
GEOLOGIC HAZARDS SECTION DIGITAL MAP 2001-2
(HSDM 2001-2)

**PRELIMINARY DIGITAL
SURFICIAL GEOLOGIC MAP
OF THE
BURGESS JUNCTION 30' X 60' QUADRANGLE,
SHERIDAN, BIG HORN AND JOHNSON
COUNTIES, WYOMING, AND SOUTHERN
MONTANA**

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WYOMING STATE GEOLOGICAL SURVEY

*Laramie, Wyoming
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Preliminary Digital Surficial Geologic Map of the Burgess Junction 30' x 60' Quadrangle, Sheridan, Big Horn, and Johnson Counties, Wyoming and southern Montana

Background

The Preliminary Digital Surficial Geologic Map of the Burgess Junction 30 x 60 Minute Quadrangle shows the surficial features (landforms) and deposits present on the surface in the Quadrangle. The map was primarily generated for a statewide study of aquifer vulnerability to contamination from pesticides. In that context, it was to be used to assist in the generation of a new State soils map, to analyze the effects of the vadose zone on contaminant migration, to define specific Quaternary-age aquifers, and to refine the analysis of regional hydrogeologic settings.

The Preliminary Digital Surficial Geologic Map of the Burgess Junction 30 x 60 Minute Quadrangle can be used, in conjunction with a bedrock geologic map, as a guide in siting new facilities or industries in Wyoming. It can also be used to identify and locate geologic hazards, such as landslides and windblown deposits, or to assist in the search for shallow ground water supplies and for construction aggregate. The map has already been used in the generation of Quaternary Geologic Maps of Wyoming.

Quadrangle Mapping

The mapping was accomplished through the use of limited existing surficial geology maps, existing bedrock geology maps, existing soil surveys, existing landslide maps, existing windblown deposits maps, existing clinker maps, and aerial photography. Most of the Quadrangle had to be newly mapped for surficial geology, which was accomplished by interpreting aerial photography and using existing related references.

Aerial Photography

The aerial photography used to generate the surficial geology map was predominantly U.S. Geological Survey (USGS) National High Altitude Photography (NHAP I, 1980 - 1982). The USGS photography was color infrared at a scale of 1:58,200. In addition, Bureau of Land Management (BLM) photography (CPIR, RWIR, WWIR, and RKSP series, 1974-1976) was used to provide detail in select areas. The BLM photos were color infrared at a scale of 1:31,680. In localized areas, additional photography from multiple sources and dates was used to fill small gaps in the NHAP coverage. The photography was analyzed by using a Fairchild Aviation Corporation Magnifying Mirror Stereoscope and an Abrams Instrument Corporation Pocket Stereoscope.

GIS Methodology

The surficial geology of the Quadrangle was drafted onto a 1:100,000-scale green-line mylar copy of the Quadrangle. The mylar base was scanned in one piece on a Tangent ColorScan Flatbed Scanner (Model CCS300-34FB, 300 ppi, 24 x 36 inches) using CCS-Tbundle3 Tangent scanning software. The coverage was scanned at a resolution of 300 dpi, using an 8-bit per pixel grayscale. A black/white threshold filter was then applied to the coverage to obtain an optimal one-bit per pixel image (the green-line background fully disappeared in this process). The resulting raster image was cleaned using Corel Photopaint version 6.0, particularly in order to separate bleeding lines. Conversion of the cleaned raster image to a DXF file was accomplished using GTX-OSR version 4.0 set in "map" data mode with optimal smoothing, zero speckle filtering, and zero character recognition. The DXF file was then converted to an ARC coverage. The initial raster file was converted to an ARC grid coverage, warped to size so it could be used as a background aid while manually editing the coverage linework within ArcEDIT. The coverage was registered using 15 tic locations and transformed to UTM coordinates using pre-registered tic coverages provided by the Spatial Data Visualization Center at the University of Wyoming. The surficial geology polygons were attributed using a nine-digit character item NAME, representing the surficial geologic unit nomenclature, and a six-digit numeric item CODE, representing the classification of the unit.

Mapping Classification Scheme

The classification scheme for surficial geologic units developed by the Wyoming State Geological Survey was a modification of those developed by Gibbons (1986a, 1986b), Pierce (1973, 1974a, 1974b, 1974c), Reheis (1987), Reheis and Coates (1987), Reheis and Williams (1984), Richmond (1973a, 1973b, 1973c, 1973d, 1974, 1977), Richmond and Pierce (1971, 1972), Richmond and Waldrop (1972, 1975), Waldrop (1975a, 1975b), and Waldrop and Pierce (1975). The classification scheme has two phases, with the first phase being a simple classification and description of single units, such as alluvium (a), colluvium (c), eolian (e), and bedrock (R). The second phase of the classification combines the single elements into a multi-element classification and description for a specific mapping unit. In many cases, a specific mapping unit may be composed of many single elements, such as slopewash (s), colluvium (c), and bedrock (R), that in certain areas can not be shown separately at a scale of 1:100,000. In such cases, the single elements were combined into a more complex unit (scR), with the single elements ranked from most dominant to least dominant. The mapping unit scR would then represent a complex deposit composed of slopewash, colluvium, and bedrock outcrops, with more slopewash present than either colluvium or bedrock outcrop.

Single-Element Classification and Description

a	alluvium - stream and river deposits
b	bench - a strip of relatively level earth or rock, raised and capped with gravel.
c	colluvium - loose and incoherent deposits, usually at the foot of a cliff or on the surface of a slope and there chiefly by gravity.
d	dissected
e	eolian deposits - wind blown deposits, includes sand, silt, and clay
f	alluvial fan deposits - a fan shaped deposit made by a stream or a debris flow where they have run out onto a level plain.
g	glacial deposits - deposits that have been formed through glacial action, such as till and moraine.
k	clinker – bedrock that has been baked and fused as a result of a burning coal seam.
K	Karst
l	landslide - earth and rock which became loosened from a hillside and slides, flows, or falls down the slope.
M	large open pit mine/quarry
p	playa lake - broad, shallow sheets of water which quickly gather and evaporite, leaving mud flats or broad, shallow deposits.
R	bedrock
r	residuum - a residual deposit remaining in place after the decomposition of rocks.
s	slopewash - soil and rock material that has been moved down a slope by gravity assisted by running water.
t	terrace deposits - relict alluvial deposits on relatively flat, horizontal, or gently inclined surfaces which are bounded by a steeper ascending slope on one side and by a steeper descending slope on the opposite side.
u	grus - an accumulation of angular, coarse-grained fragments resulting from the granular disintegration of crystalline rocks.

Multi-Element Classification and Description

The first letter represents the main surficial unit seen on aerial photographs. Following letters represent other deposits that were seen in smaller amounts.

a	alluvial deposits
ag	alluvial fan deposits mixed with
ar	alluvial deposits mixed with residuum
as	slopewash mixed with alluvial deposits
asr	slopewash mixed with alluvium and residuum
at	alluvial deposits mixed with terrace deposits
b	bench deposits
bd	dissected bench deposits
csR	colluvium mixed with and slopewash with bedrock outcrops
csgR	glacial deposits mixed scattered bedrock outcrops, colluvium, and slopewash
fa	alluvial fan deposits
fb	alluvial fan deposits grading into bench deposits
fbd	alluvial fan deposits grading into dissected bench deposits
fd	dissected alluvial fan deposits

ft	alluvial fan deposits that grade into terrace deposits
ftd	dissected alluvial fan deposits that grade into terrace deposits
g	glacial deposits
ga	glacial deposits mixed with alluvial deposits
gG	glaciated bedrock with a mantle of glacial deposits
gsG	glaciated bedrock with a mantle of glacial deposits and slopewash
gsR	glacial deposits mixed with scattered bedrock outcrops and slopewash
gsaG	glaciated bedrock with a mantle of glacial deposits, slopewash, and alluvial deposits
Gucg	glaciated bedrock with a mantle of glacial deposits, grus, and colluvium
kr	clinker mixed with residuum
l	landslide debris
laR	landslide debris mixed with scattered bedrock outcrops and alluvial deposits
ls	landslide debris mixed with slopewash
M	mined areas
r	residuum
raR	residuum mixed with alluvium and scattered bedrock outcrops
Rc	bedrock mixed with colluvium
Rcr	bedrock mixed with colluvium and residuum
rcs	colluvium mixed with residuum and slopewash
Rcs	bedrock mixed with colluvium and slopewash
Rcu	bedrock mixed with colluvium and grus
rRs	residuum mixed with scattered bedrock outcrops and slopewash
Rs	residuum mixed with slopewash
Rsr	bedrock mixed with slopewash and residuum
rsR	residuum mixed with slopewash and bedrock outcrops
rsRk	residuum mixed with slopewash, bedrock outcrops and clinker
rsa	residuum mixed with slopewash and alluvial deposits
psc	colluvium mixed with residuum and slopewash
rscR	residuum mixed with slopewash, colluvium and scattered bedrock outcrops
rsk	residuum mixed with slopewash and clinker
Rsrk	bedrock mixed with slopewash, residuum, and clinker
Ruc	bedrock mixed with grus and colluvium
Rucq	periglacial features and deposits mixed with bedrock outcrops, grus, and colluvium
sa	slopewash mixed with alluvial deposits
sag	slopewash mixed with alluvial and glacial deposits
sagG	glaciated bedrock with a mantle of glacial deposits, slopewash, and alluvial deposits
sar	slopewash mixed with alluvial deposits and residuum
saR	slopewash mixed with scattered bedrock outcrops and alluvial deposits
sarR	slopewash mixed with alluvial deposits and scattered bedrock outcrops
sauR	slopewash mixed with scattered bedrock outcrops, alluvium, and grus
scgR	glacial deposits mixed with slopewash, colluvium, and bedrock outcrops
scR	slopewash mixed with colluvium and scattered bedrock outcrops
scr	slopewash mixed with colluvium and residuum
scrR	slopewash mixed with colluvium and residuum and scattered bedrock outcrops
sf	alluvial fan deposits mixed with slopewash
sfR	alluvial fan deposits mixed with slopewash and scattered bedrock outcrops
sfa	alluvial fan deposits mixed with slopewash and alluvium
sfd	dissected alluvial fan deposits mixed with slopewash
sfr	alluvial fan deposits mixed with slopewash and residuum
sft	alluvial fan deposits grading into terrace deposits and slopewash

sg	glacial deposits mixed with slopewash
sgR	glacial deposits mixed with slopewash and scattered bedrock outcrops
sr	slopewash mixed with residuum
srg	glacial deposits mixed with slopewash and residuum
srk	clinker mixed with slopewash and residuum
sraR	slopewash mixed with residuum, alluvial deposits, and bedrock outcrops
srcR	slopewash mixed with residuum, colluvium, and bedrock outcrops
srR	slopewash mixed with residuum and bedrock outcrops
srRa	slopewash mixed with residuum, alluvial deposits, and bedrock outcrops
suRg	glacial deposits mixed with slopewash, grus, and scattered bedrock outcrops
t	terrace deposits
ta	terrace deposits mixed with alluvial deposits
td	dissected terrace deposits
tdr	dissected terrace deposits mixed with residuum
tr	terrace deposits mixed with residuum
ts	terrace deposits mixed with slopewash
uaR	grus mixed with alluvium and scattered bedrock outcrops
usR	grus mixed with slopewash and scattered bedrock outcrops
usgG	glaciated bedrock with glacial deposits, grus, and slopewash
usgR	glacial deposits mixed with grus, slopewash, and scattered bedrock outcrops

Classification of Map Units (Map Legend)

Alluvial Deposits

Alluvium

(101) – a, ar

Alluvium 101 – Alluvium and alluvium mixed with residuum

(102) – at

Alluvium 102 – Alluvium mixed with terrace deposits

Alluvial Fan Deposits

(201) – fa, sf, sfa, sfr

Alluvial Fan 201- Alluvial fan deposits mixed with slopewash, residuum, and alluvium

(202) – fb, ft, sft

Alluvial Fan 202 – Alluvial fan deposits grading into bench and/or terrace deposits, mixed with slopewash

(203) – fbd

Alluvial Fan 203 – Dissected alluvial fan deposits grading into bench deposits

(204) – fd, ftd, sfd

Alluvial Fan 204 – Dissected alluvial fan deposits grading into terrace deposits, mixed with slopewash

Bench Deposits

(401) – b,

Bench 401 – Bench deposits

(402) – bd, bds

Bench 402 – Dissected bench deposits

Terrace Deposits

(601) – t, ta, ts,

Terrace 601 – Terrace deposits and terrace deposits mixed with alluvium, slopewash, residuum, and eolian deposits

(602) – td, tdr

Terrace 602 – Dissected terrace deposits mixed with residuum

(603) – tr

Terrace 603 – Terrace mixed with residuum

Landslide Deposits

(801) – l, ls, laR

Landslide 801 – landslides and landslides mixed with slopewash and bedrock outcrops

Slopewash

(1101) – as, asr, sa, sar, sr

Slopewash 1101 – Slopewash and slopewash mixed with residuum, and alluvium

(1102) – saR, sarR, sauR, scR, scrR, sfR, sraR, srR, srRa, srcR

Slopewash 1102 – Slopewash mixed with scattered bedrock outcrops and residuum, alluvium, alluvial fan deposits, grus, and/or colluvium

Colluvium

(1201) – rcs, rsc, scr

Colluvium 1201 - Colluvium mixed with slopewash and residuum

(1202) – csR

Colluvium 1202 - Colluvium mixed with scattered bedrock outcrops and slopewash

Glacial deposits

(1301) – ag

Glacial outwash 1301 – Glacial outwash mixed with alluvium

(1302) – g, ga, sag, sg, srg

Glacial 1302 – Glacial deposits mixed with alluvium, slopewash, and residuum

(1303) – csgR, gsR, scgR, sgR, suRg, usgR

Glacial 1303 – Glacial deposits mixed with scattered bedrock outcrops, slopewash, colluvium and grus

(1304) – gG, gsG, gsaG, Gucg, sagG, usgG

Glaciated bedrock 1304 – Glaciated bedrock with a mantle of glacial deposits, slopewash, alluvium, and/or grus

Residuum

(1401) – r, rs, rsa

Residuum 1401 – Residuum and residuum mixed with slopewash, and alluvium

(1402) – raR, rRs, rscR

Residuum 1402 - Residuum mixed with scattered bedrock outcrops and slopewash, alluvium, and/or colluvium

(1404) – uaR, usR

Residuum 1404 – Grus mixed with scattered bedrock outcrops, slopewash, and alluvium

Bedrock

(1501) – Rcs, Rcr, Rcs, Rcu, Rsr, Rsrk, Ruc

Bedrock 1501 – Bedrock mixed with colluvium, slopewash, grus, residuum and clinker

(1502) – rR, sR

Bedrock 1502 – Bedrock mixed with residuum and/or slopewash

Lake

(1601) – lake

Lake 1601

Mined areas

(1701) – M

Mined areas 1701

Clinker

(2001) – kr, rsk, srk

Clinker 2001 – Clinker mixed with slopewash and residuum

(2002) – rsRk

Clinker 2002 – – Clinker mixed with scattered bedrock outcrops, residuum and slopewash

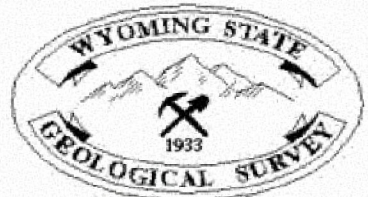
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Geology - Interpreting the past to provide for the future



Prepared in cooperation with the
U.S. GEOLOGICAL SURVEY

Geologic Hazards Section Digital Map 01-2 (HSDM 01-2)
Preliminary Burgess Junction Wyoming Surficial Geologic Map
1:100,000-Scale Series

CLASSIFICATION OF MAP UNITS

Alluvial Deposits

Alluvium

- Alluvium and alluvium mixed with residuum, and/or eolian deposits (a, ar)
- Alluvium mixed with terrace deposits with scattered eolian deposits and/or residuum (at)

Alluvial Fan Deposits

- Alluvial fan deposits mixed with slopewash, alluvium, residuum and/or eolian deposits (fa, sf, sfa, sff)
- Alluvial fan deposits grading into terrace deposits (fh, ft, sft)
- Alluvial fan deposits grading into dissected bench deposits, mixed with slopewash, residuum, and/or eolian deposits (fbd)
- Dissected alluvial fan deposits and dissected alluvial fan deposits that grade into terrace deposits, mixed with slopewash and/or residuum (fd, fld, sfd)

Bench Deposits

- Bench deposits and bench deposits mixed with eolian deposits and/or residuum (b)
- Dissected bench deposits and dissected bench deposits mixed with slopewash, and/or eolian deposits (bd)

Terrace Deposits

- Terrace deposits and terrace deposits mixed with alluvium, eolian deposits, residuum, and/or slopewash (t, ta, ts)
- Dissected terrace deposits and dissected terrace deposits mixed with slopewash, eolian deposits, and/or residuum (td, tdr)
- Shallow terrace deposits or shallow terrace deposits / structural terrace mixed with residuum, alluvium, and/or eolian deposits (tr)

Landslide Deposits

- Landslide deposits with slopewash; unlabeled areas are ls (l, laR, ls)

Slopewash

- Slopewash and slopewash mixed with residuum, alluvium and/or eolian deposits (as, sa, saR, sr)
- Slopewash mixed with scattered bedrock outcrops and residuum, alluvium, colluvium, and/or eolian deposits (rsR, saR, sarR, sauR, scR, scrR, sRr, srRa, sraR, srcR)

Colluvium

- Colluvium mixed with scattered bedrock outcrops and slopewash (csR, rcs, rsc, scr)

Glacial Deposits and Features

- Glacial outwash, and glacial outwash mixed with alluvium, terrace and glacial deposits (ag)
- Glacial deposits and glacial deposits mixed with colluvium, slopewash, alluvium, grus, and landslide deposits (g, ga, sga, sg, stg)
- Glacial deposits mixed with scattered bedrock outcrops and alluvium, colluvium, grus, residuum, and/or slopewash (csgR, gsr, scgR, sgr, suRg, usgR)
- Glaciated bedrock with a mantle of glacial deposits and alluvium, colluvium, residuum, and/or grus (gG, gsaG, gsG, gaR, Guag, sagG, usgG)

Residuum

- Residuum mixed with slopewash, alluvium, and/or eolian deposits (r, rs, rsa)
- Residuum mixed with scattered bedrock outcrops and slopewash, alluvium, colluvium and eolian deposits (rRs, raR, rscR)
- Grus mixed with scattered bedrock outcrops and slopewash, alluvium, and/or residuum (uaR, ur)

Bedrock

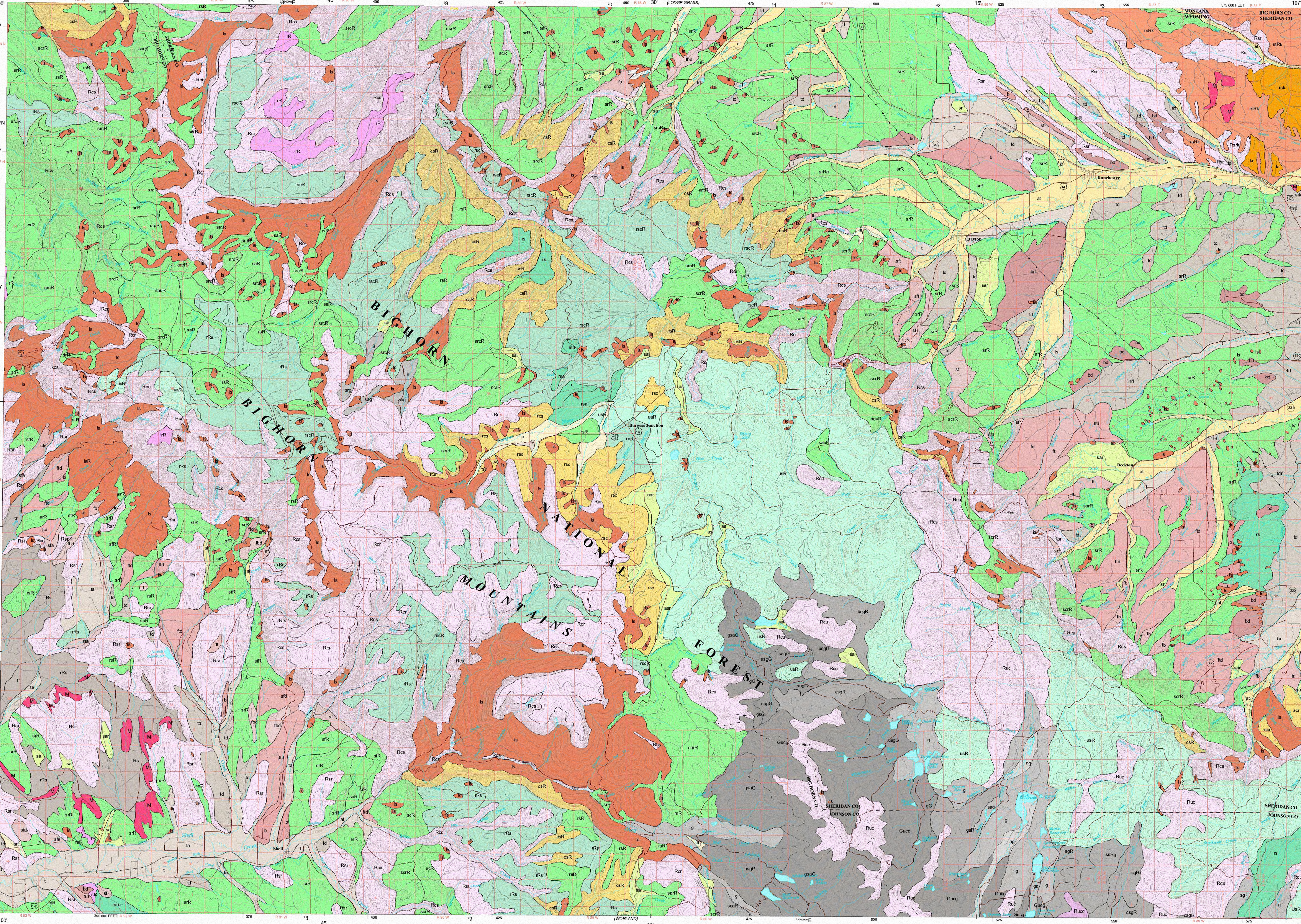
- Bedrock mixed with colluvium, slopewash, residuum and/or clinker (Rc, Rcr, Res, Rcu, Rns, Rsc, Rsr, Rsk, Ruc)
- Bedrock or upturned truncated bedrock with a thin mantle of eolian deposits, residuum, colluvium, and/or slopewash (rR, sR)
- Dissected bedrock with a thin mantle of residuum, colluvium, and/or eolian deposits (Ruqc)

Mined Areas

- Mined (M)

Clinker

- Clinker mixed with residuum and slopewash (kr, rsk, srk)
- Clinker mixed with scattered bedrock outcrops slopewash and residuum (rsRk)



Blue 10 000-meter ticks: Universal Transverse Mercator, zone 13
25 000-foot grid ticks: Wyoming Coordinate System of 1927, East zone
Digital public land survey, boundaries, hydrography, hypsography, and
transportation by the U.S. Geologic Survey, various years

UTM GRID
DECLINATION AT CENTER OF SHEET
DIAGRAM IS APPROXIMATE

SCALE 1:100 000
KILOMETERS
MILES
FEET

WYOMING
QUADRANGLE LOCATION

Produced with QuadView by Geoware

This report is preliminary and has not been reviewed for conformity with
Wyoming State Geological Survey editorial standards

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mapped and compiled by
Laura L. Halberg and James C. Case, 1999
digital cartography by
Bret L. Noecker, 2001