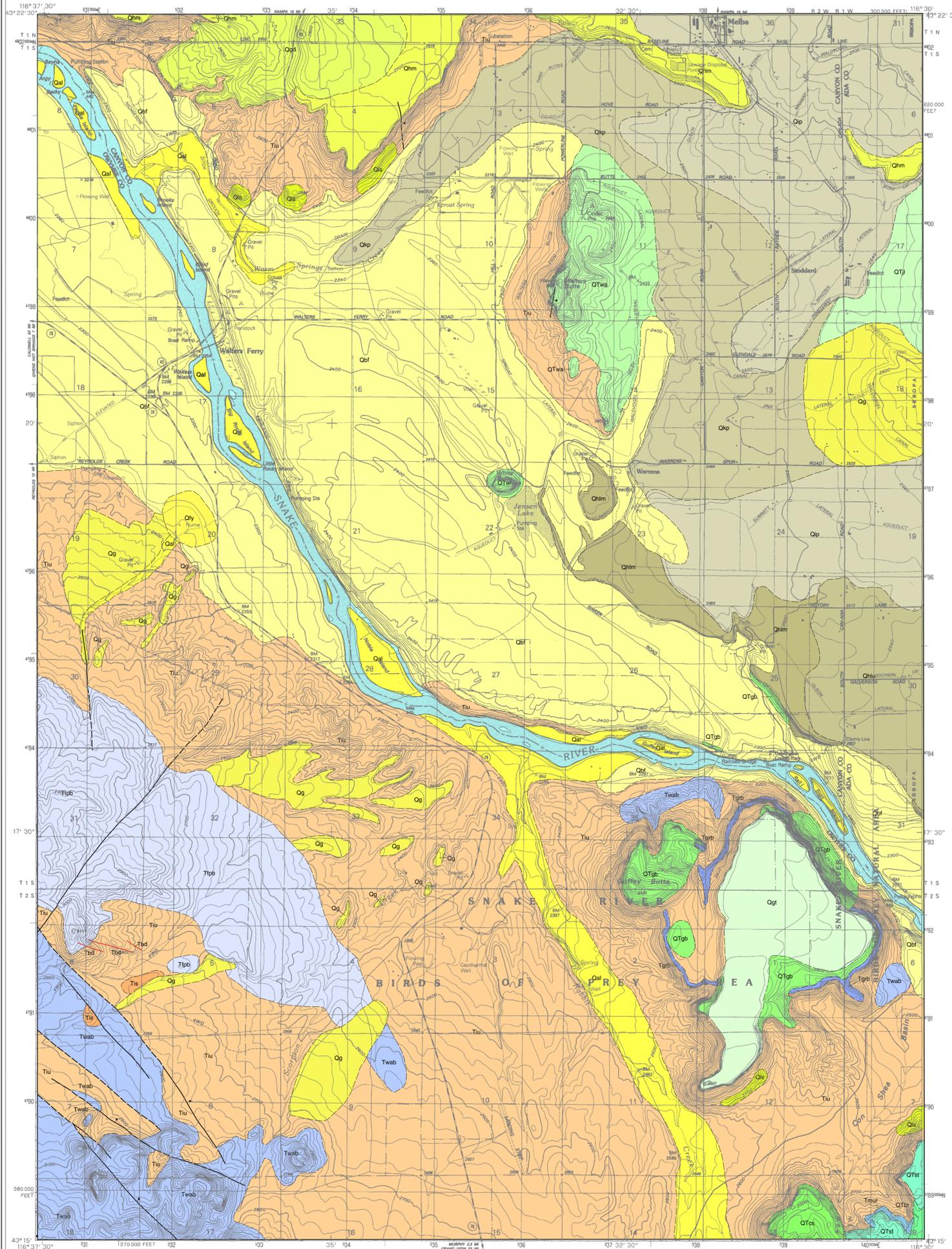


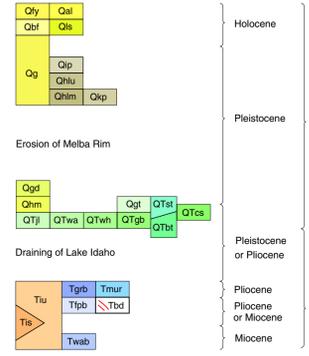
# GEOLOGIC MAP OF THE WALTERS BUTTE QUADRANGLE, ADA, CANYON, AND OWYHEE COUNTIES, IDAHO

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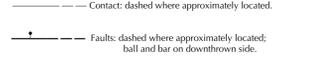
### CORRELATION OF MAP UNITS



### DESCRIPTION OF MAP UNITS

- SURFICIAL UNITS**
- Qal** ALLUVIUM—Unconsolidated gravel, sand, and silt deposits along river and stream courses.
  - Qbf** POST-BONNEVILLE FLOOD ALLUVIAL FAN—A small alluvial fan in sec. 20, T. 1 S., R. 2 W., lying on Bonneville Flood deposits.
  - Qis** BONNEVILLE FLOOD DEPOSITS—Boulders and gravel deposited by flood waters and later deposited in slack water during the Bonneville Flood.
  - Qg** LANDSLIDE DEPOSITS—Surficial and bedrock material that moved downslope at approximately the time of the Bonneville Flood.
  - Qm** GRAVEL DEPOSITS—Fluvial gravel, cobbles, and sand mainly accumulated on undifferentiated sediments of the Idaho Group after Lake Idaho drained. Includes partially eroded, ridge-capping deposits near the Snake River, deposits that follow abandoned stream courses farther from the river, and a small, pre-Initial Point basalt alluvial fan in sec. 18, T. 1 S., R. 1 W.
- SEDIMENTARY UNITS**
- Tiu** IDAHO GROUP, UNDIFFERENTIATED—Mainly beds of sand and silt deposited in Lake Idaho (Jenks and Bonnichsen, 1989) and material that was eroded and redeposited from those beds during subsequent fluvial activity. Includes some interbeds of basaltic and siliceous volcanic ash.
  - Tis** CEMENTED SANDSTONE BED WITHIN IDAHO GROUP—An interbed of cross-bedded, well-cemented, coarse-grained sandstone within the Idaho Group. Typically brown to buff colored. Derived principally from granitic outcrops to the southwest.
- VOLCANIC UNITS**
- Qip** BASALT OF INITIAL POINT—Basalt flows erupted from Initial Point volcano about 6 miles east of the northeast corner of the quadrangle. Forms a frozen lava cascade that flowed down the Melba escarpment and onto the valley floor in the northeastern part of the quadrangle. Contains abundant large plagioclase and olivine phenocrysts and has been dated at 0.414 ± 0.037 Ma (Ohlberg and others, 1995).
  - Qhlu** UPPER BASALT OF HALVERSON LAKE—Basalt flows at the canyon rim on the northeast side of Snake River at the eastern edge of the quadrangle. Flows are nearly aphyric and were erupted from an unidentified source. They are separated from the underlying middle basalt of Halverson Lake by a few feet of basaltic tuff.
  - Qhlm** MIDDLE BASALT OF HALVERSON LAKE—Basalt flows in the canyon wall northeast of the Snake River in the eastern part of the quadrangle and nearby on the floor of the Melba Alcove. Consists of four or more flows without intervening sediment beds. Nearly aphyric and may be from the same sources as the basalt of the Kuna Butte-Powers Butte type, although the two units differ somewhat chemically (unpublished analyses of Bill Bonnichsen, 1993-94, and Craig White, 1995).
  - Qkp** BASALT OF KUNA BUTTE-POWERS BUTTE TYPE—Basalt flows in the floor of the Melba Alcove and overlain by the basalt of Initial Point. May be about 0.387 ± 0.031 Ma in age. Chemically and petrographically resembles the basalt flows from Kuna Butte, Powers Butte, and affiliated vents within a few miles of the northern edge of the quadrangle (Ohlberg and others, 1995). Flows may have cascaded down the Melba escarpment in a fashion similar to the basalt of Initial Point.
  - Qgd** GROUCH DRAIN VOLCANIC COMPLEX—Basaltic tuff and a basalt flow that erupted from a phreatomagmatic vent at the northern margin of the quadrangle. The first part of the eruption deposited layers of sediment-bearing tuff as a substantial tuff ring around an enlarging crater that cut the basalt flows of the Qhm unit. As time passed, the erupted material became richer in basalt, leading to basaltic tephra deposits. Finally, a basalt flow partially filled the crater, breached its southern margin, and flowed downslope about a mile toward the valley floor where it intersected standing water.
  - Qhm** BASALT OF HAT BUTTE-MELROY BUTTE TYPE—Basalt flows exposed in the Melba escarpment across the northern part of the quadrangle. Flows are older than the escarpment. Most of this material probably was erupted from Hat Butte, a prominent shield volcano about 2 miles north of the northwestern part of the quadrangle, but some may have come from Melroy Butte, also a short distance north of the quadrangle. Locally, the flows have basalt pillows, suggesting the basalt ran into shallow water. The basalt typically contains tiny plagioclase laths, or is aphyric. The unit may be about 0.922 ± 0.184 Ma (Ohlberg and others, 1995) in age, based on its provisional correlation with the basalt of Upper Deer Flat.
  - Qgt** BASALT OF GUFFEY TABLE—A subaerial basalt flow occupies the top of Guffey Table and appears to have been erupted from the south end of the exposure area and flowed north on top of the tuff deposits of the Guffey Butte volcanic complex. At least part of the flow, in the northern portion of its exposure area, is a lava rather than pillowflow. Dates by Amiri and others (1984) indicate an age of about 1.065 ± 0.7 Ma.
  - Qtlj** JINX LATERAL VOLCANIC COMPLEX—Scattered exposures of massive to poorly bedded, sediment-bearing basaltic tuff in the northeast part of the quadrangle form the westward extension of more extensive deposits farther east. Exposures may have been deposited as underwater debris flows that were derived from the inner wall of a nearly buried crater whose eastern wall lies just to the east of the quadrangle boundary.
  - Qtwa** WALTERS BUTTE VOLCANIC COMPLEX—An eroded remnant of a large tuff ring consisting primarily of thick layers of strongly indurated, sediment-bearing basaltic tuff erupted from one or more buried eruptive zones immediately east of Walters Butte. At the top of the butte is a layer of basaltic spatter, and a small Strombolian-type cinder cone is at the north end of the exposure area. Godchaux and others (1992) suggest that the Walters Butte eruption started in shallow standing water, probably at the end-stage of Lake Idaho, but that the tuff ring soon built itself above the level of the lake. Subsequent slumping and erosion have eliminated much of the original construct.
- QUATERNARY**
- Holocene**
    - Qal, Qbf, Qis
  - Pleistocene or Pliocene**
    - Qg, Qm, Qp, Qk, Qd, Qh, Qj, Ql, Qn, Qo, Qr, Qs, Qt, Qv, Qw, Qx, Qy, Qz, Qaa, Qab, Qac, Qad, Qae, Qaf, Qag, Qah, Qai, Qaj, Qak, Qal, Qam, Qan, Qao, Qap, Qaq, Qar, Qas, Qat, Qau, Qav, Qaw, Qax, Qay, Qaz, Qba, Qbb, Qbc, Qbd, Qbe, Qbf, Qbg, Qbh, Qbi, Qbj, Qbk, Qbl, Qbm, Qbn, Qbo, Qbp, Qbq, Qbr, Qbs, Qbt, Qbu, Qbv, Qbw, Qbx, Qby, Qbz, Qca, Qcb, Qcc, Qcd, Qce, Qcf, Qcg, Qch, Qci, Qcj, Qck, Qcl, Qcm, Qcn, Qco, Qcp, Qcq, Qcr, Qcs, Qct, Qcu, Qcv, Qcw, Qcx, Qcy, Qcz, Qda, Qdb, Qdc, Qdd, Qde, Qdf, Qdg, Qdh, Qdi, Qdj, Qdk, Qdl, Qdm, Qdn, Qdo, Qdp, Qdq, Qdr, Qds, Qdt, Qdu, Qdv, Qdw, Qdx, Qdy, Qdz, Qea, Qeb, Qec, Qed, Qee, Qef, Qeg, Qeh, Qei, Qej, Qek, Qel, Qem, Qen, Qeo, Qep, Qeq, Qer, Qes, Qet, Qeu, Qev, Qew, Qex, Qey, Qez, Qfa, Qfb, Qfc, Qfd, Qfe, Qff, Qfg, Qfh, Qfi, Qfj, Qfk, Qfl, Qfm, Qfn, Qfo, Qfp, Qfq, Qfr, Qfs, Qft, Qfu, Qfv, Qfw, Qfx, Qfy, Qfz, Qga, Qgb, Qgc, Qgd, Qge, Qgf, Qgh, Qgi, Qgj, Qgk, Qgl, Qgm, Qgn, Qgo, Qgp, Qgq, Qgr, Qgs, Qgt, Qgu, Qgv, Qgw, Qgx, Qgy, Qgz, Qha, Qhb, Qhc, Qhd, Qhe, Qhf, Qhg, Qhi, Qhj, Qhk, Qhl, Qhm, Qhn, Qho, Qhp, Qhq, Qhr, Qhs, Qht, Qhu, Qhv, Qhw, Qhx, Qhy, Qhz, Qia, Qib, Qic, Qid, Qie, Qif, Qig, Qih, Qij, Qik, Qil, Qim, Qin, Qio, Qip, Qiq, Qir, Qis, Qit, Qiu, Qiv, Qiw, Qix, Qiy, Qiz, Qja, Qjb, Qjc, Qjd, Qje, Qjf, Qjg, Qjh, Qji, Qjk, Qjl, Qjm, Qjn, Qjo, Qjp, Qjq, Qjr, Qjs, Qjt, Qju, Qjv, Qjw, Qjx, Qjy, Qjz, Qka, Qkb, Qkc, Qkd, Qke, Qkf, Qkg, Qkh, Qki, Qkj, Qkl, Qkm, Qkn, Qko, Qkp, Qkq, Qkr, Qks, Qkt, Qku, Qkv, Qkw, Qkx, Qky, Qkz, Qla, Qlb, Qlc, Qld, Qle, Qlf, Qlg, Qlh, Qli, Qlj, Qlk, Qll, Qlm, Qln, Qlo, Qlp, Qlq, Qlr, Qls, Qlt, Qlu, Qlv, Qlw, Qlx, Qly, Qlz, Qma, Qmb, Qmc, Qmd, Qme, Qmf, Qmg, Qmh, Qmi, Qmj, Qmk, Qml, Qmm, Qmn, Qmo, Qmp, Qmq, Qmr, Qms, Qmt, Qmu, Qmv, Qmw, Qmx, Qmy, Qmz, Qna, Qnb, Qnc, Qnd, Qne, Qnf, Qng, Qnh, Qni, Qnj, Qnk, Qnl, Qnm, Qnn, Qno, Qnp, Qnq, Qnr, Qns, Qnt, Qnu, Qnv, Qnw, Qnx, Qny, Qnz, Qoa, Qob, Qoc, Qod, Qoe, Qof, Qog, Qoh, Qoi, Qoj, Qok, Qol, Qom, Qon, Qoo, Qop, Qoq, Qor, Qos, Qot, Qou, Qov, Qow, Qox, Qoy, Qoz, Qpa, Qpb, Qpc, Qpd, Qpe, Qpf, Qpg, Qph, Qpi, Qpj, Qpk, Qpl, Qpm, Qpn, Qpo, Qpp, Qpq, Qpr, Qps, Qpt, Qpu, Qpv, Qpw, Qpx, Qpy, Qpz, Qqa, Qqb, Qqc, Qqd, Qqe, Qqf, Qqg, Qqh, Qqi, Qqj, Qqk, Qql, Qqm, Qqn, Qqo, Qqp, Qqq, Qqr, Qqs, Qqt, Qqu, Qqv, Qqw, Qqx, Qqy, Qqz, Qra, Qrb, Qrc, Qrd, Qre, Qrf, Qrg, Qrh, Qri, Qrj, Qrk, Qrl, Qrm, Qrn, Qro, Qrp, Qrq, Qrr, Qrs, Qrt, Qru, Qrv, Qrw, Qrx, Qry, Qrz, Qsa, Qsb, Qsc, Qsd, Qse, Qsf, Qsg, Qsh, Qsi, Qsj, Qsk, Qsl, Qsm, Qsn, Qso, Qsp, Qsq, Qsr, Qss, Qst, Qsu, Qsv, Qsw, Qsx, Qsy, Qsz, Qta, Qtb, Qtc, Qtd, Qte, Qtf, Qtg, Qth, Qti, Qtj, Qtk, Qtl, Qtm, Qtn, Qto, Qtp, Qtq, Qtr, Qts, Qtt, Qtu, Qtv, Qtw, Qtx, Qty, Qtz, Qua, Qub, Quc, Qud, Que, Quf, Qug, Quh, Qui, Quj, Quk, Qul, Qum, Qun, Quo, Qup, Quq, Qur, Qus, Qut, Quu, Quv, Quw, Qux, Quy, Quz, Qva, Qvb, Qvc, Qvd, Qve, Qvf, Qvg, Qvh, Qvi, Qvj, Qvk, Qvl, Qvm, Qvn, Qvo, Qvp, Qvq, Qvr, Qvs, Qvt, Qvu, Qvv, Qvw, Qvx, Qvy, Qvz, Qwa, Qwb, Qwc, Qwd, Qwe, Qwf, Qwg, Qwh, Qwi, Qwj, Qwk, Qwl, Qwm, Qwn, Qwo, Qwp, Qwq, Qwr, Qws, Qwt, Qwu, Qwv, Qww, Qwx, Qwy, Qwz, Qxa, Qxb, Qxc, Qxd, Qxe, Qxf, Qxg, Qxh, Qxi, Qxj, Qxk, Qxl, Qxm, Qxn, Qxo, Qxp, Qxq, Qxr, Qxs, Qxt, Qxu, Qxv, Qxw, Qxx, Qxy, Qxz, Qya, Qyb, Qyc, Qyd, Qye, Qyf, Qyg, Qyh, Qyi, Qyj, Qyk, Qyl, Qym, Qyn, Qyo, Qyp, Qyq, Qyr, Qys, Qyt, Qyu, Qyv, Qyw, Qyx, Qyy, Qyz, Qza, Qzb, Qzc, Qzd, Qze, Qzf, Qzg, Qzh, Qzi, Qzj, Qzk, Qzl, Qzm, Qzn, Qzo, Qzp, Qzq, Qzr, Qzs, Qzt, Qzu, Qzv, Qzw, Qzx, Qzy, Qzz
- TERTIARY**
- Pliocene or Miocene**
    - Tiu, Tis
  - Miocene**
    - Twab

### SYMBOLS



### REFERENCES

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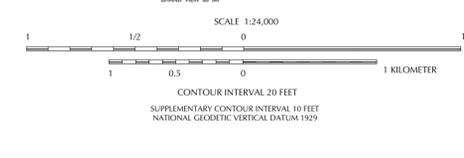
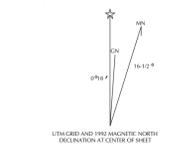
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Control by USGS and NOS/NOAA  
Base map from USGS Digital Raster Graphic.  
Compiled from aerial photographs taken 1955. Revised from aerial photographs taken 1987. Field checked 1990. Map edited 1992.  
North American Datum of 1927 (NAD 27). Projection and 10,000-foot grid ticks: Idaho Coordinate System, west zone (Transverse Mercator), 1000-meter Universal Transverse Mercator grid, zone 11.  
Bounded islands in the Snake River are part of the Deer Flat National Wildlife Refuge.



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