

Miscellaneous Publication 156

**GEOSPATIAL DATABASE:**

**Compiled Geologic Mapping in the Area of the  
Proposed Susitna–Watana Hydroelectric Project,  
South-central Alaska**

*Mapping compiled by:*

D.S.P. Stevens, E.N. Bachmann, and T.C. Wright

*Bedrock compilation review and revision by:*

D.N. Solie, Baseline Geoconsulting, LLC

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## **PROJECT SUMMARY**

The Alaska Energy Authority (AEA) in 2010 was authorized by the State of Alaska to begin laying the groundwork to develop the Susitna–Watana Hydroelectric Project on the Susitna River, Alaska. The project was intended to help meet the future electrical needs of Alaska’s Railbelt Region by providing clean, renewable energy at the lowest possible long-term cost. An accurate assessment of the site geology is important for dam location, design, and construction, as well as for other planning and land management decisions in the region.

In support of the proposed Susitna–Watana Hydroelectric Project, the Alaska Division of Geological & Geophysical Surveys (DGGS) developed a Geographic Information System (GIS)-based geologic compilation of published and unpublished maps for twelve, inch-to-mile (1:63,360-scale) quadrangles (fig. 1) encompassing the proposed hydroelectric project footprint, including the anticipated reservoir and surrounding area. DGGS geologists reviewed and analyzed existing geologic mapping for quality and completeness, and the maps were converted for use in GIS (table 1). The conversion process included scanning and georeferencing the original hard-copy map documents, creating a geodatabase, digitizing the geologic data, assigning attributes, and producing a digital data product for public release. The best available geologic mapping was synthesized into a single compilation data layer, and is packaged along with georeferenced scans and digitized vector files of the original geologic source maps. Bedrock geology was reviewed and revised by an independent contractor to ensure consistency with current geologic interpretations of the area.

This geodatabase product will be a valuable reference resource for developers, planners, and scientists working on the hydroelectric project, as well as for any other projects in the area.

## **ACKNOWLEDGMENTS**

This capital project was funded by the Alaska Energy Authority (AEA) through the Alaska Department of Commerce, Community, and Economic Development (DCCED).

Table 1. Data Sources for Geologic Map Compilation, Proposed Susitna–Watana Hydroelectric Project

DAS01	Kline, J.T., Bundtzen, T.K., and Smith, T.E., 1990, Preliminary bedrock geologic map of the Talkeetna Mountains D-2 Quadrangle, Alaska: Alaska Division of Geological & Geophysical Surveys Public Data File 90-24, 13 p., 1 sheet, scale 1:63,360. doi: <a href="https://doi.org/10.14509/1458">10.14509/1458</a>
DAS02	Smith, T.E., Albanese, M.D., and Kline, G.L., 1988, Geologic map of the Healy A-2 Quadrangle, Alaska: Alaska Division of Geological & Geophysical Surveys Professional Report 95, 1 sheet, scale 1:63,360. doi: <a href="https://doi.org/10.14509/2276">10.14509/2276</a>
DAS03	Csejtey, Béla, Jr., Nelson, W.H., Jones, D.L., Silberling, N.J., Dean, R.M., Morris, M.S., Lanphere, M.A., Smith, J.G., and Silberman, M.L., 1978, Reconnaissance geologic map and geochronology, Talkeetna Mountains Quadrangle, northern part of Anchorage Quadrangle, and southwest corner of Healy Quadrangle, Alaska: U.S. Geological Survey Open-File Report 78-558-A, 60 p., 1 sheet, scale 1:250,000. <a href="http://dggs.alaska.gov/pubs/id/12425">http://dggs.alaska.gov/pubs/id/12425</a>
DAS04	Reger, R.D., Bundtzen, T.K., and Smith, T.E., 1990, Geology of the Healy A-3 Quadrangle, Alaska: Alaska Division of Geological & Geophysical Surveys Public Data File 90-1, 13 p., 2 sheets, scale 1:63,360. doi: <a href="https://doi.org/10.14509/1433">10.14509/1433</a>
DAS05	Clautice, K.H., 1990, Geologic map of the Valdez Creek mining district: Alaska Division of Geological & Geophysical Surveys Public Data File 90-30, 1 sheet, scale 1:250,000. doi: <a href="https://doi.org/10.14509/1464">10.14509/1464</a>
DAS06– DAS21	Acres, 1982a, Susitna Hydroelectric Project: 1980–81 Geotechnical Report, v. 2, part 2, Appendix G–K, final draft, 237 p. <a href="http://www.arlis.org/docs/vol1/Susitna/0/APA69.html">http://www.arlis.org/docs/vol1/Susitna/0/APA69.html</a>
DAS22	Woodward-Clyde Consultants, 1982, Final report on seismic studies for Susitna Hydroelectric Project, 363 p. (fig. 3–4). <a href="http://www.arlis.org/docs/vol1/Susitna/12/APA1255.pdf">http://www.arlis.org/docs/vol1/Susitna/12/APA1255.pdf</a>
DAS23	Woodward-Clyde Consultants, 1982, Final report on seismic studies for Susitna Hydroelectric Project, 363 p. (fig. 4–15). <a href="http://www.arlis.org/docs/vol1/Susitna/12/APA1255.pdf">http://www.arlis.org/docs/vol1/Susitna/12/APA1255.pdf</a>
DAS24	Merritt, R.D., Eakins, G.R., and Clough, J.G., 1982, Coal investigation of the Susitna Lowland: Alaska Division of Geological & Geophysical Surveys Alaska Open-File Report 142, 89 p., 4 sheets, scale 1:250,000. doi: <a href="https://doi.org/10.14509/62">10.14509/62</a>
DAS25	Eakins, G.R., Jones, B.K., and Forbes, R.B., 1977, Investigation of Alaska’s uranium potential: Alaska Division of Geological & Geophysical Surveys Alaska Open-File Report 109, 213 p., 10 sheets, scale 1:250,000. doi: <a href="https://doi.org/10.14509/21">10.14509/21</a>
DAS26	Csejtey, Béla, Jr., 1974, Reconnaissance geologic investigations in the Talkeetna Mountains, Alaska: U.S. Geological Survey Open-File Report 74-147, 48 p., 1 sheet, scale 1:63,360. <a href="http://dggs.alaska.gov/pubs/id/11004">http://dggs.alaska.gov/pubs/id/11004</a>
DAS27– DAS28	Acres, 1982b, Susitna Hydroelectric Project, 1982 Supplement to 1980–81 Geotechnical Report. <a href="http://www.arlis.org/docs/vol1/Susitna/0/APA68.html">http://www.arlis.org/docs/vol1/Susitna/0/APA68.html</a>
DAS29	Richter, D.H., 1963, Geology of the Portage Creek–Susitna River area: Alaska Division of Mines and Minerals Geologic Report 3, 2 sheets, scale 1:24,000. doi: <a href="https://doi.org/10.14509/332">10.14509/332</a>
DAS30	Woodward-Clyde Consultants, 1982, Final report on seismic studies for Susitna Hydroelectric Project, 363 p. (fig. 4–21). <a href="http://www.arlis.org/docs/vol1/Susitna/12/APA1255.pdf">http://www.arlis.org/docs/vol1/Susitna/12/APA1255.pdf</a>
DAS31	Csejtey, Béla, Jr., Mullen, M.W., Cox, D.P., and Stricker, G.D., 1992, Geology and geochronology of the Healy Quadrangle, south-central Alaska: U.S. Geological Survey Miscellaneous Investigations Series Map 1961, 63 p., 2 sheets, scale 1:250,000. <a href="http://dggs.alaska.gov/pubs/id/12847">http://dggs.alaska.gov/pubs/id/12847</a>
DAS33	Clautice, K.H., Newberry, R.J., Pinney, D.S., Blodgett, R.B., Bundtzen, T.K., Gage, B.G., Harris, E.E., Liss, S.A., Miller, M.L., Reifentuhl, R.R., and Clough, J.G., 2001, Geologic map of the Chulitna region, southcentral Alaska: Alaska Division of Geological & Geophysical Surveys Report of Investigation 2001-1B, 32 p., 1 sheet, scale 1:63,360. doi: <a href="https://doi.org/10.14509/2771">10.14509/2771</a>
DAS34	Woodward-Clyde Consultants, 1982, Final report on seismic studies for Susitna Hydroelectric Project, 363 p. (fig. 4–17). <a href="http://www.arlis.org/docs/vol1/Susitna/12/APA1255.pdf">http://www.arlis.org/docs/vol1/Susitna/12/APA1255.pdf</a>

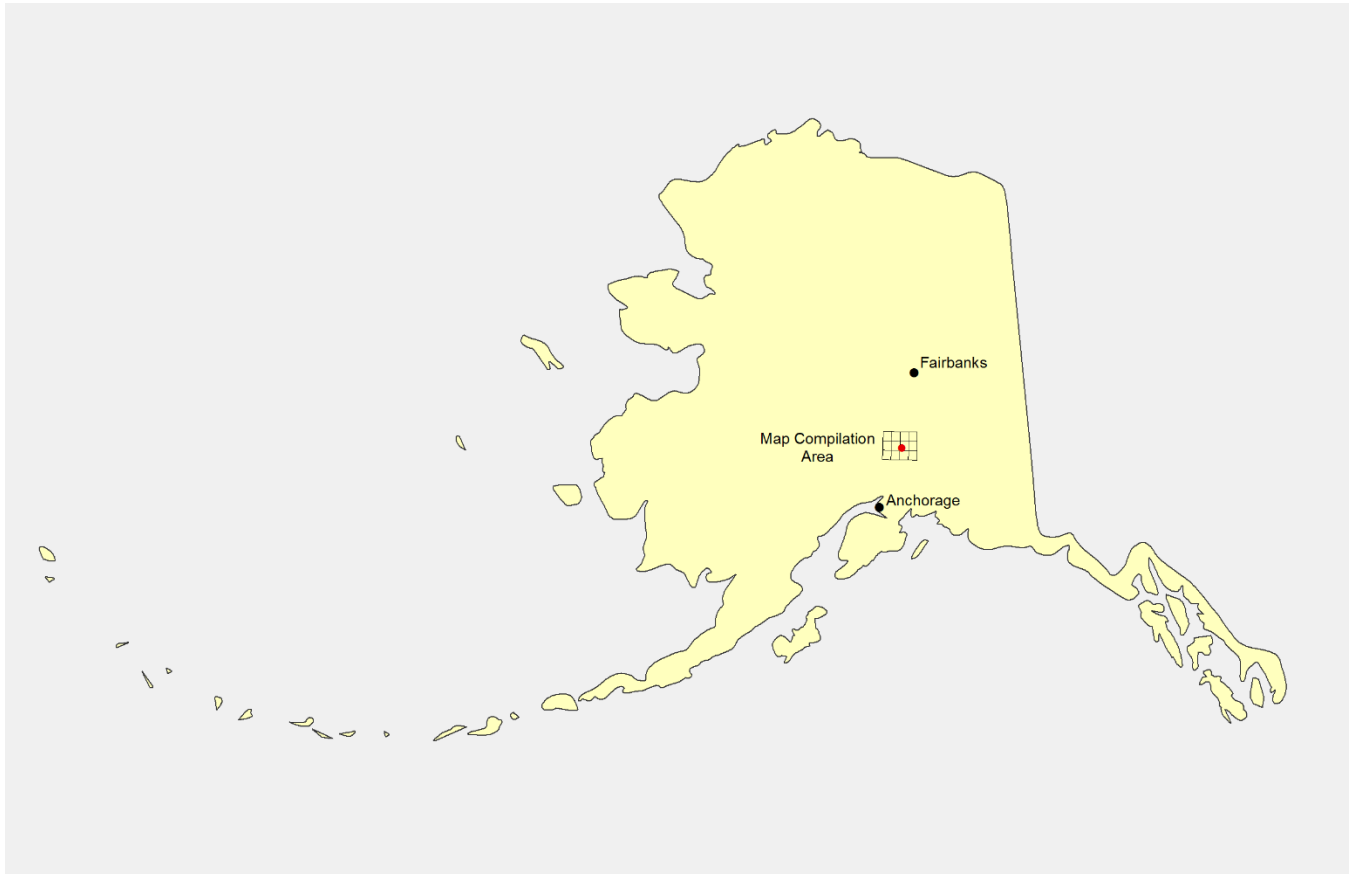


Figure 1. Map showing 1:63,360-scale quadrangles included in the geologic map compilation geodatabase: Healy A-2, A-3, A-4, A-5; and Talkeetna Mountains C-2, C-3, C-4, C-5, D-2, D-3, D-4, D-5. Red dot is location of the proposed dam and powerhouse.