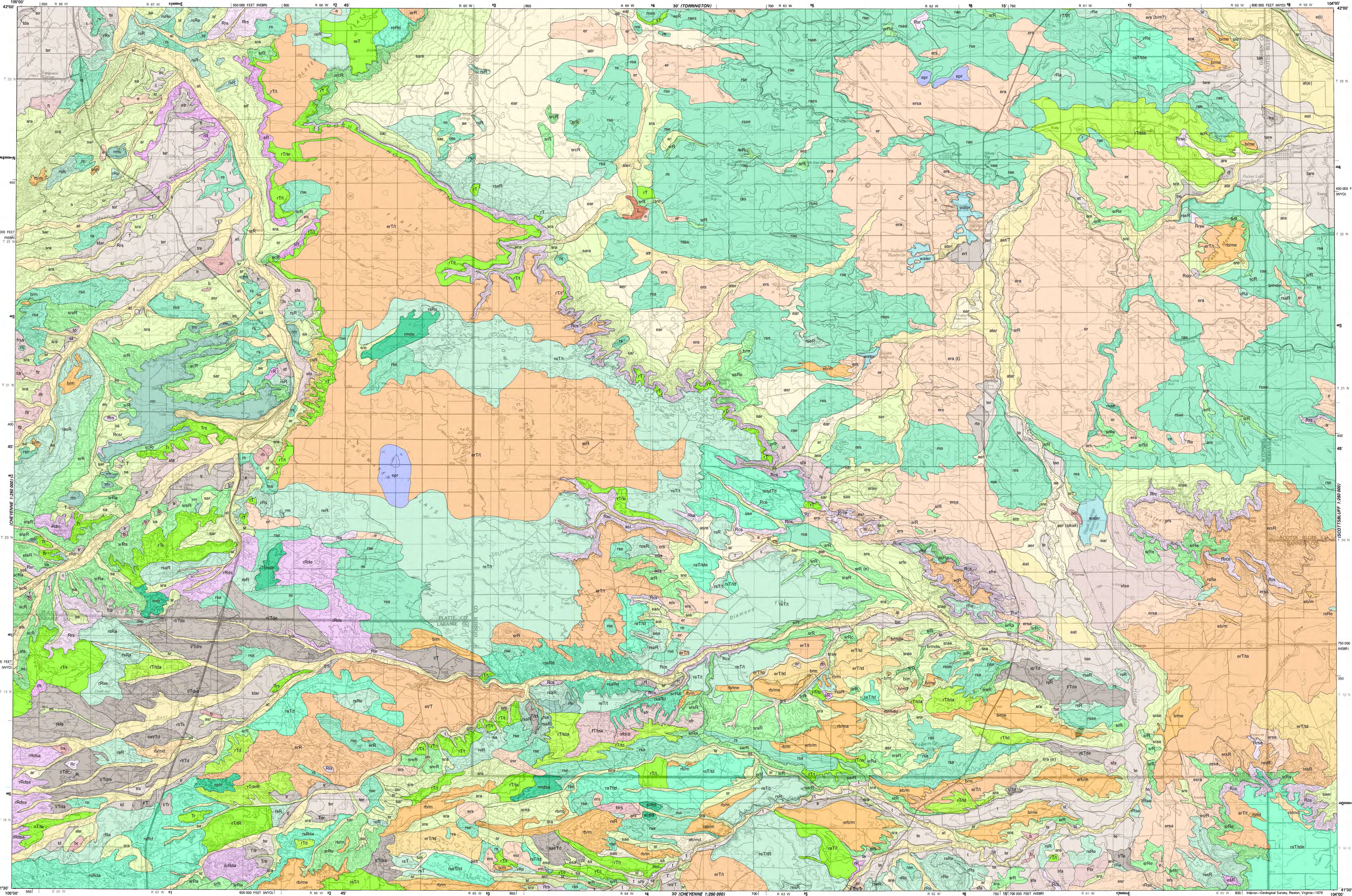




Geology - Interpreting the past to provide for the future



Prepared in cooperation with
the U.S. GEOLOGICAL SURVEY



CLASSIFICATION OF MAP UNITS

Alluvial Deposits

- Alluvium and alluvium mixed with residuum, eolian deposits, lacustrine deposits and/or slopewash (101) (ae, aer, aes, ear, eas, ae, ar, ab/m, ar, are)
- Alluvium mixed with terrace deposits or terrace deposits/structural terrace, with (scattered) eolian deposits and/or residuum (102) (at, ae/T, aer, ats, eat, ate, ar, ar, sat)

Alluvial Fan Deposits

- Alluvial fan deposits and alluvial fan deposits mixed with slopewash, alluvium, residuum, and/or eolian deposits (201) (stf, st, sfa, fs, stae, fse, sfr, frsa)
- Alluvial fan deposits grading into bench deposits or terrace deposits, or structural terrace/terrace deposits, or alluvial plain deposits mixed with slopewash, residuum and/or eolian deposits (202) (Fbr, ft, flr, fT/sa)
- Dissected alluvial fan deposits and dissected alluvial fan deposits that grade into terrace deposits, mixed with slopewash and/or residuum (204) (ldr, fdr)

Bench Deposits

- Bench deposits and bench deposits mixed with eolian deposits, residuum, and/or slopewash (401) (rb, be, b, br, bs)

Bench Deposits or mesa caprock undifferentiated

- Bench deposits, mesa caprock and bench deposits, mesa caprock with a thin cover of eolian deposits and/or residuum (501) (b/mc, eb/m, rab/m, r/b/mc, r/b/mc, r/b/m, r/b/m)
- Dissected bench deposits, mesa caprock and dissected bench deposits, mesa caprock with a thin cover of eolian deposits, slopewash and/or residuum (502) (b/mc, r/b/mc, b/mc, b/mc)

Terrace Deposits

- Terrace deposits and terrace deposits mixed with alluvium, eolian deposits, residuum, and/or slopewash (601) (t, lue, tae, te, et, ter, ta, tr, ts, tse, st, T)
- Dissected terrace deposits and dissected terrace deposits mixed with slopewash, alluvium, eolian deposits, and/or residuum (602) (td, fda, fda)
- Shallow terrace deposits or shallow terrace deposits/structural terrace mixed with residuum and/or eolian deposits (603) (tre, rie, er, t/T, tr, rei/T, tr, r/Ts, er, sa/T)
- Dissected shallow terrace deposits and dissected shallow terrace deposits, structural terrace mixed with residuum and/or eolian deposits (604) (r/Td, r/Td, rda)
- Terrace deposits, structural terrace and terrace deposits, structural terrace mixed eolian deposits (607) (t/Ts, t/T)
- Dissected terrace deposits, structural terrace and dissected terrace deposits, structural terrace mixed eolian deposits (608) (sa/Td, s/Td, t/Td, t/Td, t/Td, t/Td)

Eolian Deposits

- Eolian deposits and eolian deposits mixed with residuum, slopewash and alluvium (701) (e, era, ers, er, esa)
- Eolian deposits covering terrace deposits or terrace deposits/structural terrace (702) (et/T)
- Eolian deposits mixed with scattered bedrock outcrops or structural terrace/ terrace deposits and residuum and/or slopewash (703) (er/T, erR, erR)
- Eolian deposits mixed with dissected structural terrace/ terrace deposits and residuum (705) (er/Td)

Landslide Deposits

- Landslides and landslides mixed with slopewash (801) (L)
- Mesa caprock mixed with a thin cover of residuum and/or eolian deposits (901) (rm, rms)
- Dissected mesa caprock with a thin cover of residuum and/or eolian deposits (902) (mfr, mde, mda, mrd)

Playa lake and playa lake deposits

- Playa Lake 1001 - Playa lake, playa lake deposits, and playa lake deposits mixed with eolian deposits, residuum and/or alluvium (1001) (ep)

Slopewash

- Slopewash and slopewash mixed with residuum, alluvium, eolian deposits, alluvial fan deposits, and/or colluvium (1101) (scs, ser, sr, ere, sra, sra, sra, sr, sr, sra, sra, sra, sr, sa, sea, sr)
- Slopewash mixed with scattered bedrock outcrops and residuum, alluvial fan deposits, alluvium, eolian deposits, and/or eolian deposits (1102) (scR, scR, scR, srR, srR, srR, srR, srR, srR, srR, srR, srR, srR, srR)

Colluvium

- Colluvium mixed with slopewash, alluvial fan deposits, and/or residuum (1201) (cs)
- Colluvium mixed with scattered bedrock outcrops and eolian deposits (1202) (csR)

Residuum

- Residuum mixed with slopewash, alluvium, eolian deposits, and/or alluvial fan deposits (1401) (rnc, mas, rse, re, rae, rae, rse, r, rs, rnc, rca, rca, rca, ra)
- Residuum mixed with scattered bedrock outcrops or structural terrace/terrace deposits and slopewash, alluvium, eolian deposits, alluvial fan deposits, and/or colluvium (1402) (rRc, rRc, rRc, rRc, rRc, rRc, rRc, rRc, rRc, rRc, rRc, rRc, rRc, rRc, rRc, rRc)
- Residuum mixed with slopewash, eolian deposits, and/or alluvium on dissected bedrock outcrops and/or dissected structural terrace/terrace (1403) (r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td)

Bedrock

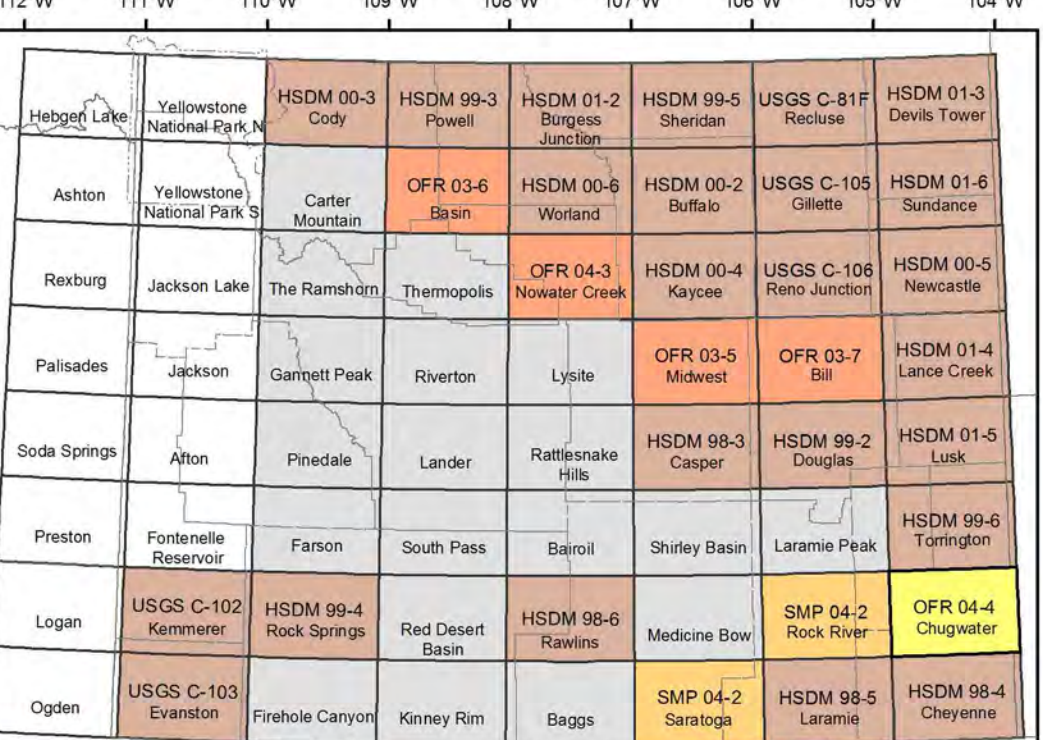
- Bedrock and bedrock mixed with colluvium, alluvial fan deposits, eolian deposits, slopewash, eolian deposits, and/or residuum (1501) (Rsc, Rsc, Rsc, Rsc, Rsc, Rsc, Rsc, Rsc, Rsc, Rsc, Rsc, Rsc, Rsc, Rsc, Rsc, Rsc)
- Bedrock or upturned truncated bedrock with a thin mantle of eolian deposits, residuum, and/or slopewash (1502) (sR, esR, sR)
- Dissected bedrock with a thin mantle of residuum and/or eolian deposits (1504) (rRda, rRda, rRda, rRda, rRda, rRda, rRda, rRda, rRda, rRda, rRda, rRda, rRda, rRda, rRda)

Structural Terrace/Terrace Deposits

- Structural terrace/terrace deposits with a mantle of eolian deposits, residuum, and/or alluvial deposits (1601) (r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td, r/Td)
- Dissected structural terrace/terrace deposits with a mantle of residuum, slopewash and/or of eolian deposits (1602) (r/TdR, r/TdR, r/TdR, r/TdR, r/TdR, r/TdR, r/TdR, r/TdR, r/TdR, r/TdR, r/TdR, r/TdR, r/TdR, r/TdR, r/TdR)

Water Features

- Lake, stream, river (1601) (Water)



INDEX TO 1:100,000 SCALE SURFICIAL GEOLOGIC MAPS OF WYOMING

KEY TO ABBREVIATIONS
U.S. Geological Survey maps: Coal Investigations Series (C), Wyoming State Geological Survey maps: Open File Report (OFR), Hazardous Section Digital Map (HSDM), and unpublished STATEMAP project (SMP).

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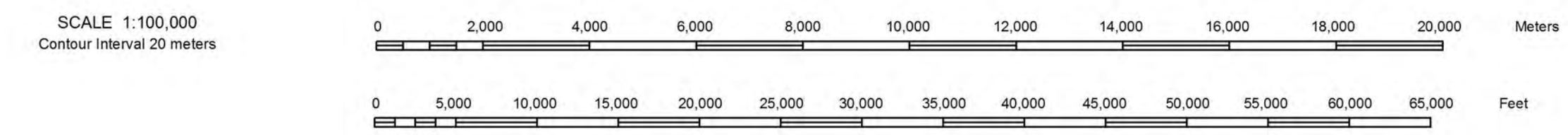
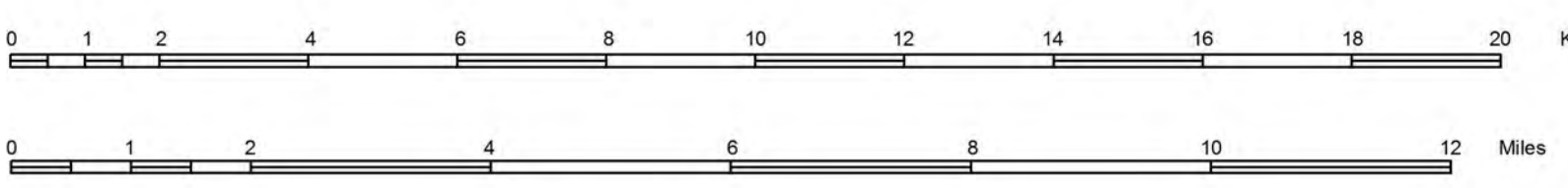
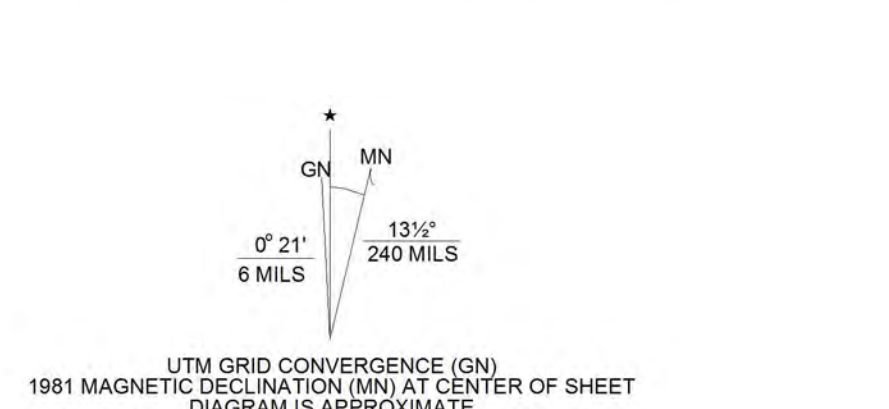
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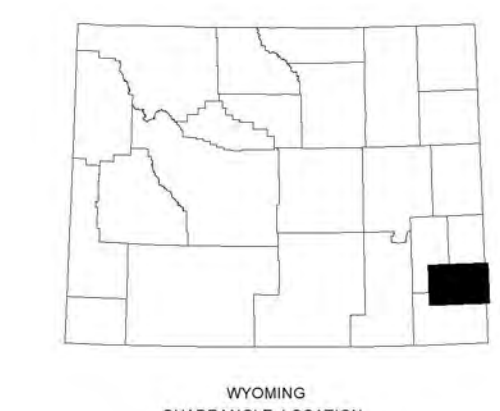
Additional copies of this map can be obtained from:
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Email: sales@wsgs.wyo.gov

A digital version of this map is also available on CD - ROM.

Projection: Universal Transverse Mercator (UTM), zone 13
North American Datum of 1927 (NAD 27)
10,000-meter grid ticks: UTM, zone 13
50,000-foot grid ticks: Wyoming State Plane Coordinate System, East zone



Prepared in cooperation with the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under Cooperative Agreement Number 03HQAG0097.
Digital cartography by Robin Lyons and Joseph M. Huss
Map projection: Lambert Conformal Conic.
Horizontal datum: North American Datum of 1983.
Ellipsoid: Geoidetic Reference System 80.



PRELIMINARY SURFICIAL GEOLOGIC MAP OF THE CHUGWATER 30' x 60' QUADRANGLE, WYOMING

Compiled and mapped by
James C. Case and Laura L. Hallberg

2004

OPEN FILE REPORT 04-4

**PRELIMINARY DIGITAL
SURFICIAL GEOLOGIC MAP
OF THE
CHUGWATER 30' X 60' QUADRANGLE,
GOSHEN, LARAMIE AND PLATTE
COUNTIES, WYOMING**

*Mapped and compiled by Laura L. Hallberg and James C. Case
Digital cartography by Robin W. Lyons, and Joseph M. Huss*

WYOMING STATE GEOLOGICAL SURVEY

Lance Cook, State Geologist

*Laramie, Wyoming
2004*

This report has not been reviewed for conformity with the editorial standards of the Wyoming State Geological Survey.

*Prepared in cooperation with the U.S. Geological Survey,
National Cooperative Mapping Program,
under Cooperative Agreement Numbers 03HQAG0097.*

Preliminary Digital Surficial Geologic Map of the Chugwater 30' x 60' Quadrangle, Goshen, Laramie and Platte counties, Wyoming

Background

The Preliminary Surficial Geologic Map of the Chugwater 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 Surficial Geologic Map of the Chugwater 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.

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 polygons were attributed using a nine-digit character S_Unit, representing the surficial geologic unit nomenclature, and a six-digit numeric item S_Code, representing the classification of the unit.

Currently the product can be referred to as Open File Report (OFR) 04-4. Errors may exist as the product is preliminary surficial geology mapping. Any errors will be corrected with future releases. The product was produced at 1:100,000 scale and should not be utilized at scales larger than produced.

The vector polygon product was produced via on-screen digitizing of the original scanned surficial surficial geologic map. The map was scanned at 300dpi on a Hewlett Packard 800ps scanner. The image was georeferenced in ArcGIS 9.0 to the 1:100,000 quad base and statewide tic layer. The data was initially digitized as an ESRI personal Geodatabase in ArcGIS 9.0. The topology was checked for overlaps and gaps and fixed accordingly. The product was then exported to ESRI shapefiles for use by other GIS and CAD systems. The annotation was created within the map document from the surficial geology attributes and does not exist as a separate annotation layer.

The raster base map was scanned at 300dpi on a Hewlett Packard 800ps scanner and converted to black and white by Adobe Photoshop. The image was georeferenced in ArcGIS 9.0 to the 1:100,000 quad base and statewide tic layer.

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.

State Map Classification Codes

Alluvial Deposits

Alluvium

Alluvium and alluvium mixed with residuum, eolian deposits, grus, lacustrine deposits and/or slopewash (101)

(a, ae, aer, aes, ar, are, ars, arse, arw, asre, aw, awr, ea, ear, eas, raw)

Alluvium mixed with terrace deposits, with scattered eolian deposits, slopewash, and/or residuum (102)

(ast, at, ate, ater, atr, ats, atsr, eat, sat)

Shallow alluvium mixed with scattered bedrock outcrops and residuum, slopewash, and/or colluvium (103)

(aR, aRe, arR, ascR, aseR, asR, asRe)

Alluvial Fan Deposits

Alluvial fan deposits and alluvial fan deposits mixed with slopewash, alluvium, residuum, and/or eolian deposits (201)

(af, afe, afr, afs, asf, f, fa, far, fas, fe, frsa, fs, fsa, fse, fsr, sf, sfa, sfae, sfar, sfe, sfr, sfre)

Alluvial fan deposits grading into bench deposits or terrace deposits, or alluvial plain deposits mixed with slopewash, residuum, and/or eolian deposits (202)

(fAs, fb, fbe, fbr, fbs, ft, fte, ftr, fts, sfb, sft, sfr)

Alluvial fan deposits grading into dissected bench deposits, mixed with slopewash, residuum, and/or eolian deposits (203)

(fbd, fbdr, fbds, sfbd)

Dissected alluvial fan deposits and dissected alluvial fan deposits that grade into terrace deposits, mixed with slopewash and/or residuum (204)

(fd, fdr, fdrs, fds, fdsr, ftd, ftde, ftdr, ftds, rftd, sftd, sfd, sfdR)

Old Alluvial Plain Deposits

Dissected old alluvial plain deposits and dissected old alluvial plain deposits mixed with eolian deposits (301)

(Ad, Ade)

Bench Deposits

Bench 401 – Bench deposits and bench deposits mixed with eolian deposits, residuum, and/or slopewash (401)

(b, be, br, bre, bs, eb, rb)

Bench 402 – Dissected bench deposits and dissected bench deposits mixed with slopewash, eolian deposits, and/or residuum (402)
(bd, bde, bdr, bdre, bdrs, bds, ebd, ebdr, sbd, sbde)

Bench Deposits or mesa caprock undifferentiated

Bench deposits / mesa caprock and bench deposits/mesa caprock with a thin cover of eolian deposits and/or residuum (501)
(b/m, b/me, eb/m, erb/m, rab/m, rb/m, rb/ma, rb/me)

Bench-Mesa 502 – Dissected bench deposits / mesa caprock and dissected bench deposits/ mesa caprock with a thin cover of eolian deposits, slopewash, and/or residuum (502)
(b/md, b/mde, eb/md, rb/md, rb/mde, sb/md)

Terrace Deposits

Terrace deposits and terrace deposits mixed with alluvium, eolian deposits, residuum, and/or slopewash (601)
(et, st, str, t, ta, tae, tar, tare, tas, te, ter, tra, ts, tse, tsr)

Dissected terrace deposits and dissected terrace deposits mixed with slopewash, alluvium, eolian deposits, and/or residuum (602)
(etd, etdr, std, stde, stdr, td, tda, tdar, tde, tdr, tdre, tdrs, tds)

Shallow terrace deposits or shallow terrace deposits / structural terrace mixed with residuum, alluvium, and/or eolian deposits (603)
(ert, ert/T, etr, rat, ret/T, rt, rte, rt/Te, rt/Ts, tr, tre, t/Tr)

Dissected shallow terrace deposits and dissected shallow terrace deposits / structural terrace mixed with residuum and/or eolian deposits (604)
(ertd, ret/Td, rtd, rtde, rt/Td, rt/Tde)

Dissected shallow terrace deposits mixed with scattered bedrock outcrops and slopewash (606)
(stdR)

Terrace deposits/ structural terrace and terrace deposits/structural terrace mixed with eolian deposits (607)
(t/T, t/Te)

Terrace 608 - Dissected terrace deposits/ structural terrace and dissected terrace deposits/structural terrace mixed with slopewash, alluvium, residuum, and eolian deposits (608)
(sat/T, st/Td, t/Td, t/Tde, t/Tdr, t/Tdra, t/Tdre)

Eolian Deposits

Eolian deposits and eolian deposits mixed with residuum, slopewash, and alluvium (701)
(e, er, era, ers, ersa, es, esr, esra)

Eolian deposits covering terrace deposits or terrace deposits / structural terrace (702)
(et/T)

Eolian deposits mixed with scattered bedrock outcrops or structural terrace / terrace deposits and residuum and/or slopewash (703)
(eRp, erR, ersR, erT, erT/t, erT/ta)

Eolian deposits covering dissected terrace deposits or dissected terrace deposits / structural terrace (704)
(ertd, et/Td)

Eolian deposits mixed with dissected structural terrace / terrace deposits and residuum (705)
(erTd, erT/td)

Landslide Deposits

Landslides and landslides mixed with slopewash, colluvium, alluvium, and/or scattered bedrock outcrops (801)
(l, laR, lc, ls, srl)

Mesa

Mesa caprock mixed with a thin cover of residuum and/or eolian deposits (901)
(erm, rm, rme, rms)

Dissected mesa caprock with a thin cover of residuum and/or eolian deposits (902)
(mdr, rmd, rmde, rmdsa, srmd)

Playa lake and playa lake deposits

Playa lake, playa lake deposits, and playa lake deposits mixed with eolian deposits, residuum and/or alluvium (1001)
(aep, ap, eap, ep, epa, epr, p, pa, pe, pre)

Slopewash

Slopewash and slopewash mixed with residuum, alluvium, eolian deposits, alluvial fan deposits, grus and/or colluvium (1101)
(as, ase, asr, asu, esa, s, sa, sae, saf, sar, sare, sau, sc, scr, sea, ser, sera, sr, sra, srae, src, sre, srf, srfe, sur, sura)

Slopewash mixed with scattered bedrock outcrops and residuum, alluvial fan deposits, alluvium, grus, colluvium, clinker, and/or eolian deposits (1102)
(sacR, saR, saRe, sarR, sauR, scR, scRa, scRe, scRr, scrR, scuR, sfdR, sfR, sfRe, sfrR, sraR, srcR, sRe, sreR, srfR, sRk, sRr, srR, srRa, srRc, srRe, srRf, srRk, sruR, sucR, suR, surR)

Colluvium

Colluvium mixed with slopewash, alluvial fan deposits, and/or residuum (1201)
(c, cs, csa, csf, csr)

Colluvium mixed with scattered bedrock outcrops and residuum, grus and/or slopewash (1202)
csR, csrR, csuR, cuR, rcs, rcsR

Glacial Deposits and Features

Glacial Outwash

Glacial outwash, and glacial outwash mixed with alluvium, terrace deposits, and glacial deposits (1301)
(ag, ao, go, o, to)

Glacial deposits

Glacial deposits and glacial deposits mixed with colluvium, slopewash, alluvium, grus, and landslide deposits (1302)
(ag, csg, g, ga, gs, gsa, lg, rsg, sag, sg, srg, uga)

Glacial deposits mixed with scattered bedrock outcrops and alluvium, colluvium, grus, residuum, and/or slopewash (1303)
(csgR, gsR, rsgR, rsRg, sagR, scgR, sgR, suRg, usgR)

Glaciated bedrock

Glaciated bedrock with a mantle of glacial deposits and alluvium, colluvium, residuum, slopewash, and/or grus (1304)
(csgG, , Gcg, Gcsg, gG, Grg, gsaG, gcsG, gsG, Gg, Gsg, Gucg, Gusg, rgG, rsgG, sagG, sgG, usgG)

Residuum

Residuum mixed with slopewash, alluvium, eolian deposits, and/or alluvial fan deposits (1401)
(r, ra, rae, raes, ras, rase, re, rea, reas, res, rs, rsa, rsae, rse, rsf)

Residuum mixed with scattered bedrock outcrops or structural terrace / terrace deposits and slopewash, alluvium, eolian deposits, alluvial fan deposits, and/or colluvium (1402)
(raR, raRe, rasR, reR, resR, reT/t, reT/tR, rRa, rRae, rRcs, rRe, rRs, rRsa, rRsc, rRse, rsaR, rscR, rseR, rsfR, rsR, rsRa, rsRe, rsT, rsT/t, sRs)

Residuum mixed with slopewash, eolian deposits, and/or alluvium on dissected bedrock outcrops and/or a dissected structural terrace/terrace (1403)
(raT/td, raT/tde, reRd, resTd, reTd, reT/td, rsaRd, rsaT/td, rsRd, rsRda, rsT/td)

Grus mixed with scattered bedrock outcrops and slopewash, alluvium, and/or residuum (1404)
(rusR, uaR, ursR, usR, usaR, usrR)

Bedrock

Bedrock and bedrock mixed with colluvium, alluvial fan deposits, eolian deposits, glacial debris, slopewash, grus, clinker, alluvium, and/or residuum (1501)
(R, Rc, Rcr, Rcs, Rcsa, RcsG, Rcsr, Rcsu, Rcu, Re, Rr, Rrc, Rrce, Rrcs, Rres, Rrs, Rrsa, Rrsc, Rrse, Rrsk, Rs, Rsa, Rsc, Rscr, Rse, Rsf, Rsk, Rsr, Rsra, Rsre, Rsrk, Rsu, Ru, Ruc, Rucs, Rus, Rusc, Rusr)

Bedrock or upturned truncated bedrock with a thin mantle of eolian deposits, residuum, colluvium, and/or slopewash (1502)
(eaR, eR, eRrs, esR, rR, sR, sRc)

Upturned and truncated bedrock with a thin mantle of residuum, terrace deposits, alluvium, bench deposits, and/or eolian deposits (1503)
(bx, rx, rxae, rxe, trx, tx)

Dissected bedrock with a thin mantle of residuum, colluvium, slopewash, alluvium, and/or eolian deposits (1504)
(Rdrc, rRde, rRda, rRds, srRda)

Lake

Lake (1601)

Mined Areas

Mined Areas (1701)
(M, RrM, RrsM)

Structural terrace/terrace deposits

Structural terrace/terrace deposits with a mantle of eolian deposits, residuum, slopewash, and/or alluvial deposits (1801)
(raT/t, raT/te, reT, reT/tr, rT, rTe, rTs, rT/t, rT/ta, rT/te, rT/tR, rT/ts, sT, Tr, T/t, T/tr)

Structural terrace/terrace deposits 1802 – Dissected structural terrace/terrace deposits with a mantle of residuum, slopewash, and/or eolian deposits (1802)
(rTd, rTde, rTdeR, rTds, rT/td, rT/tda, rT/tde, saT/td, Tdr, T/tde, T/tdra)

Volcanic neck

Volcanic neck (1901)
(v)

Clinker

Clinker mixed with residuum, slopewash, and/or alluvial deposits (2001)
(kr, kra, krs, rak, rsak, rsk, srak, srk)

Clinker mixed with scattered bedrock outcrops and slopewash and/or Residuum
(2002)
(rRsk, rskR, rsRk)

Periglacial Features and Deposits

Periglacial features and deposits mixed with colluvium (2101)
(csq, rsq)

Periglacial features and deposits mixed bedrock outcrops and grus, colluvium,
and/or slopewash (2102)
(csRq, rsRq, Rucq, usRq)

Karst

Karst mixed with alluvium, residuum, and/or residuum mixed with slopewash
(2201)
(arK, Krs)

NOTE: rtd and rtde were originally classified as 603. They are now 604.
erT/ta moved from 1801 to 703
reTd moved from 1802 to 1403

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 |
| ae | alluvial deposits mixed with eolian deposits |
| af | alluvial deposits and alluvial fan deposits |
| ap | alluvial deposits mixed with playa lake deposits |
| ar | alluvial deposits mixed with residuum |
| are | alluvial deposits mixed with residuum and eolian deposits |
| ars | alluvial deposits mixed with residuum and slopewash deposits |
| asr | alluvial deposits mixed with slopewash and residuum |
| asre | alluvial deposits mixed with slopewash, residuum and eolian deposits |
| at | alluvial deposits mixed with terrace deposits |
| ate | alluvial deposits mixed with terrace and eolian deposits |

| | |
|------|--|
| b | bench deposits |
| bd | dissected bench deposits |
| be | bench deposits mixed with scattered eolian deposits |
| e | eolian deposits |
| ea | eolian deposits mixed with alluvial deposits |
| eb | eolian deposits covering dissected bench deposits |
| ep | eolian deposits mixed with playa lake deposits |
| er | eolian deposits mixed with residuum |
| esr | eolian deposits mixed with slopewash and residuum |
| eR | eolian deposits mixed with bedrock outcrops |
| eRp | eolian deposits mixed with bedrock outcrops and playa lake deposits |
| erR | eolian deposits mixed with residuum and bedrock |
| esR | eolian deposits mixed with slopewash and bedrock outcrops |
| kr | clinker deposits mixed with residuum |
| kra | clinker residuum mixed with alluvial deposits |
| ksr | clinker covered in places by slopewash, and residuum |
| l | landslide debris |
| ls | landslide debris mixed with slopewash |
| m | mesa caprock |
| p | playa lake and playa lake deposits |
| pa | playa lake and playa lake deposits mixed with alluvial deposits |
| pe | playa lake and eolian deposits, often occurring in a deflation hollow |
| pre | playa lake deposits mixed with residuum and eolian deposits |
| Rcs | bedrock covered in places by colluvium and slopewash |
| Rr | bedrock covered in places by residuum |
| Rrs | bedrock covered in places by slopewash, and residuum |
| Rse | bedrock covered in places by slopewash and eolian deposits |
| r | residuum |
| ra | residuum mixed with alluvial deposits |
| rae | residuum mixed with alluvial and eolian deposits |
| rak | residuum mixed with alluvial deposits and clinker |
| ras | residuum mixed with alluvial deposits and slopewash |
| rm | mesa caprock with a thin cover of residuum |
| rR | residuum mixed with bedrock outcrops |
| rRs | residuum mixed with bedrock outcrops and slopewash |
| rs | residuum mixed with slopewash |
| rsa | residuum mixed with slopewash and alluvial deposits |
| rsak | residuum mixed with slopewash, alluvial deposits and clinker |
| rsk | residuum mixed with slopewash and clinker |
| rsaR | residuum mixed with slopewash, alluvial deposits, and bedrock outcrops |
| rse | residuum mixed with slopewash and scattered eolian deposits |
| rsR | residuum mixed with slopewash and bedrock outcrops |
| rsRa | residuum mixed with slopewash, bedrock outcrops and alluvium |
| rsRe | residuum mixed with slopewash, bedrock outcrops, and eolian deposits |
| rT/t | residuum on a structural terrace and/or terrace deposits |
| s | slopewash |

| | |
|------|--|
| sa | slopewash mixed with alluvial deposits |
| sae | slopewash mixed with alluvial and eolian deposits |
| sar | slopewash mixed with alluvial deposits and residuum |
| scr | slopewash mixed with colluvium and residuum |
| scR | slopewash mixed with colluvium and bedrock outcrops |
| sf | slopewash mixed with alluvial fan deposits |
| sfa | slopewash mixed with alluvial fan deposits that grade into alluvial deposits |
| sfr | slopewash mixed with alluvial fan deposits and residuum |
| sr | slopewash mixed with residuum |
| sRe | slopewash mixed with bedrock outcrops and eolian deposits |
| sra | slopewash mixed with residuum and alluvial deposits |
| srae | slopewash mixed with residuum, alluvial deposits, and eolian deposits |
| sraK | slopewash mixed with residuum, alluvial deposits, and clinker |
| sraR | slopewash mixed with residuum, alluvial deposits, and bedrock outcrops |
| srcR | slopewash mixed with residuum, colluvium, and bedrock outcrops |
| srf | slopewash mixed with residuum and alluvial fan deposits |
| srk | slopewash mixed with residuum and clinker |
| srR | slopewash mixed with residuum and bedrock outcrops |
| srRa | slopewash mixed with residuum, bedrock outcrops, and alluvium |
| t | terrace deposits |
| ta | terrace deposits mixed with alluvial deposits |
| tar | shallow terrace deposits mixed with alluvial deposits and residuum |
| td | dissected terrace deposits |
| tde | dissected terrace deposits mixed with scattered eolian deposits |
| tr | terrace deposits mixed with residuum |
| ts | terrace deposits mixed with slopewash |