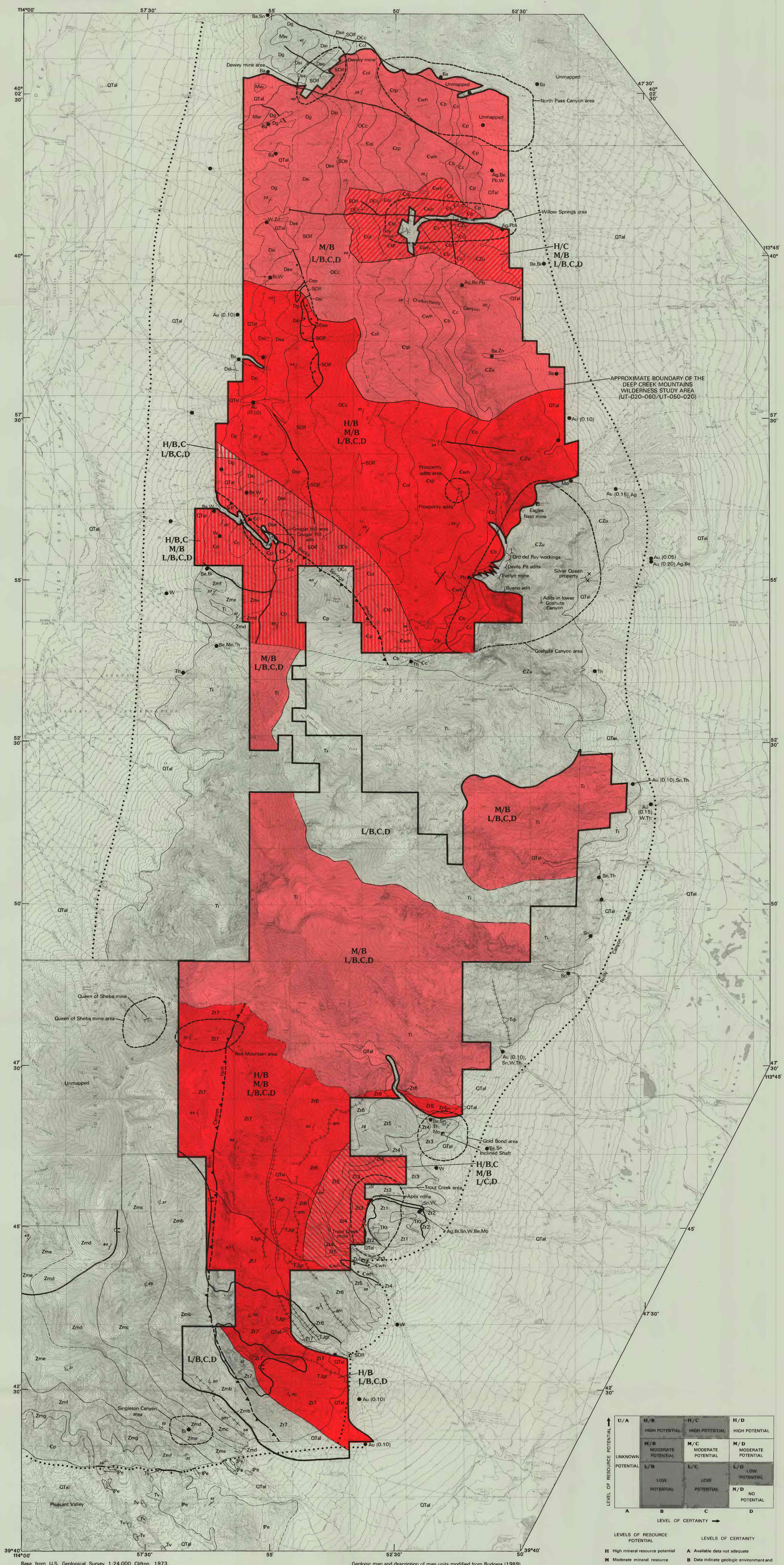

Base from U.S. Geological Survey 1:24,000 Clifton, 1973, Goshute, 1972, Goshute Canyon 1972, Ibapah, 1973, Ibapah Peak, 1972, Indian Farm Creek, 1972, Partonn, 1978, and Trout Creek, 1978

Geologic map and description of map units modified from Rodgers (1989)

SCALE 1:50 000

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

EXPLANATION OF MINERAL RESOURCE POTENTIAL

[Study area contains inferred subeconomic resources of limestone and dolomite suitable for agricultural uses, and quartzite suitable for production of eighth- and ninth-quality amber glass. The following indicated and (or) inferred resources are adjacent to the study area: (1) an indicated resource of silver, lead, zinc, and copper at the Roy mine in the Willow Springs area; (2) indicated and inferred gold resources in the Goshute Canyon area; (3) an indicated gold resource at the Queen of Sheba mine; and (4) an inferred gold resource in the Gold Bond area]

- **H/B** — **Geologic terrane having high mineral resource potential for gold and silver, with certainty level B**
- **H/C** — **Geologic terrane having high mineral resource potential for gold, silver, lead, zinc, and copper with certainty level C**
- **H/C** — **Geologic terrane having high mineral resource potential for mercury, with certainty level C**
- **H/C** — **Geologic terrane having high mineral resource potential for tungsten and beryllium, with certainty level C**
- **M/B** — **Geologic terrane having moderate mineral resource potential for gold, silver, lead, zinc, copper, molybdenum, tin, mercury, beryllium, and (or) tungsten, with certainty level B**—See figures 9 through 13 for the outline of areas of moderate potential for each commodity
- **L/B** — **Geologic terrane having low mineral resource potential for gold, silver, lead, zinc, copper, molybdenum, tin, mercury, beryllium, and (or) tungsten, with certainty level B**
- **L/C,D** — **The entire study area has low mineral resource potential for uranium and thorium, with certainty level C; low mineral resource potential for oil and gas, with certainty level B; and low resource potential for coal and geothermal energy, with certainty level D**

CORRELATION OF MAP UNITS

SEDIMENTARY AND VOLCANIC ROCKS

Units	Epoch	Period
QTal	Holocene to Oligocene(?)	QUATERNARY AND TERTIARY
Unconformity		
Tv	Oligocene	TERTIARY
Unconformity		
IPe		PENNSYLVANIAN
Mw		MISSISSIPPIAN
Unconformity		
Dg	Upper Devonian	DEVONIAN
Dsi	Middle Devonian	DEVONIAN
Dse	Lower Devonian	DEVONIAN
Unconformity		
SOlf	Upper and Middle Silurian; Upper Ordovician	SILURIAN; ORDOVICIAN
Unconformity		
O€c	Lower Ordovician	CAMBRIAN
€col	Upper Cambrian	CAMBRIAN
€tp	Middle Cambrian	CAMBRIAN
€wh	Middle Cambrian	CAMBRIAN
€b	Lower Cambrian	CAMBRIAN
€c	Lower Cambrian	CAMBRIAN
€p	Lower Cambrian	CAMBRIAN
Zmg, Zmf, Zme, Zmd, Zmc, Zmb	€Zu	CAMBRIAN
Fault contact		
Zt7, Zt6, Zt5, Zt4, Zt3		LATE PROTEROZOIC
Fault contact		
Zt2		LATE PROTEROZOIC
Fault contact		
Zt1		LATE PROTEROZOIC

INTRUSIVE ROCKS

Units	Epoch	Period
Tdi		TERTIARY
Ti	Eocene	TERTIARY
TKt		TERTIARY OR CRETACEOUS
TJgr		TERTIARY, CRETACEOUS(?), OR JURASSIC(?)
am		AGE UNKNOWN

DESCRIPTION OF MAP UNITS

QTal **Alluvium (Holocene to Oligocene(?))**—Poorly consolidated to unconsolidated mud, silt, sand, and gravel. Underlies modern rivers, streams, and washes; composes alluvial fans; and forms a thin veneer on pediment surfaces. Deltas and shorelines of the Pleistocene Lake Bonneville are included in this map unit

Tv **Volcanic rocks (Oligocene)**—Interbedded silicic ash-flow tuff and intermediate flows. Tuff is moderately to densely welded, crystal poor, devitrified, and has locally abundant fiamme. Includes tuff of the Kalamazoo Volcanics, dated at 34.7±0.5 Ma (Gans and Mahood, 1984)

IPe **Ely Limestone (Pennsylvanian)**—Medium-gray, medium- to thick-bedded limestone having abundant fossils and orange chert, and minor thin, fine-grained sandstone interbeds. Forms ledges. About 300 ft of unit is exposed in the map area

Mw **Woodman Formation (Mississippian)**—Intercalated dark-brown, friable, calcareous sandstone and dark-gray, sandy limestone. Nonresistant slope-former. About 1,000 ft of unit is exposed in the map area

Dg **Guilmette Formation (Upper and Middle Devonian)**—Light- to dark-gray, thick-bedded to massive, irregularly dolomitized limestone. Rare laminations are present near the base of the formation. Upper contact is sharp and placed at the base of the first shale bed. Forms ledges and slopes. About 1,100 ft thick

Dsi **Simonson Dolostone (Middle Devonian)**—Dark-gray to tan, evenly laminated dolostone. Finely crystalline, typically medium bedded, rarely massive. Upper contact is placed at the base of the first limestone bed. Forms resistant ledges. About 1,000 ft thick

Dse **Sevy Dolostone (Middle and Lower Devonian)**—Light-gray, medium-bedded dolostone having a distinctive sugary texture. Rare sand grains are present in the upper quarter of the unit. Upper contact is gradational and placed at the base of the first evenly laminated dolostone bed, which coincides with the top of a dark-gray limestone bed having sand grains and sand lenses. Forms resistant ledges. About 650 ft thick

SOlf **Laketown Dolostone (Upper and Middle Silurian) and Fish Haven Dolostone (Upper Ordovician)**—Laminated, sugary-textured, and silicified dolostone. The upper quarter of this unit, equivalent to the upper part of the Laketown Dolostone, consists of dark-gray silicified dolostone with numerous chert nodules and lenses. The middle half of this unit, equivalent to the middle part of the Laketown Dolostone, consists of thick-bedded to massive, light-gray, sugary-textured dolostone. The basal quarter of this map unit, which includes the lower part of the Laketown Dolostone and the Fish Haven Dolostone, consists of thin- to thick-bedded dolostone having light-gray and dark-gray laminations. Upper contact is placed at the base of the first regularly bedded dolostone bed, which is locally an intraformational conglomerate. Forms ledges and cliffs about 1,100 ft thick

O€c **Chokecherry Dolomite (Lower Ordovician and Upper Cambrian)**—Limestone, commonly dolomitized, with subordinate shale. Upper third consists of blue-gray, thin-bedded, silty to sandy limestone that forms a prominent dip slope throughout the northern Deep Creek Range. Underlain by dolomitized limestone interbedded with nonresistant shale and siltstone. This section is underlain by light-gray, thin- to medium-bedded, cherty dolomitized limestone having distinctive flat-pebble conglomerate beds. Lower one-sixth of unit is thick-bedded, medium- to dark-gray dolomitized limestone having abundant chert nodules and lenses subparallel to bedding. Includes the Notch Peak Formation (Lower Ordovician and Upper Cambrian) of McCollum and McCollum (1984), and is in part correlative with the Pogonip Group (Middle and Lower Ordovician). Upper contact, placed at the base of the first laminated dolostone bed, is an unconformity characterized by the absence of the regionally persistent Eureka Quartzite (Upper and Middle Ordovician) and, to the north, the upper part of the Chokecherry Dolomite. Maximum thickness about 1,050 ft

€col **Orr Formation and Lamb Dolomite (Upper Cambrian)**—Upper half consists of light-gray, oolitic, shaley, thin-bedded limestone, which is irregularly dolomitized, and light-gray, very thick bedded dolostone. Two laterally continuous shale units are present near the top. Lower half is dark-gray, oolitic, commonly cross-stratified, coarsely crystalline, thick-bedded dolostone. Includes the Orr Formation and Lamb Dolomite of McCollum and McCollum (1984). Upper contact is placed at the base of the first cherty limestone bed, which is marked by a break in slope. Forms ledges and slopes. About 1,800 ft thick

€tp **Trippe Limestone and Pierson Cove Formation (Middle Cambrian)**—Limestone and dolomitized limestone. Upper half of unit is medium- to dark-gray, thin- to thick-bedded shaley limestone, which in places is dolomitized. Laminated limestone is rare but diagnostic of the upper half. Lower half of unit is thick-bedded to massive, dolomitized limestone, which is dark gray with light-gray vugs, producing a mottled appearance. Includes the Trippe Limestone and Pierson Cove Formation of McCollum and McCollum (1984). Upper contact is placed at the base of the first thick-bedded, oolitic dolostone. More resistant dolomitized limestone forms ledges and less resistant limestone forms slopes. About 1,300 ft thick

€wh **Wheeler Shale, Swasey Limestone, Whirlwind Formation, Dome Limestone, Chisholm Shale, and Howell Formation (Middle Cambrian)**—Interbedded shale and limestone. Shale is olive green to tan, calcareous, and commonly contains silt lenses. Limestone is medium gray, thin to medium bedded, oolitic, fossiliferous, and commonly contains shale lenses. Includes the Wheeler Shale, Swasey Limestone, Whirlwind Formation, Dome Limestone, Chisholm Shale, and Howell Formation as defined by McCollum and McCollum (1984). Upper contact is placed below the first resistant, thick-bedded, dolomitized limestone bed and above a nonresistant shale unit. Forms prominent ledges that alternate with slopes. About 1,650 ft thick

€b **Busby Quartzite (Lower Cambrian)**—Dark-brown, thin- to thick-bedded quartz arenite and subarkosic sandstone. Upper contact is placed at the base of the first limestone bed. Equivalent to the upper half of the Pioche Shale as defined by McCollum and McCollum (1984). Resistant cliff-former. About 450 ft thick

€c **Cabin Shale (Lower Cambrian)**—Dark-brown to olive-green laminated shale and siltstone. Upper one-third contains discontinuous sandstone lenses that are more numerous up section. Upper contact is placed at the base of a prominent sandstone cliff. Equivalent to the lower half of the Pioche Shale as defined by McCollum and McCollum (1984). Forms slopes and swales. About 500 ft thick

€p **Prospect Mountain Quartzite (Lower Cambrian)**—Thick- to very thick bedded, light-brown, fine- to medium-grained feldspathic quartz arenite. Ubiquitous cross-stratification. Upper contact is placed at a distinctive topographic break, which marks first appearance of shale. Resistant cliff-former. About 3,000 ft thick

McCoy Creek Group (Late Proterozoic)—Interbedded quartzite, metasiltstone, schist, and marble. Divided in descending order into six units, G, F, E, D, C, and B (Woodward, 1965; Rodgers, 1984)

Zmg **Unit G**—Laminated phyllite and metasiltstone. Phyllite is olive green and purple, and contains lenses of metasiltstone and minor quartzite. Upper contact is sharp and placed at the base of the first thick-bedded vitreous quartzite bed. Forms slopes. About 300 ft thick

Zmf **Unit F**—Medium- to thick-bedded, vitreous white quartzite containing lenses of pebble conglomerate. Upper contact is sharp and placed at the base of the first phyllite bed. Forms cliffs. About 1,200 ft thick

Zme **Unit E**—Interbedded olive-green and purple, rarely laminated phyllite, olive-green metasiltstone, and tan to brown, silty quartzite. Upper contact is sharp and placed at the base of thick-bedded vitreous quartzite bed. Forms ledges and slopes. About 1,300 ft thick

Zmd **Unit D**—Thick-bedded to massive, slightly feldspathic, brown vitreous quartzite containing minor conglomerate lenses. Upper contact is gradational and placed at the top of the uppermost, laterally extensive, thick-bedded quartzite bed. Forms cliffs. About 1,200 ft thick

Zmc **Unit C**—Thin- to medium-bedded, brown silty quartzite containing minor interbedded schist. Upper contact is transitional over an interval of 20 ft to thick-bedded quartzite. Forms ledges and slopes. About 1,450 ft thick

Zmb **Unit B**—Thin-bedded metasiltstone in the upper one-third of the unit and thin-bedded to massive schist containing thin-bedded marble in the lower two-thirds of the unit. Upper contact is gradational and placed at the base of the first medium-bedded quartzite bed. Forms slopes. About 2,000 ft thick

€Zu **Prospect Mountain Quartzite (Lower Cambrian) and McCoy Creek Group (Late Proterozoic), undivided**

Trout Creek sequence (Late Proterozoic)—Interbedded quartzite, schist, diamictite, and marble. Divided in descending order into seven units, 7, 6, 5, 4, 3, 2, and 1 (Misch and Hazzard, 1962; Rodgers, 1984)

Zt7 **Unit 7**—Very thick bedded, light-brown, medium- to coarse-grained quartzite. Contains lenses of conglomerate and rip-up clasts in the upper 1,300 ft. Upper contact is a fault that is parallel to bedding. Resistant cliff-former. About 4,500 ft thick

Zt6 **Unit 6**—Three distinct units: an upper unit of laminated siltstone and quartzite, a middle unit of interbedded, thin- to medium-bedded quartzite and schist, and a lower unit of silver-gray schist. Uppermost 100 ft consists of interbedded vitreous quartzite and laminated quartzite. Forms ledges and slopes. About 4,000 ft thick

Zt5 **Unit 5**—Interbedded metadiamictite, schist, and quartzite. Metadiamictite consists of grit to cobble-size clasts in a schistose matrix. Clast lithologies include quartzite, granite, gneiss, schist, and marble. Schist is brown to black, generally massive but locally laminated. Quartzite is commonly medium grained, dark brown to gray, thick bedded, and laterally continuous; it is locally pebbly, white, massive, and lensoidal. Upper contact is placed at the top of the highest metadiamictite bed. Forms ledges and slopes. About 1,200 ft thick

Zt4 **Unit 4**—Thick-bedded to massive, light-brown quartzite and minor black schist. Upper contact is placed at the top of a massive, 30- to 100-ft-thick cliff-forming quartzite bed. Forms ledges. About 200–600 ft thick

Zt3 **Unit 3**—Interbedded metasiltstone, quartzite, conglomerate, and subordinate schist and metadiamictite. Quartzite and conglomerate are brown to gray, fine grained to pebbly, thick bedded, and laterally continuous. Metadiamictite consists of dominantly grit-size but also minor pebble- and cobble-size, clasts of quartzite, granite, gneiss, schist, marble, and amphibolite in a dark-gray to brown schistose matrix. Upper contact is gradational and placed at the base of the first medium-bedded, fine-grained, gray quartzite bed. Forms slopes interrupted by low ledges. About 1,000 ft thick

Zt2 **Unit 2**—Consists of an upper dark-gray to light-gray calcite marble and a lower white to beige dolomite containing minor silicic lenses. Upper contact is a fault. Forms ledges. About 150 ft thick

Zt1 **Unit 1**—Black to dark-gray schist containing irregular quartzite laminations and one massive quartzite bed. Upper contact is a fault at low angles to bedding. Intruded by and domed upward by the alaskite at Trout Creek. Unit is at least 120 ft thick

INTRUSIVE IGNEOUS ROCKS

Tdi **Diabase (Tertiary)**—Diabase dikes composed of clinopyroxene, plagioclase, hornblende, and minor magnetite. Intrude the Ibapah pluton

Ti **Ibapah pluton (Eocene)**—Monzogranite to granodiorite (Wallace, 1986). Composed of alkali feldspar, plagioclase, quartz, biotite, and minor to trace amounts of sphene, magnetite, garnet, apatite, monazite, allanite, thorite, and zircon. Locally, muscovite is a major constituent (Wallace, 1986). Textures range from medium to coarse grained and equigranular to porphyritic with alkali feldspar megacrysts. Uranium-lead analysis of zircon indicates an intrusive age of 39±1 Ma (Miller and others, 1988). More general term pluton is used in place of stock (Rodgers, 1989) because aeromagnetic data suggests it is not a deep-rooted body

TKt **Alaskite at Trout Creek (Tertiary or Cretaceous)**—Composed of quartz, microcline, and minor to trace amounts of muscovite, garnet, magnetite, apatite, and zircon. Locally, biotite is an important constituent. Equigranular, fine-to medium-grained, and commonly aplitic; muscovite locally occurs in books as much as one inch in diameter. Informal name used instead of Trout Creek pluton (Rodgers, 1989) because mapped unit consists primarily of sills

TJgr **Granite (Tertiary, Cretaceous(?), or Jurassic(?))**—Granite stocks and sills composed of variable proportions of alkali feldspar, plagioclase, quartz, and minor biotite and magnetite. Sills consist of monzogranite from the Ibapah pluton

am **Amphibolite (age unknown)**—Amphibolite sills composed of hornblende, plagioclase, and minor quartz and magnetite. Locally, garnet is present. Sills are foliated parallel to their intrusive contacts with Trout Creek sequence unit 6 and McCoy Creek Group unit B

Contact—Dashed where approximately located; dotted where concealed

Fault—Dashed where approximately located; dotted where concealed; queried where doubtful

Normal fault—Ball and bar on downthrown side

Thrust fault—Teeth on upper plate

Axial trace of Water Canyon overturned anticline

Strike and dip of bedding
- 50 **Inclined**
- 40 **Overturned**

Mine or adit

Inclined shaft

Outline of mineralized area

Au (0.10)● **Sample locality and element anomalies in stream-sediment (gold only) and heavy-mineral concentrate samples. Gold values in parts per million**

LEVELS OF RESOURCE POTENTIAL

- **H** High mineral resource potential
- **M** Moderate mineral resource potential
- **L** Low mineral resource potential
- **U** Unknown mineral resource potential
- **N** No known mineral resource potential

LEVELS OF CERTAINTY

- **A** Available data not adequate
- **B** Data indicate geologic environment and suggest level of resource potential
- **C** Data indicate geologic environment, give good indication of level of resource potential, but do not establish activity of resource-forming processes
- **D** Data clearly define geologic environment and level of resource potential and indicate activity of resource-forming processes in all or part of the area

Diagram showing relationships between levels of mineral resource potential and levels of certainty. Shading shows levels that apply to this study area

MAP SHOWING MINERAL RESOURCE POTENTIAL, GEOLOGY, SAMPLE LOCALITIES, AND ELEMENT ANOMALIES OF THE DEEP CREEK MOUNTAINS WILDERNESS STUDY AREA, JUAB AND TOOELE COUNTIES, UTAH