transported material usually found at the mouths of steep, narrow gullies where steep first-order tributary drainages reach a stream confluence or valley floor, floodplain, landslide bench, or terrace adjacent to a larger stream.

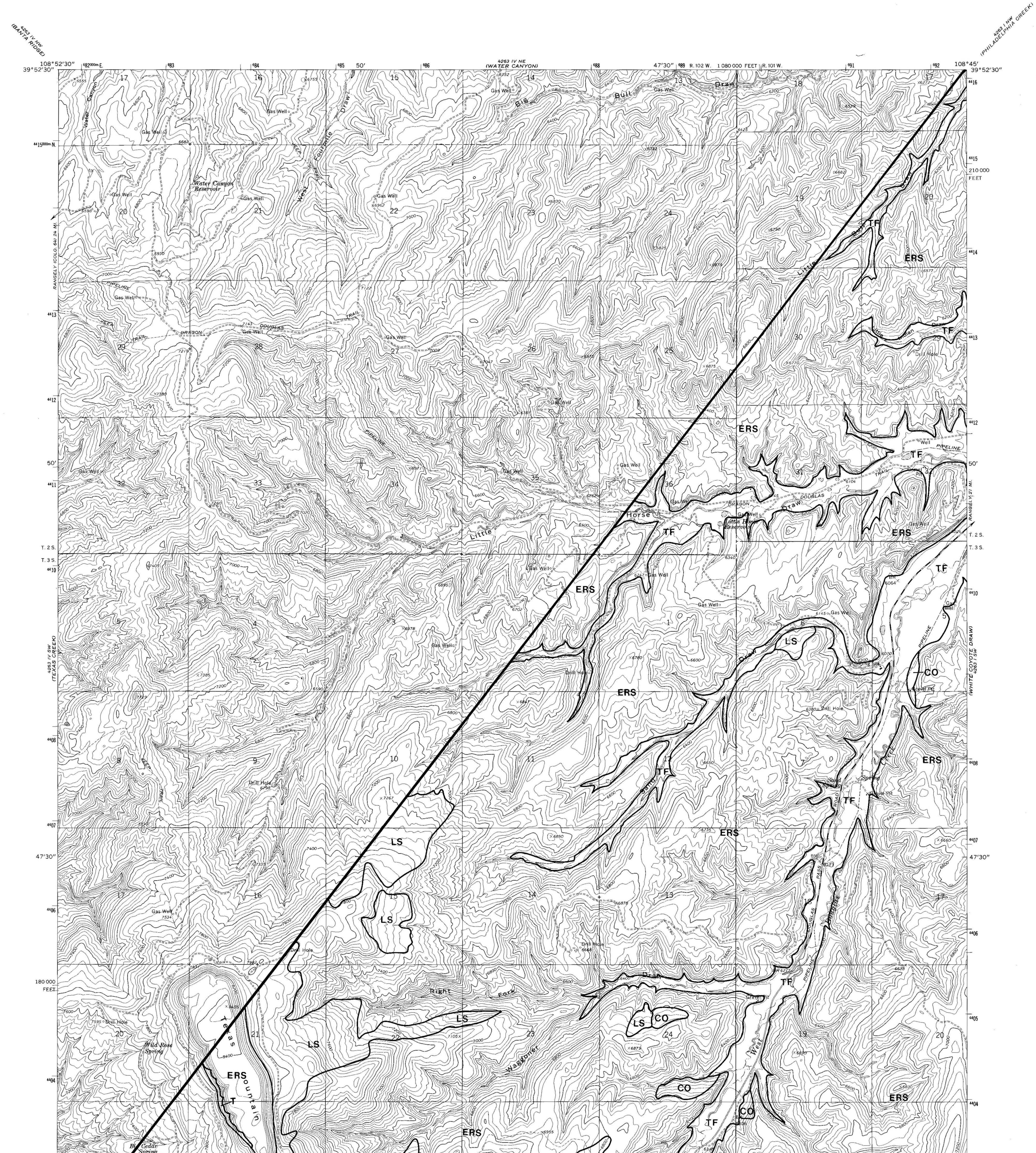
EROSIONAL LANDFORMS

ERS **Erosional Rock Slopes and Ridges**
Gentle to steep slopes, cliffs, spires, and ridges formed by erosion of Tertiary and Cretaceous sedimentary rock formations. Character of slopes is mainly controlled by lithologic factors associated with various rock types and stratigraphy of bedrock formations. Smooth, steep, uniform slopes and sharp cliffs and spires are characteristic of the Green River Formation (**Tgr**) marlstones and oil shales. Rugged, steep, rocky terrain with many cliffs, shoulders, and benches is characteristic of the Mesa Verde Group (**Kmv**) outcrop, with its massive sandstones interbedded with shales and claystones. Uncommon, scattered erosional ridges in the Wasatch (**Tw**), are generally smooth, gently rounded, and sculpted by mass wasting of the incompetent mudstone which makes up much of the Formation.

BR **Undivided Bedrock Exposures**
Bedrock exposures whose form is not distinctive enough to fall in the **ERS** category described above. This classification generally includes scattered, small bedrock outcrops exposed within large landslide-earthflow landforms, (**LS**). Outcrops occurring within the mass wasted terrain may give general indications as to the thickness of unconsolidated colluvial slope failure deposits. Some exposures probably represent intact blocks of bedrock which have become detached and incorporated into and transported within the slope failure deposits, however, no distinction of this type of bedrock exposure is made.

B **Badlands**
Area where modern stream, rill, and sheet erosion of soft, weakly resistant bedrock results in distinctive rounded and fluted low hills and cliffs. These areas are almost exclusively associated with the Wasatch Formation outcrop in places where erosional processes are rapid enough to degrade the bedrock outcrop. The products of erosion in these areas are usually deposited in or near badlands. Mapped only in a small area on the Garvey Canyon Quadrangle.

Contact between units



Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1964

Polyconic projection. 1927 North American datum
10,000-foot grid based on Colorado coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

1°24' 25 MILS — 15° 267 MILS

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

COLORADO

QUADRANGLE LOCATION

TEXAS MOUNTAIN, COLO.

3—1

108°45′ 39°52′30″ 693000m E. RANGLEY 16 MI. 695 42′30″ 697 4263 I NW (PHILADELPHIA CREEK) R. 101 W. 699 40′ R. 100 W. 700 701 702 1 120 000 FEET 108°37′30″ 39°52′30″

4416000m N. 4415 4414 4413 50′ 4412 T. 2 S. T. 3 S. 4410 4409 4408 4407 47′30″ 4406 4405 4404 4403 170 000 FEET

4416 210 000 FEET 4415 4414 4413 50′ 4412 4411 T. 2 S. T. 3 S. 4410 4409 4408 4407 47′30″ 4406 4405 4404 4403000m N.

DOUGLAS PASS 18 MI.

4263 IV SE (TEXAS MOUNTAIN)

4263 I SE (BLACK CABIN GULCH)

(BIG FOUNDATION CREEK) 4263 III NE

(RAZORBACK RIDGE) 4263 I NE

(BRUSHY POINT) 4263 II NW

1 090 000 FEET

39°45′ 108°45′ 693 695 696 42′30″ 697 699 R. 101 W. 40′ R. 100 W. 701 000m E. 39°45′ 108°37′30″

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1981

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1964

Polyconic projection. 1927 North American datum
10,000-foot grid based on Colorado coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

To place on the predicted North American Datum 1983 move the projection lines 7 meters north and 57 meters east as shown by dashed corner ticks

Map photoinspected 1973
No major culture or drainage changes observed

GN MN 1°29′ 26 MILS 15° 267 MILS

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

COLORADO

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Medium-duty ——— Light-duty ———

Unimproved dirt - - - - - -

WHITE COYOTE DRAW, COLO.

3–2

EAST EVACUATION CREEK, COLO.

3–3

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1964

Polyconic projection. 1927 North American datum
10,000-foot grids based on Colorado coordinate system, north and central zones
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

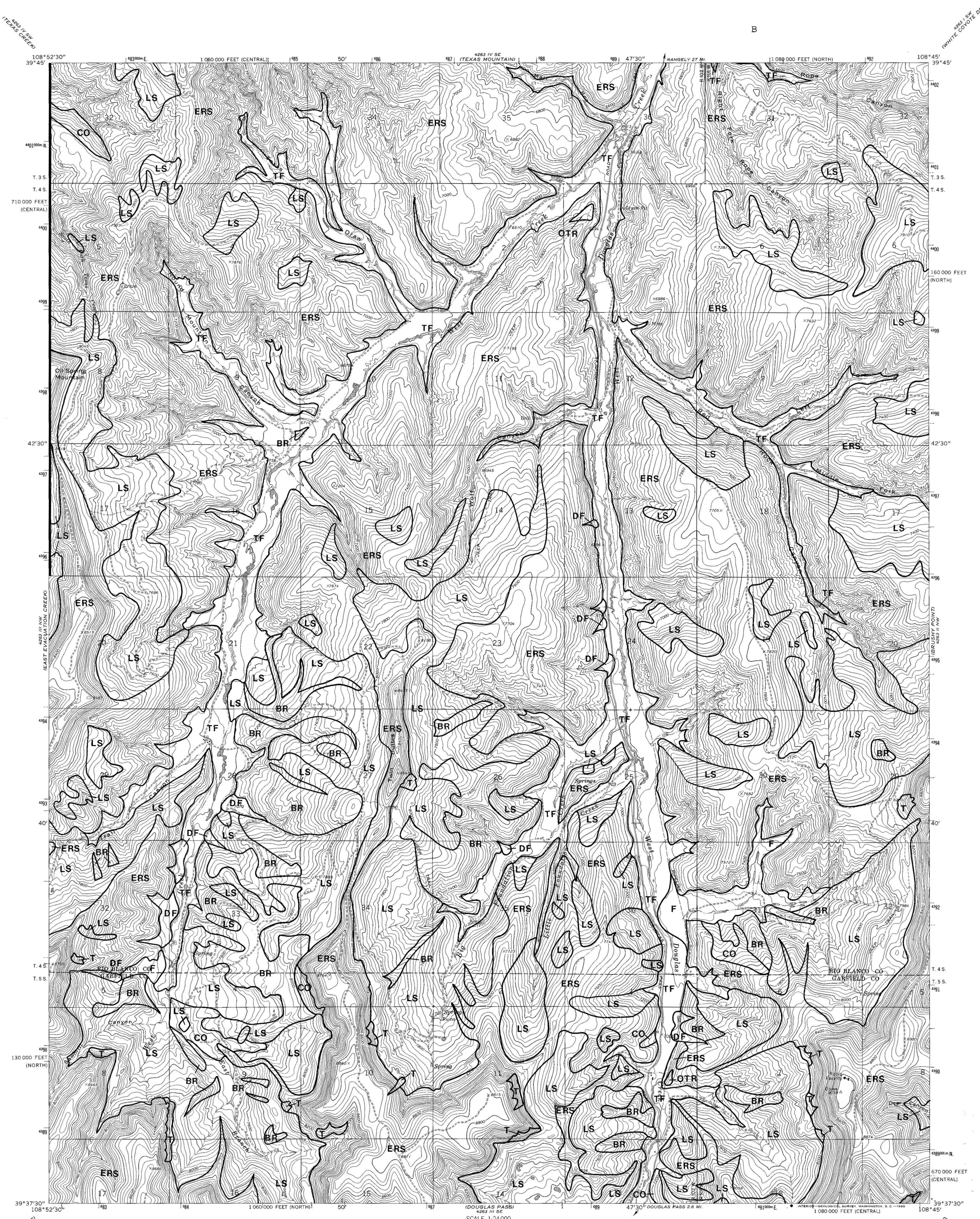
ROAD CLASSIFICATION
Light-duty ——— Unimproved dirt - - - - -

COLORADO
QUADRANGLE LOCATION

4263 IV SE (TEXAS MOUNTAIN)
4263 IV SW (TEXAS CREEK)
4263 III NE (BIG FOUNDATION CREEK)
4263 III SE (DOUGLAS PASS)
(BAXTER PASS) 4263 III SW

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1968

B



Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1964

Polyconic projection. 1927 North American datum
10,000-foot grids based on Colorado coordinate system, north and central zones
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET (1°24' 25 MILS; 15° 267 MILS)

SCALE 1:24 000

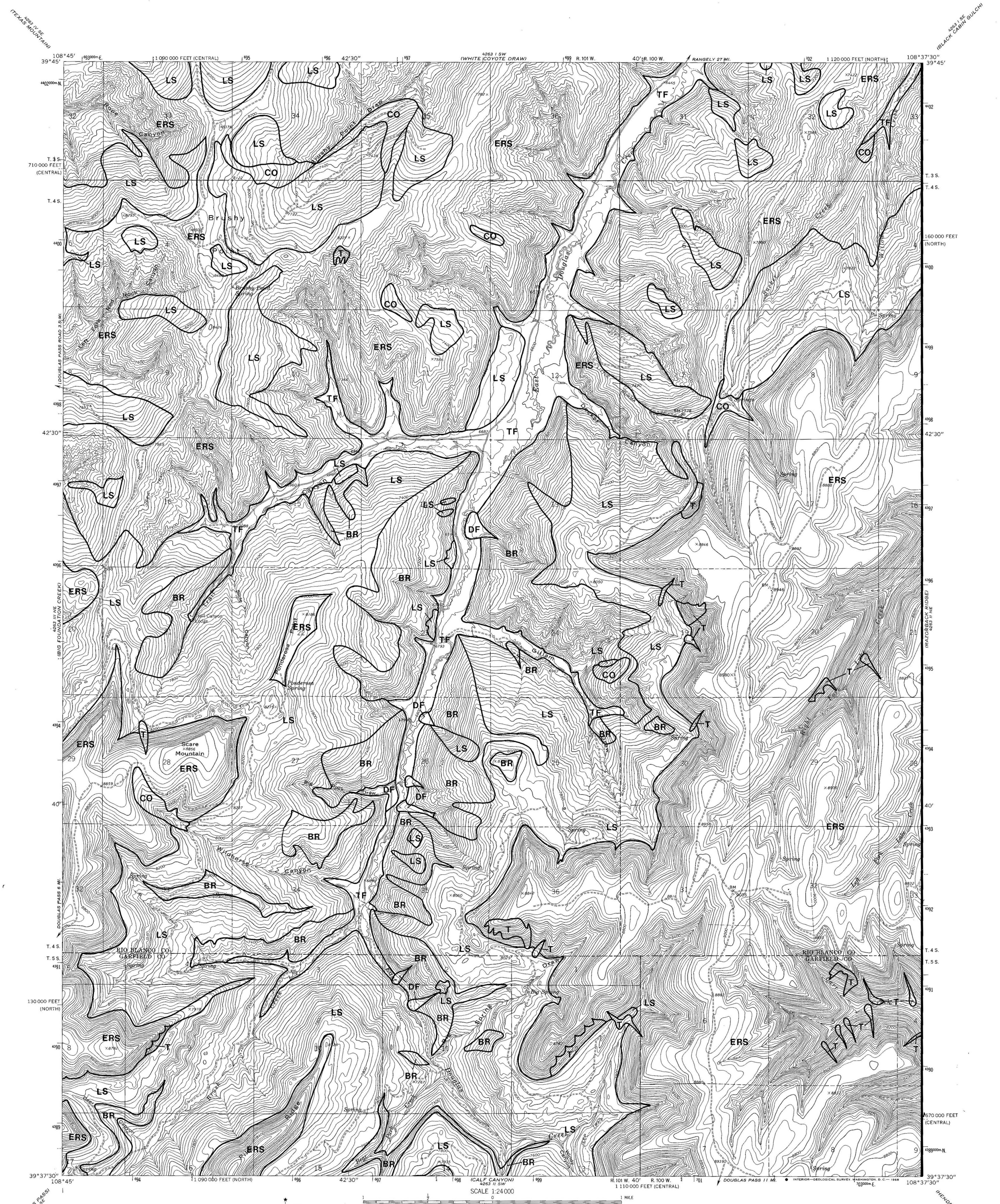
CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION (COLORADO)

ROAD CLASSIFICATION
Light-duty .... Unimproved dirt

BIG FOUNDATION CREEK, COLO.

3–4



Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1964

Polyconic projection. 1927 North American datum
10,000-foot grids based on Colorado coordinate system, north and central zones
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Light-duty .... Unimproved dirt ....

BRUSHY POINT, COLO.

3–5

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1964

Polyconic projection. 1927 North American datum
10,000-foot grid based on Colorado coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

Certain land lines are omitted because of insufficient data

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

GN MN 1°19′ 23 MILS 15° 267 MILS

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

COLORADO
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Light-duty Unimproved dirt

BAXTER PASS, COLO.

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1964

Polyconic projection. 1927 North American datum
10,000-foot grid based on Colorado coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

Certain land lines are omitted because of insufficient data

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1°23' 25 MILS — 15° 267 MILS

SCALE 1:24 000

1 MILE — 7000 FEET — 1 KILOMETER

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

COLORADO
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Light-duty — Unimproved dirt
State Route

DOUGLAS PASS, COLO.

3—7

4263 III NE (BIG FOUNDATION GREEN)
4263 II NE (RAZORBACK RIDGE)
4263 II NW (BRUSHY POINT)
4263 III SE (DOUGLAS PASS)
4263 II SE (HENDERSON RIDGE)
4262 IV NE (HOWARD CANYON)
4262 I NE (MIDDLE DRY FORK)
(GARVEY CANYON) 4262 I NW
DOUGLAS PASS 4 I MI.
LOMA 24 MI.
DE BEQUE 34 MI.

108°45′ 42′30″ 108°37′30″ 39°37′30″ 39°30′ 32′30″ 35′

694000m E. 695 696 697 698 699 700 701 702 703 702000m E.

R. 101 W. 40′ R. 100 W. 1 110 000 FEET

4388000m N. 4387 4386 4385 4384 4383 4382 4381 4380 4379 4378 4377 4376 4375000m N.

660 000 FEET 630 000 FEET

T. 5 S. T. 6 S.

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1964

Polyconic projection. 1927 North American Datum
10,000-foot grid based on Colorado coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

Certain land lines are omitted because of insufficient data

To place on the predicted North American Datum 1983 move the projection lines 6 meters north and 57 meters east as shown by dashed corner ticks

GN MN 1°28′ 26 MILS 15° 267 MILS

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Map photoinspected 1973
No major culture or drainage changes observed

SCALE 1:24 000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

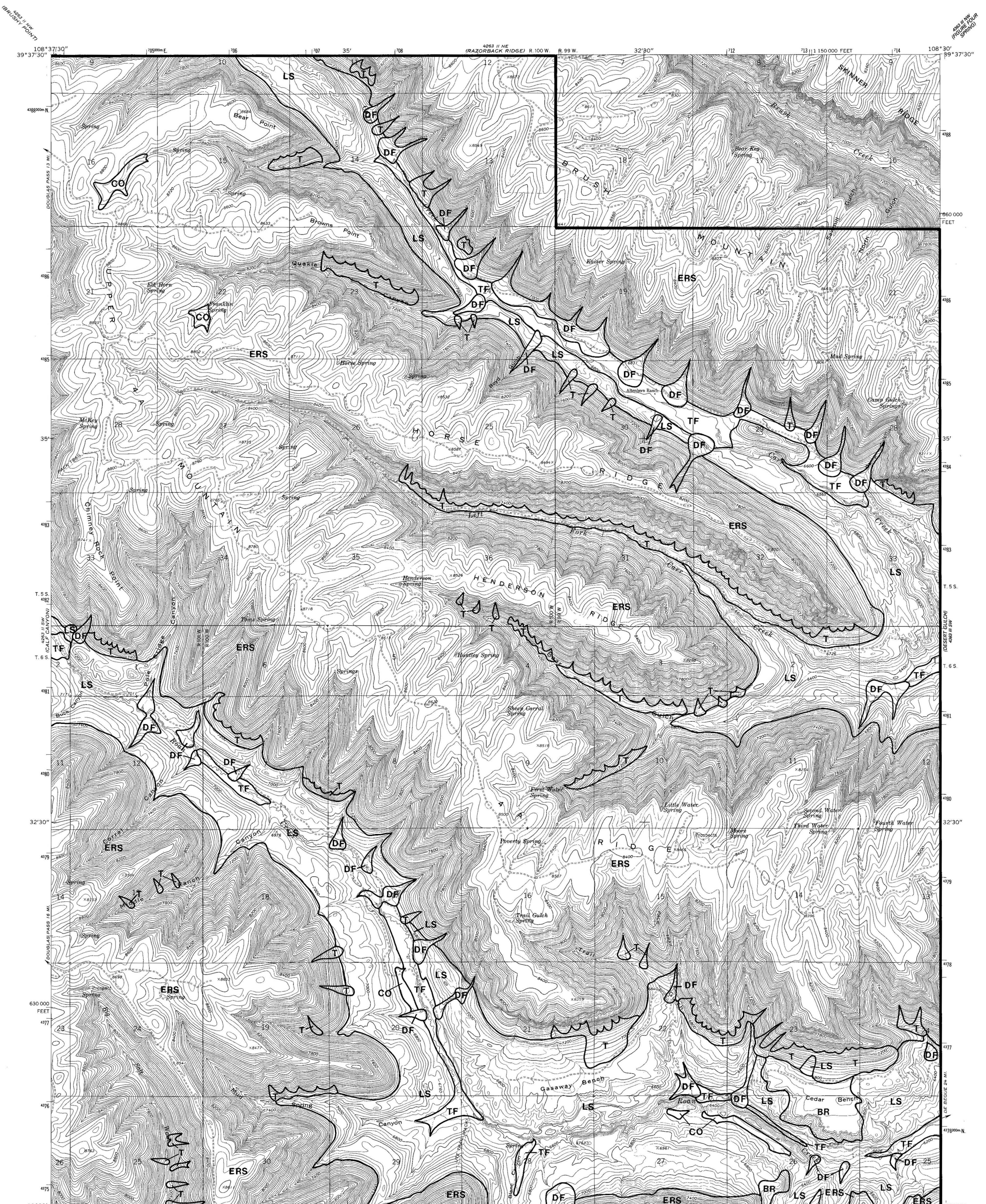
COLORADO
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Unimproved dirt

CALF CANYON, COLO.

3–8

● INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1985



Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1964

Polyconic projection. 1927 North American datum
10,000-foot grid based on Colorado coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

To place on the predicted North American Datum 1983 move the projection lines 6 meters north and 57 meters east as shown by dashed corner ticks

UTM GRID AND 1964 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

COLORADO
QUADRANGLE LOCATION

Map photoinspected 1973
No major culture or drainage changes observed

ROAD CLASSIFICATION
Light-duty ——— Unimproved dirt = = = =

HENDERSON RIDGE, COLO.

3—9

4263 III SE (DOUGLAS PASS)

4263 II SE (HENDERSON RIDGE)

108° 45′ — 108° 37′ 30″ — 39° 30′ — 39° 27′ 30″ — 39° 25′ — 39° 22′ 30″

694 000m E. — 695 — 696 — R. 102 W. 42′ 30″ — R. 101 W. — 698 — 700 — 40′ — 701 — 1 110 000 FEET — 702 — 703 — 704 000m E.

4263 II SW (GALF CANYON)

RANGELY 19 MI. — LOMA (U.S. 6 AND 50) 23 MI.

4372 000m N. — 620 000 FEET — 580 000 FEET

4374 — 4373 — 4372 — 4371 — 4370 — 4369 — 4368 — 4367 — 4366 — 4365 — 4364 — 4363 — 4362 — 4361

T. 6 S. — T. 7 S. — T. 8 S.

4262 IV NE (HOWARD CANYON) — 4262 I NE (MIDDLE DRY FORK)

(HIGHLINE LAKE) 4262 IV SE — (CORCORAN PEAK) 4262 I SE

FRUITA 17 MI. — 1 090 000 FEET — (RUBY LEE RESERVOIR) 4262 I SW

Topography by photogrammetric methods from aerial photographs taken 1967. Field checked 1968

Polyconic projection. 1927 North American datum
10,000-foot grid based on Colorado coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Certain land lines are omitted because of insufficient data

UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

GN — MN — 1°28′ 26 MILS — 15° 267 MILS

SCALE 1:24000

1 MILE — 1000 0 1000 2000 3000 4000 5000 6000 7000 FEET — 1 KILOMETER

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

COLORADO

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Light-duty road, all weather, improved surface

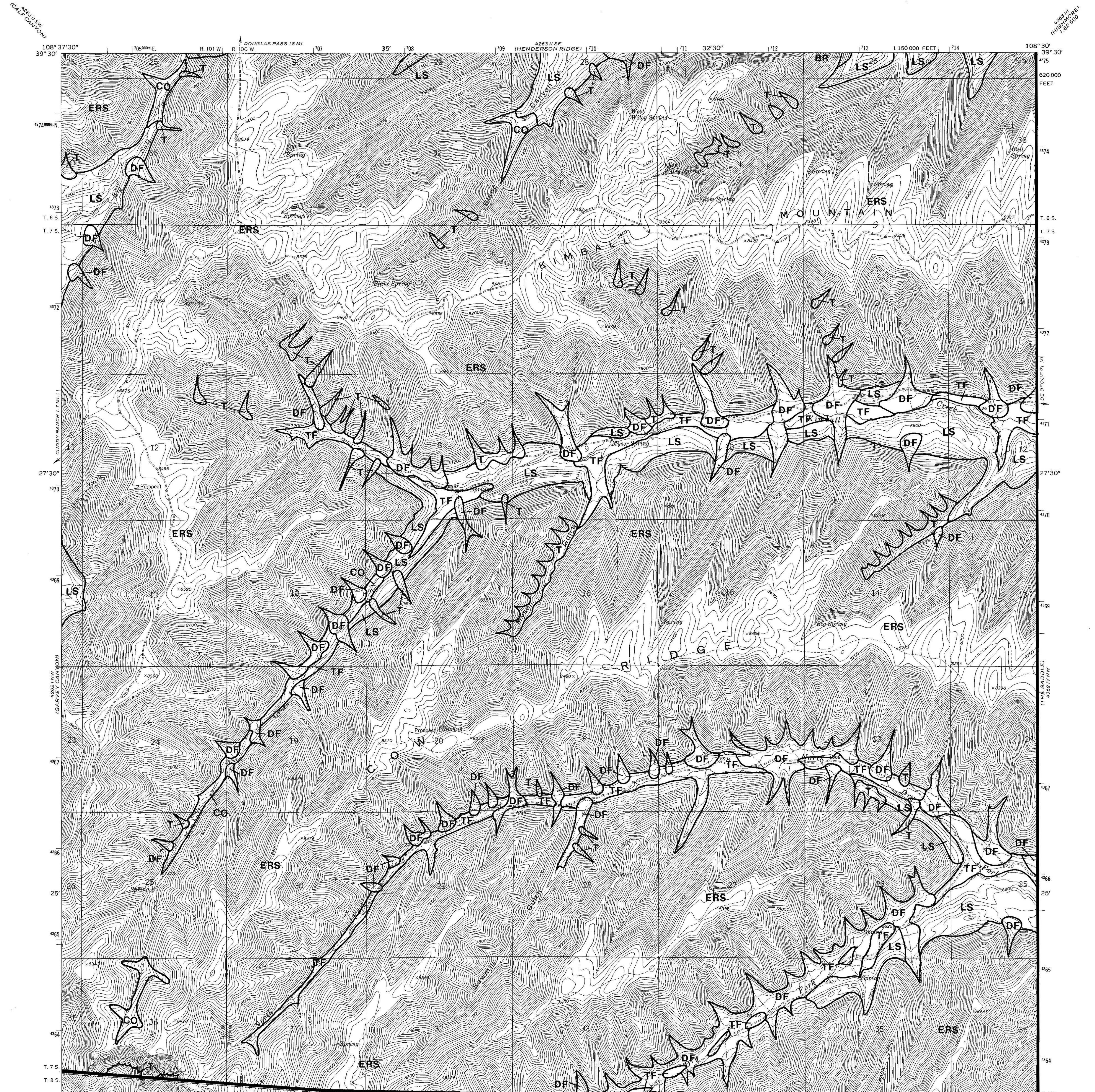
Unimproved road, fair or dry weather

State Route

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1972

GARVEY CANYON, COLO.

3—10



Topography by photogrammetric methods from aerial photographs taken 1967. Field checked 1968

Polyconic projection. 1927 North American datum

10,000-foot grid based on Colorado coordinate system, central zone

1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Certain land lines are omitted because of insufficient data

UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1°33′ 27 MILS — 15° 267 MILS

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET

DATUM IS MEAN SEA LEVEL

(RUBY LEE RESERVOIR) 4262 I SW

(WINTER FLATS) 4362 IV SW

COLORADO

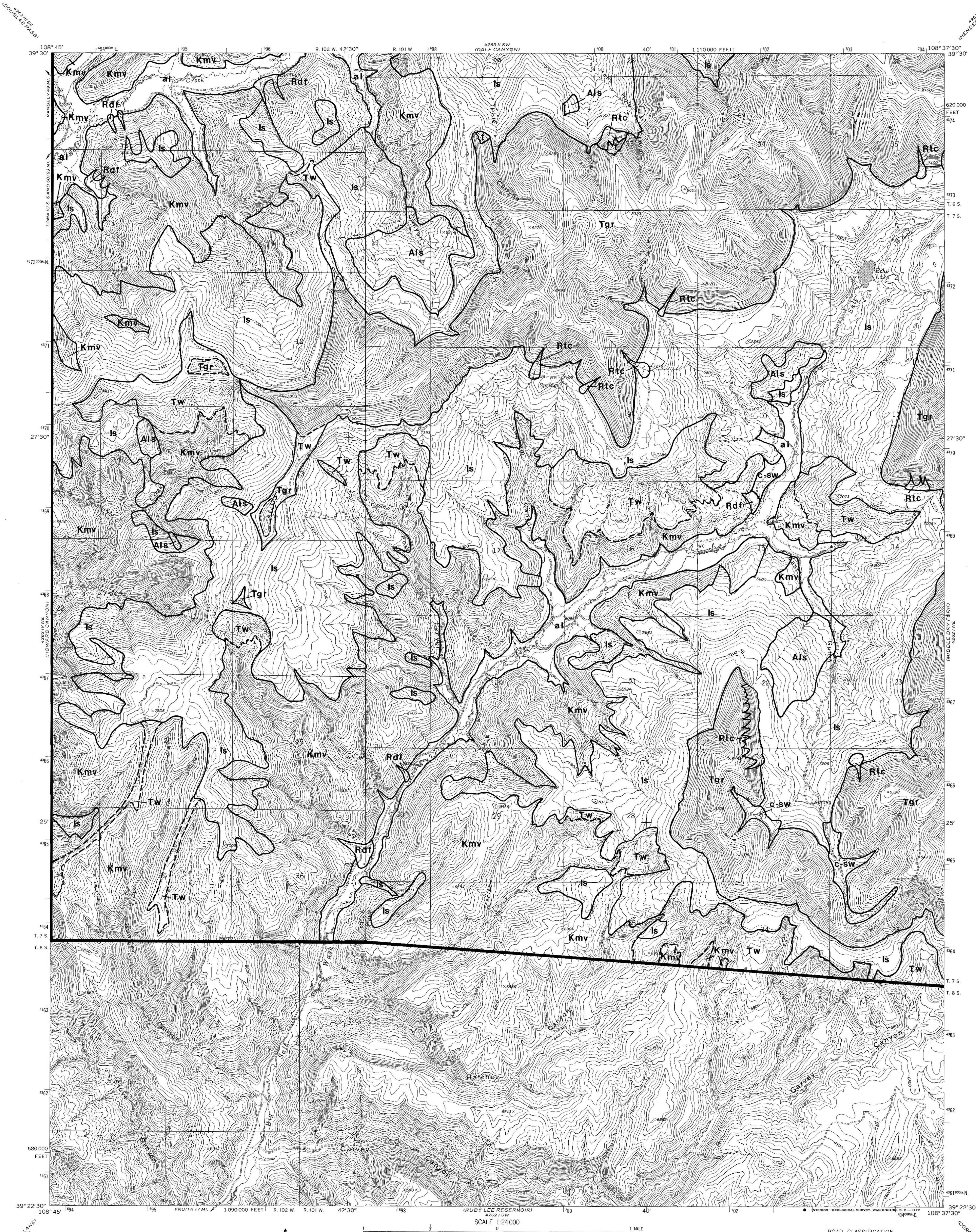
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Unimproved road, fair or dry weather

MIDDLE DRY FORK, COLO.

3—11



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UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

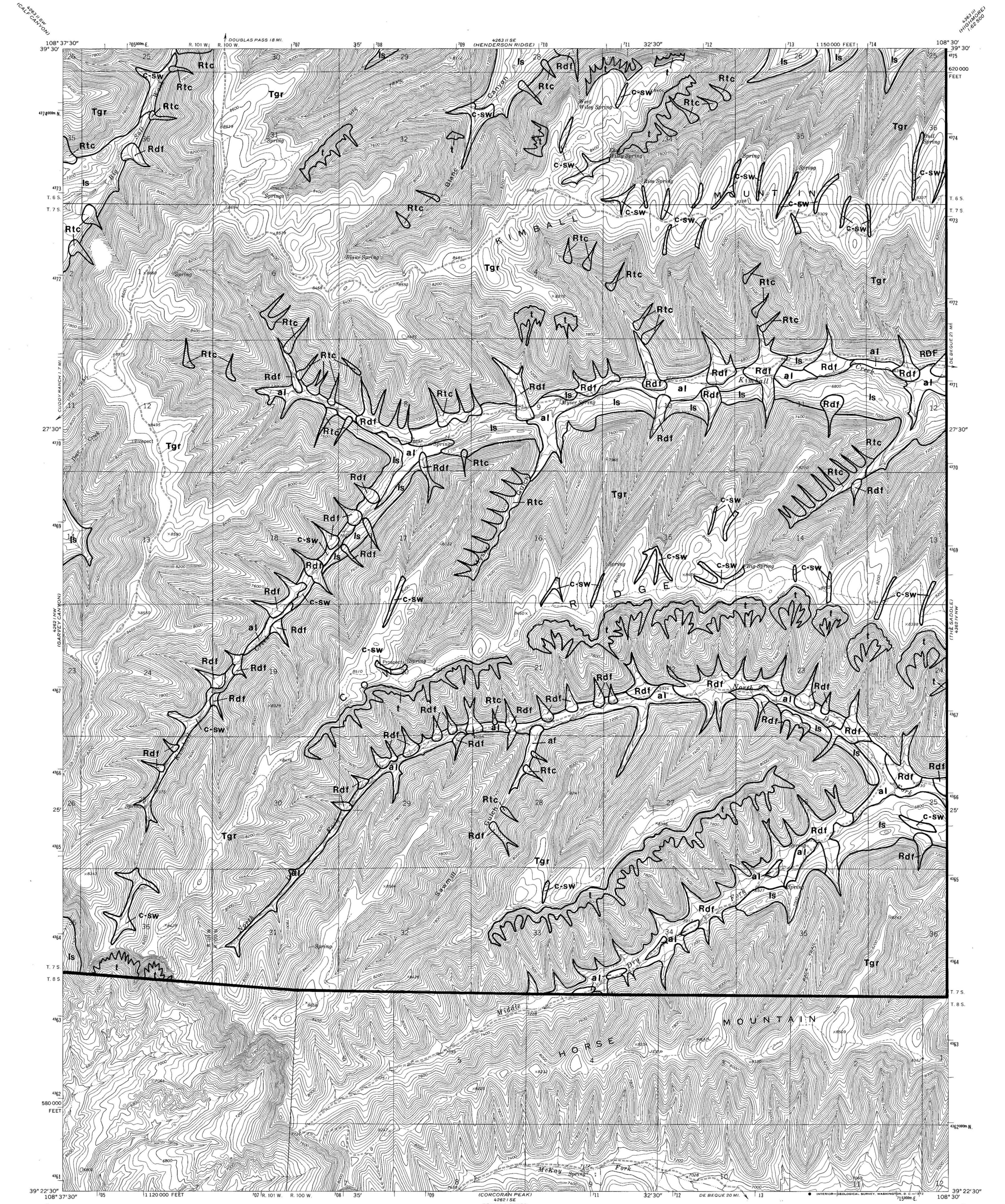
COLORADO
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Light-duty road, all weather, improved surface
Unimproved road, fair or dry weather
State Route

GARVEY CANYON, COLO.

1–10



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Certain land lines are omitted because of insufficient data

UTM GRID AND 1968 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1°33′ 27 MILS — 15° 267 MILS

SCALE 1:24 000

1 MILE — 7000 FEET — 1 KILOMETER

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

COLORADO
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Unimproved road, fair or dry weather

MIDDLE DRY FORK, COLO.

1—11