CHRISTOPHER D. ARP

U.S. Geological Survey, Alaska Science Center, 4230 University Dr., Anchorage, AK 99508-4664
907-786-7119 • carp@usgs.gov

A creative, forward thinking hydroecologist with a diversity of practical experiences in natural resources across a broad range of ecosystems. A strong capability to conduct scientific research using concepts and methods from multiple disciplines to produce comprehensive integrated results applicable to environmental policy and management. A long-term professional goal of helping people to understand and appropriately manage ecosystems and their human services and resources.

EDUCATION

Ecology — **Ph.D.** - 2006
Utah State University – Logan, UT
Dissertation Research: Geomorphology, hydrology, and biogeochemistry of stream-lake ecosystems in the Sawtooth Mountains, Idaho, USA
Advisor: Michelle A. Baker

Watershed Science — **M.S.** - 1998
Colorado State University - Fort Collins, CO
Thesis Title: Chemical and water-level influences on litter decomposition in subalpine fens of Colorado
Advisor: John D. Stednick

Fisheries and Wildlife Biology / Environmental Studies — **B.S.** - 1994 (double major)
Iowa State University - Ames, IA
Advisor: John Summerfelt

RELEVANT WORK EXPERIENCE

10/06 - present **Research Ecologist (limnologist)**
- Interdisciplinary basic and applied research of lakes, streams and rivers, and wetlands in Alaska.
- Process studies to partition natural ecosystem variation from climate change and local land-use effects.
- Use of sensor monitoring networks coupled with remotes sensing to scale ecosystem processes.

5/02 - 9/06 **Research Assistant**
Department of Biology / The Ecology Center – Logan, UT
- Interdisciplinary aquatic ecosystem research focused on nitrogen cycling in streams and lakes
- Field work involving hydrologic instrumentation, monitoring, and experiments; mapping and geomorphic surveys; water chemistry sampling and experimentation.
- Modeling, data analysis, proposal and manuscript writing, and oral presentations.
- Teaching assistant for a course in watershed hydrology

3/97 – 1/99, 5/01 – 5/02 **Research Consultant**
Dr. David J. Cooper, Consulting Ecologist – Boulder, CO
By Project (contract agency is in parenthesis)
- Prospect Basin fen baseline and post-development monitoring and oversight (Telluride Ski & Golf)
- In-stream flow requirements of riparian tree communities: San Miguel River, CO (BLM)
- Functional assessment of sedimentation and erosion in riverine and slope wetlands (State of Utah)
- Functional assessment of sediment and carbon budgets in wetlands (Colorado Geologic Survey)
- Cottonwood establishment and health on regulated rivers (Bureau of Reclamation)
- Hydrogeomorphic classification system for Colorado wetlands (Colorado Geologic Survey)

5/99 – 4/01 **Development Worker**
U.S. Peace Corps – Ecuador, S.A.
Dept. of Aquaculture Engineering, National University of Loja (counterpart agency) - Loja, Ecuador
- Initiated and managed an extension program for fish farmers in the Ecuadorian Amazon region.
- Designed and taught a university course in Water Resources to aquaculture engineering students.
- Trained an incoming group of Peace Corp volunteers in a new program in aquaculture extension.

ADDITIONAL WORK EXPERIENCE

9/96 - 2/97	**Soil Science Technician** Colorado State University – Fort Collins, CO
7/94 – 8/96 (intermittent)	**Domestic Fisheries Observer** Saltwater, Inc – Anchorage, AK
3/94 – 7/94	**Park Restoration Crew Leader** FEMA – Boone, IA
5/92 – 8/93 (summers)	**Biological Science Technician** U.S. Fish & Wildlife Service – North Dakota

TEACHING EXPERIENCE

8/05 - 12/05	Teaching Assistant for a course in Watershed Hydrology Department of Aquatic, Watershed, and Earth Resources, Utah State University - Logan, UT
7/00 - 11/00	Technical Trainer for development workers in an aquaculture extension program US Peace Corps - Quito, Ecuador
8/99 - 2/00	Professor for a course in Hydrology and Water Quality *Programa Carrera Ingeniería en Acuacultura, Universidad Nacional de Loja* - Loja, Ecuador
11/98	Guest lecturer for a course in Land-use and Water Quality Department of Earth Resources, Colorado State University - Fort Collins, CO

PROFESSIONAL SKILLS

- environmental analysis
- research design, implementation, & evaluation
- experimental & modeling statistics
- water quality sampling & analysis
- mapping; topographic & stratigraphic
- isotope, dye, and salt tracers
- hydrologic instrumentation & monitoring
- report & proposal writing
- public speaking
- Spanish writing & speaking
- field work excellence
- educating, mentoring, & training (formal & non-formal)
- teamwork & interdisciplinary planning
- networking & leadership

COMPUTER SOFTWARE AND MODELS

Proficiency	**Experience**
Word • Excel • Other Microsoft Applications	Macintosh • DOS • UNIX
SAS • SigmaStat • SigmaPlot	IHA7 (hydrograph analysis software)
ArcGIS, ArcHydro • Surfer	MODFLOW (groundwater flow model)
OTIS-P (river solute transport model)	TauDEM (hydrographic analysis model)
	Interactive Data Language (IDL)

RESEARCH AFFILIATIONS

- American Water Resources Association
- American Society of Limnology and Oceanography
- American Geophysical Union

GRANTS, HONORS & AWARDS

- Environmental Protection Agency STAR Fellowship – present ($37,000 / year)
- Subsurface Science Fellowship, Inland Northwest Research Alliance – 2002-03 ($26,500 / year)
- Ecology Center Graduate Fellowship – 2004 ($3,500)
- Alpha Zeta National Agricultural Honorary Society, Iowa State University – 1993

PROFESSIONAL SERVICE & PARTICIPATION

- Matanuska-Susitna Borough Wetlands Planning Committee - 2008
- Short Course: Morphology, Morphodynamics, and Ecology of Mountain Rivers - National Center for Earth Surface Dynamics, Berkeley, California - 2005
- Peer-reviewer for *Environmental Management, Landscape Ecology, Journal of the North American Benthological Society, Journal of Geophysical Research, and Biogeochemistry*
- *RED DE EXTENSION PISCICOLA AMAZONICA*, External Director – 2001-04
- 1st Annual Water Symposium committee, Colorado State University – 1997
- American Water Resources Association, Colorado State University Student Chapter President – 1996-97

PEER-REVIEWED PUBLICATIONS

13. Jones, B.M., **C.D. Arp**, M.T. Jorgenson, K.M. Hinkel, J.A. Schmutz, and P.L Flint. In press. Increase in the rate and uniformity of coastline erosion in arctic Alaska. *Geophysical Research Letters*.

12. Briggs, M.A., M.N. Gooseff, **C.D. Arp**, and M.A. Baker. In press. A method for estimating surface transient storage parameters for streams with concurrent hyporheic storage. *Water Resources Research.*

11. Jones, B.M., **C.D. Arp**, K.M. Hinkel, R.A. Beck, J.A. Schmutz, and B. Winston. 2008. Arctic lake physical processes and regimes with implications for winter water availability and management in the National Petroleum Reserve Alaska. *Environmental Management*, doi: 10.1007/s00267-9241-0

10. Jones, B.M., K.M. Hinkel, **C.D. Arp**, W.R. Eisner. 2008. Modern erosion rates and loss of coastal features and sites, Beaufort Sea coastline, Alaska. *Arctic,* 61(4):361-372.

9. Jones, B.M., R. Rhykus, Z. Lu, **C.D. Arp**, D. Selkowitz. 2008. Radar imaging of winter seismic activity in the National Petroleum Reserve, Alaska. *Polar Record,* 44(2):1-5.

8. Alessa, L, A. Kliskey, R. Lammers, **C. Arp**, D. White, L. Hinzman, and R. Busey. 2008. The arctic water resources vulnerability I index: an integrated assessment tool for community resilience and vulnerability with respect to freshwater. *Environmental Management*, 42:523-541.

7. Arp, C.D. and M.A. Baker. 2007. Discontinuities in stream nutrient uptake below lakes in mountain drainage networks. *Limnology and Oceanography*, 52: 1978-1990.

6. Myers, A.K., A.M. Marcarelli, **C.D. Arp**, M.A. Baker, W.A. Wurtsbaugh. 2007. Disruption of stream sediment size and stability by lakes in mountain watersheds: potential effects on periphyton biomass. *Journal of the North American Benthological Society*, 26(3): 390-400.

5. Arp, C.D., J.C. Schmidt., M.A. Baker, and A. Myers. 2007. Stream geomorphology in a mountain lake district: hydraulic geometry, sediment sources and sinks, and downstream effects. *Earth Surface Processes and Landforms*, 32(4): 525-543.

4. Arp, C.D., M.N. Gooseff, M.A. Baker, and W. Wurtsbaugh. 2006. Surface-water hydrodynamics and regimes of a small mountain stream-lake ecosystem. *Journal of Hydrology*, 329: 500-513.

3. Arp, C.D. and D.J. Cooper. 2004. Analysis of sediment retention in western riverine wetlands: the Yampa River Watershed, Colorado. *Environmental Management*, 33(3):318-330.

2. Cooper, D.J., R.A. Andrus, and **C.D. Arp.** 2002. *Sphagnum balticum* in a Southern Rocky Mountain iron fen. *Madrono*, 49(3):186-188.

1. Arp, C.D., D.J. Cooper, and J.D. Stednick. 1999. The effects of heavy metals from acid rock drainage on *Carex aquatilis* leaf litter decomposition in Rocky Mountain fens. *Wetlands*, 19(3):665 - 674.

MANUSCRIPTS IN PREPARATION

MacKay, M., P. Neal, **C. Arp**, L De Senerpont Domis, X. Fang, G. Gal, K. Johnk, G. Kirillin, J. Lenters, E. Litchman, S. MacIntyre, P. Marsh, J. Melack, W. Mooij, F. Peeters, A. Quesada, S. Schladow, M. Schmid, C. Spence, H. Stefan, and S. Stokes. In review. Modeling lakes and reservoirs in the climate systems. *Limnology and Oceanography.*

Hall, R.O., M.A. Baker, **C.D. Arp**, and B.J. Koch. In review. Hydrological control of nitrogen removal, storage, and export in a mountain stream. *Limnology and Oceanography*.

Jones, B.M., C Kolden, R. Jandt, J.T. Aboatzoglou, F. Urban, and **C.D. Arp**. In review. Characterization of the 2007 Anaktuvuk River tundra fire, North Slope, Alaska. Arctic, Antarctic, and Alpine Research.

Arp, C.D., B.M. Jones, F.E. Urban, and J.A. Schmutz. In preparation. Analyzing lake hydrologic changes from 1973 to 2008 using observational data coupled with a simple water balance model on the Alaskan arctic coastal plain.

Arp, C.D., B.M. Jones, and others. In preparation. Lake Surface Temperature and Ice Cover in the Alaskan Subarctic and Arctic: Using In-situ Monitoring, Remote Sensing, and Numerical Modeling to Analyze Regimes from 2001 to 2008

REPORTS

Arp, C.D. and B.M. Jones. In press. Geography of Alaska lake districts: identification, description, and analysis of lake-rich regions of a diverse and dynamic state. Scientific Investigations Report, U.S. Geological Survey

Cooper, D.J. and **C.D. Arp**. 2003. North Fork of the Gunnison River riparian vegetation analysis. North Fork River Improvement Association.

Cooper, D.J. and **C.D. Arp**. 2002. Prospect Basin fens: baseline monitoring for the year 2001. Prospect Bowl Fen Protection Oversight Committee.

Arp, C.D, and E. Benítez G. 2001. A review concerning the potential use of native Amazonian fishes for aquaculture in Ecuador, *Red de Extensión Piscícola Amazónica* Publication, *Programa Carrera en Acuacultura*, *Universidad Nacional de Loja*, Loja, Ecuador.

Arp, C.D. and D.J. Cooper. 1999. Analysis of sediment fluxes in riparian and slope wetlands: Yampa River Watershed, Colorado. Department of Environmental Quality, State of Utah.

Cooper, D.J., **C.D. Arp,** and D.C. Anderson. 1999. Importance of the 1997 Flaming Gorge Dam bypass flows for native ecosystem maintenance along the Green River in Browns Park and Lodore Canyon, Colorado. Bureau of Reclamation.

Cooper, D.J. and **C.D. Arp.** 1999. Riparian vegetation of the San Miguel River: surface and groundwater interactions, plant water sources, plant water status, and susceptibility to impacts from changing river base flows. Bureau of Land Management

CONFERENCE PRESENTATIONS

Arp, C.D., B.M. Jones, and J.A. Schmutz. 2008. Spatial and temporal dynamics of lake ice on the Arctic Coastal Plain of Alaska. American Geophysical Union *Chapman Conference on Lakes as Sentinels, Integrators, and Regulators of Climate Change, Lake Tahoe, NV*

Arp, C.D. and B.M. Jones. 2008. Decadal to seasonal lake salinity dynamics in the Teshekpuk Lake Special Area. *Alaska Chapter of the American Water Resources Association, Juneau, AK.*

Arp, C.D., B.M. Jones, and C.E. Zimmerman. 2007. Geography of Alaska lake districts. *American Geophysical Union, San Francisco, CA.*

Alessa, L., A. Kiskey, R. Lammers, **C. Arp**, D. White, L. Hinzman. 2007. The Arctic water resources vulnerability index (AWRVI): A new tool for assessing resilience to change. *Arctic Research Consortium*, Washinton, D.C.

Arp, C.D., E.A. Hood, E.G. Neal. 2006. Recent Changes in the Magnitude and Timing of Discharge in Glacial and Non-Glacial Watersheds in Southeastern Alaska. *American Geophysical Union*, San Francisco, CA California

Arp, C.D., M.N. Gooseff, and M.A. Baker. 2006. Transient storage behavior across stream-reaches with varying discharge, bedform, and groundwater influx. *North American Benthological Society*, Anchorage, Alaska.

Arp, C.D. and M.A. Baker. 2005. Relating hydrogeomorphic attributes to nutrient uptake in alluvial streams of a mountain lake district. *American Geophysical Union*, New Orleans, Louisiana.

Baker, M.A., **C.D. Arp**, M.N. Gooseff, and R.O. Hall. 2005. Developing a method for partitioning transient storage into hyporheic and in-channel dead zone components. *American Geophysical Union*, New Orleans, Louisiana.

Myers, M.A., A.M. Marcarelli, **C.D. Arp**, W. Wurtsbaugh, and M.A. Baker. 2005. Lake disruptions on sediment mobility and effects on benthic chlorophyll. *American Geophysical Union*, New Orleans, Louisiana.

Arp, C.D., J.C. Schmidt, and M.A. Baker. 2005. The effect of lakes on stream geomorphology in a mountain lake district. *American Society of Limnology and Oceanography*, Salt Lake City, Utah.

Wurtsbaugh, W.A., K.R. Nydick, M.A. Baker, **C.D. Arp**, R.O. Hall, and J.W. Haefner. 2005. Lacustrine control of nutrient flux through Rocky Mountain watersheds: physical and biological mechanisms. *American Society of Limnology and Oceanography*, Salt Lake City, Utah.

Hall, R.O., M.A. Baker, J.L. Tank, **C.D. Arp**, and B.J. Koch. 2005. Export of particulate nitrogen during storms interpreted from ^{15}N tracer studies in streams. *American Society of Limnology and Oceanography*, Salt Lake City, Utah.

Arp, C.D. 2004. Using hydrogeomorphic templates in aquatic ecosystem science and management: examples from the Rocky Mountain West. *Utah State University Spring Runoff Conference*, Logan, Utah.

Nydick, K., W. Wurtsbaugh, M.A. Baker, R.O. Hall, and **C.D. Arp**. 2004. Biologic and hydrologic controls on nitrogen cycling in mountain watersheds: results of ecosystem ^{15}N stable isotope tracer additions. *Utah State University Spring Runoff Conference*, Logan, Utah.

Arp, C.D., M.A. Baker, M. Gooseff, and J.C. Schmidt. 2003. Are lake connected streams different in ways other than the connection? Lake effects on stream geomorphology and implications to hydrologic and ecological functioning. *American Geophysical Union*, San Francisco, California.

Arp, C.D., M.A. Baker, and M. Gooseff. 2003. Modeling hyporheic exchange and nitrate retention in a mountain stream. *Subsurface Science Symposium*, Salt Lake City, Utah.

Nydick, K., **C.D. Arp**, M.A. Baker, R.O. Hall, and W. Wurtsbaugh. 2003. Retention of nitrogen in stream-lake linkages during snowmelt. *Ecological Society of America*, Portland, Oregon.

Arp, C.D., M.A. Baker, and R.O. Hall. 2003. Spatial patterns of transient storage and nitrate uptake along a stream reach flowing into a mountain lake. *North American Benthological Society*, Athens, Georgia.

Hall, R.O., M.A. Baker, W.A. Wurtsbaugh, B. Koch, and **C.D. Arp**. Storage of nitrogen-15 during snowmelt in 2 mountain streams separated by a lake. *North American Benthological Society*, Athens, Georgia.

Baker, M.A., R.O. Hall, W.A. Wurtsbaugh, M.M. Bozeman, and **C.D. Arp**. Dissolved nitrogen dynamics in a coupled stream-lake ecosystem during snowmelt quantified using 15-N nitrate. *North American Benthological Society*, Athens, Georgia.