

BIOGRAPHICAL SKETCH: LARRY R. BROWN

EDUCATION:

University of California-Irvine, B.S., 1978, Biological Sciences
University of California-Davis, B.S., 1980, Wildlife and Fisheries Biology
University of California-Davis, M.S., 1982, Ecology
University of California-Davis, Ph.D., 1988, Ecology

RESEARCH AND PROFESSIONAL EXPERIENCE:

1999-present Research Biologist, U.S. Geological Survey, Sacramento, CA
1997-1999 Fishery Biologist, U.S. Bureau of Reclamation, Sacramento, CA. This was a two-year temporary assignment from the U.S. Geological Survey.
1991-1997 Physical Scientist, U.S. Geological Survey, Sacramento, CA.
1991 Lecturer, Dept. Marine Sciences, University of California, Santa Cruz, CA.
1987-1991 Post-graduate Researcher, University of California, Davis, CA.
1980-1987 Research Assistant, University of California, Davis, CA.
1984-1985 Teaching Assistant, University of California, Davis, CA.
1980 Teaching Assistant, University of California, Davis, CA.

RESEARCH INTERESTS:

My research interests include the ecology of aquatic communities, the associations of such communities with environmental conditions, and invasion ecology, focusing on the environmental factors associated with the success of invading species and their interactions with native communities. I have been particularly interested in predation and the effects of introduced predators on native organisms. I have over 20 years experience working in California aquatic systems, primarily streams, rivers, and the Sacramento-San Joaquin Delta. I am a recognized expert on the ecology of California fishes and, since starting work with the U.S. Geological Survey, have gained considerable experience with benthic macroinvertebrates and algae.

PROFESSIONAL ACTIVITIES AND HIGHLIGHTS:

Symposium organizer, 2003 American Fisheries Society Annual Meeting, Effects of Urbanization on Aquatic Ecosystems, 2003
Co-Editor of American Fisheries Society Symposium volume (in progress), Effects of Urbanization on Aquatic Ecosystems, 2003-present
Co-Editor of American Fisheries Society Symposium volume, Early Life History of Fishes in the San Francisco Estuary and Watershed, 2002-2004
Co-Program Chair for the 2nd CALFED Science Conference, 2002-2003
Screening panel member for selection of candidates for National Marine Fisheries Service Recovery Teams for Central Valley salmonids (2002) and coho salmon (2002)
President, Water Quality Section, American Fisheries Society, 2001-2003
President, California-Nevada Chapter, American Fisheries Society, 2001-2002
Selection Committee, EPA Science Achievement Award, Biology/Ecology, 2000 and 2001

Co-Program Chair, for the 1st CALFED Science Conference, 2000,
Session Chair, Annual Meeting, California-Nevada Chapter, American Fisheries Society, 1999 and
2000

U.S. Bureau of Reclamation Performance Award, 1999

American Fisheries Society, Certified Fisheries Biologist, 1997-present

U.S. Fish and Wildlife Service Certificate of Appreciation (for membership on the Delta Native
Fishes Recovery Team), 1995

U.S. Geological Survey Performance Awards, 1992-1994

Academic Committees: Joaquin B. Feliciano, University of California-Davis (in progress); Dr. Joe
Merz, University of California-Davis; Dr. Robert Leidy, University of California-Davis

Referee for various journals including: Transactions of the American Fisheries Society,
Environmental Biology of Fishes, Canadian Journal of Fisheries and Aquatic Sciences,
North American Journal of Fisheries Management, Copeia, and Archives of Environmental
Contamination and Toxicology

PEER-REVIEWED PUBLICATIONS (LAST 10 YEARS):

Brown, L.R., P.B. Moyle, and R.M. Yoshiyama. 1994. Status of coho salmon (*Oncorhynchus
kisutch*) in California. North American Journal of Fisheries Management 14:237-261.

Brown, L.R., S.A. Matern, and P.B. Moyle. 1995. Comparative ecology of prickly sculpin (*Cottus
asper*) and coastrange sculpin (*C. aleuticus*) in the Eel River drainage, California.
Environmental Biology of Fishes 42:329-343.

Brown, L.R. and A. Brasher. 1995. Effects of predation by Sacramento squawfish (*Ptychocheilus
grandis*) on habitat choice of California roach (*Lavinia symmetricus*) and rainbow
trout (*Oncorhynchus mykiss*) in artificial streams. Canadian Journal of Fisheries and
Aquatic Sciences 52:1639-1646.

Periera, W.E., Domagalski, J.L., Hostettler, F.D., Brown, L.R., and Rapp, J.B. 1996. Occurrence
and accumulation of pesticides and organic contaminants in river sediment, water and
clam tissues from the San Joaquin River and tributaries, California. Environmental
Toxicology and Chemistry 14:172-180.

Brown, L.R. 1997. Water-quality assessment of the San Joaquin-Tulare basins, California:
Analysis of available information on aquatic biology, through 1992. U.S. Geological
Survey, Water Supply Paper 2471.

Brown, L.R. and P.B. Moyle. 1997. Invading species in the Eel River, California: successes,
failures, and relationships with resident species. Environmental Biology of Fishes
49:271-291.

Brown, L.R. 1997. Concentrations of chlorinated organic compounds in biota in relation to
concentrations in bed sediment in streams of the San Joaquin Valley, California.
Archives of Environmental Contamination and Toxicology 33:357-368.

Brown, L.R., C.R. Kratzer, and N.M. Dubrovsky. 1999. Integrating chemical, water quality,
habitat, and fish assemblage data from the San Joaquin River drainage, California. Pp.
25-62, in, K.M. Scow, G.E. Fogg, D.E. Hinton, and M.L. Johnson (eds.), Integrated
assessment of ecosystem health, Lewis Publishers, Boca Raton, FL.

Brown, L.R., A.M. Brasher, B.C. Harvey, and M. Matthews. 1999. Success and failure of
invading species in stream systems: case studies from California and Hawaii. Pp. 415-
430, in, R. Claudi and J. Leach (eds.), Non-indigenous freshwater organisms in North

- America: their biology and impact, Lewis Publishers, Boca Raton, FL.
- Brown, L.R. 2000. Fish communities and their associations with environmental variables, lower San Joaquin River drainage, California. *Environmental Biology of Fishes* 57:251-269.
- Brown, L.R. and J.T. May. 2000. Macroinvertebrate assemblages on woody debris and their relations with environmental variables in the lower Sacramento and San Joaquin river drainages, California. *Environmental Monitoring and Assessment*. *Environmental Monitoring and Assessment* 64:311-329.
- Ford, T.J. and L.R. Brown. 2001. Distribution and Abundance of Chinook Salmon and Resident Fishes of the Lower Tuolumne River, California. Pp. 253-304, in, R. Brown (ed.), *Fish Bulletin 179: Contributions to the Biology of Central Valley Salmonids*. California Department of Fish and Game, Sacramento, CA.
- Leland, H.V., L.R. Brown, and D.K. Mueller. 2001. Distribution of algae in the San Joaquin River, California, in relation to nutrient supply, salinity, and other environmental factors. *Freshwater Biology* 46:1139-1167.
- May, J.T. and L.R. Brown. 2002. Fish community structure in relation to environmental variation within the Sacramento River Basin and implications for streams of the Central Valley, California. *Environmental Biology of Fishes* 63:373-388.
- Brown, L.R. and T.J. Ford. 2002. Effects of flow on the fish communities of a regulated California river: implications for managing native fishes. *River Research and Applications* 18:331-342.
- Meador, M.R., L.R. Brown, and T.M. Short. 2003. Relations between introduced fish and environmental conditions at large geographic scales. *Ecological Indicators* 3:81-92.
- Brown, L.R. 2003. An introduction to the San Francisco Estuary tidal wetlands restoration series. In: L.R. Brown, editor. *Issues in San Francisco Estuary Tidal Wetlands Restoration*. San Francisco Estuary and Watershed Science. Vol. 1, Issue 1, Article 1. <http://repositories.cdlib.org/jmie/sfews/vol1/iss1/art1>.
- Brown, L.R. 2003. Will tidal wetland restoration enhance populations of native fishes? In: L.R. Brown, editor. *Issues in San Francisco Estuary Tidal Wetlands Restoration*. San Francisco Estuary and Watershed Science. Vol. 1, Issue 1, Article 2. <http://repositories.cdlib.org/jmie/sfews/vol1/iss1/art2>.
- Brown, L.R. 2003. Potential effects of organic carbon production on ecosystems and drinking water. In: L.R. Brown, editor. *Issues in San Francisco Estuary Tidal Wetlands Restoration*. San Francisco Estuary and Watershed Science. Vol. 1, Issue 1, Article 3. <http://repositories.cdlib.org/jmie/sfews/vol1/iss1/art3>.
- Brown, L.R. 2003. A summary of the tidal wetlands restoration series. In: L.R. Brown, editor. *Issues in San Francisco Estuary Tidal Wetlands Restoration*. San Francisco Estuary and Watershed Science. Vol. 1, Issue 1, Article 6. <http://repositories.cdlib.org/jmie/sfews/vol1/iss1/art6>.
- Dege, M. and L.R. Brown. 2004. Springtime Distribution and Abundance of Larval and Juvenile Fishes in the Upper San Francisco Estuary. Pages 49-66 *in* F. Feyrer, L.R. Brown, R. Brown, and J. Orsini, editors. *Early Life History of Fishes in the San Francisco Estuary and Watershed*. American Fisheries Society.
- Matern, S.A. and L.R. Brown. In press. Invaders eating invaders: exploitation of novel alien prey by the shimofuri goby in the San Francisco Estuary, California. *Biological Invasions*.
- Brown, L.R. and P.B. Moyle. In press. Native fish communities of the Sacramento-San Joaquin watershed, California: a history of decline. Pages XX *in* F. Rinne, R. Hughes, and R.

Calamusso, editors. Fish Communities of Large Rivers of the United States. American Fisheries Society.

Burton, C.A., L.R. Brown, and K. Belitz. In press. Relations of water source and channel type with benthic macroinvertebrate and periphyton communities in the highly urbanized Santa Ana River Basin, California. American Fisheries Society Symposium Volume, Effects of Urbanization on Stream Ecosystems.

Brown, L.R., C.A. Burton, and K. Belitz. In press. Aquatic communities of the highly urbanized Santa Ana River Basin, California. American Fisheries Society Symposium Volume, Effects of Urbanization on Stream Ecosystems.

MANUSCRIPTS IN REVIEW:

Brown, L.R. and D. Michniuk. Nearshore fish assemblages of the alien-dominated Sacramento-San Joaquin Delta, 1980-1983 and 2001-2003. Submitted to Transactions of the American Fisheries Society.

Giddings, E., L.R. Brown, T. M. Short, and M.R. Meador. Relation of fish communities to environmental conditions in urban streams of the Wasatch Front, Utah. Submitted to Western North American Naturalist.

Giddings, E., L.R. Brown, T. M. Short, and M.R. Meador. Brown trout condition as an indicator of environmental stress in urban streams of the Wasatch Front, Utah. Submitted to North American Journal of Fisheries Management.

Daniel R. Cayan

Scripps Institution of Oceanography & U.S. Geological Survey
9500 Gilman Drive - 0224
La Jolla, California 92093-0224
(858) 534-4507
dcayan@ucsd.edu

Education

- 1971 B.S. Degree (Meteorology and Oceanography)(University of Michigan)
- 1972 M.S. Degree (Physical Oceanography) (University of Michigan)
- 1977 M.S. Degree (Meteorology) (UC Davis, UC San Diego)
- 1990 Ph.D. Degree (Oceanography) (UC San Diego) (Russ Davis, Adviser)

Employment

- 1991-present Oceanographer (half-time) U.S. Geological Survey, Water Resources Division
- 1993-present Researcher (half-time) Climate Research Division, Scripps Institution of Oceanography
- 1996-present Director, Climate Research Division, Scripps Institution of Oceanography

Professional Memberships

- American Meteorological Society
- American Geophysical Union

Selected Publications:

- Stewart, I.T., D.R. Cayan, and M.D. Dettinger, 2004: Changes towards earlier streamflow timing across western North America. *J. Climate* (*in press*).
- Bromirski, P.D., D.R. Cayan, and R.E. Flick, 2004: Wave spectral energy variability in the Northeast Pacific. *J. Geophysical Research-Oceans* (*in press*).
- Lundquist, J., D. Cayan, and M. Dettinger, 2004. Spring onset in the Sierra Nevada: When is snowmelt independent of elevation? *J. Hydromet.*, **5**, 325-340.
- Hayhoe, K., D.R. Cayan, C.B. Field, P.C. Frumhoff, E.P. Maurer, N.L. Miller, S.C. Moser, S.H. Schneider, K.N. Cahill, E.E. Cleland, L. Dale, R. Drapek, R.M. Hanemann, L.S. Kalkstein, J. Lenihan, C.K. Lunch, R.P. Neilson, S.C. Sheridan, and J.H. Verville, 2004: Emissions pathways, climate change, and impacts on California. *PNAS* **101**(34), 12422-12427.
- Westerling, A.L., D.R. Cayan, T.J. Brown, B. Hall, and L.G. Riddle, 2004: Climate, Santa Ana Winds and Autumn Wildfires in Southern California. *EOS* **85**(31), 289-300.
- Knowles, N., D.R. Cayan, 2004: Elevational dependence of projected hydrologic changes in the San Francisco estuary and watershed. *Climatic Change* **62**:319-336.
- Gershunov, A. and D.R. Cayan, 2003: Heavy daily precipitation frequency over the contiguous U.S.: Sources of climatic variability and seasonal predictability. *J. Climate*. **16**(16), 2752–2765.
- Cayan, D.R., M.D. Dettinger, K. Redmond, G. McGabe, N. Knowles, D.H. Peterson, 2003. The transboundary setting of California's water and hydropower systems—linkages between the Sierra Nevada, Columbia, and Colorado hydroclimates. *Advances in Global Change Research* **16**, Climate and Water, Transboundary Challenges in the Americas. Diaz, H.F., and Woodhouse, B. (*eds.*).
- Lundquist, J.D., D.R. Cayan, 2002: Seasonal and spatial patterns in diurnal cycles in streamflow in the western United States. *J. Hydrometeorology*, **3**(5), 591-603.
- Knowles, N., D.R. Cayan, 2002: Potential effects of global warming on the Sacramento/San Joaquin watershed and the San Francisco estuary. *Geophysical Research Letters*, **29**(18), 1891.
- Cayan, D.R., S. Kammerdiener, M. D.Dettinger, J. M. Caprio, and D. H. Peterson, 2001: Changes in the onset of spring in the western United States. *Bull. Am. Met Soc.*, **82**(3), 399-415.

- Biondi, F., A. Gershunov, and D. Cayan, 2001: North Pacific decadal climate variability since 1661. *J. Climate, Letters*, **14**(1), 5-10.
- Pandey, G.R., D.R. Cayan, and K.P. Georgakakos, 1999: Precipitation structure in the Sierra Nevada of California during winter. *J. Geophysical Research*, 104(**D10**), 12,019-12,030.
- Cayan, D.R., K.T. Redmond, and L.G. Riddle, 1999: ENSO and hydrologic extremes in the Western United States. *J. Climate*, **12**(9), 2881-2893.
- Cayan, D.R., M.D. Dettinger, H.F. Diaz, and N.E. Graham, 1998: Decadal climate variability of precipitation over western North America. *J. Climate*, **11**(2), 3148-3166.
- McGowan, J.A., D.R. Cayan, and L.M. Dorman, 1998: Climate-ocean variability and ecosystem response in the northeast Pacific. *Science*, **281**, 210-217.
- Cayan, D. R., 1996: Interannual Climate variability and snow pack in the western United States. *J. Climate*, **9**(5), 928-948.
- Dettinger, M. D. and D. R. Cayan, 1995: Large-scale atmospheric forcing of recent trends toward early snowmelt runoff in California. *J. Climate*, **8**, 606-623.

PhD's Supervised:

Noah Knowles (degree granted 2000)
Jessica Lundquist (degree granted 2004)
Steven Taylor (current)

Recent Collaborators

M. Dettinger, USGS San Diego; D. Peterson, USGS Menlo Park; G. McCabe, USGS, Denver, CO; H. Diaz, NOAA CDC, Boulder, CO; D. Meko, U Arizona, Tucson; M. Hughes, U Arizona, Tucson; W. White, SIO; A. Miller, SIO; K. Redmond, WRCC, Reno, NV; J. Lean, Naval Res Lab, Washington, DC; A. Weinheimer, SIO; J. McGowan, SIO; F. Biondi, Univ. Nev, Reno; A. Gershunov, SIO; A. Westerling, SIO; N. Knowles, SIO; R. Nemani, U Montana; W. Reisen, UC Davis; J. Burns, UCSD

BIOGRAPHICAL SKETCH - JAMES E. CLOERN

EDUCATION

University of Wisconsin-Madison, B.S. 1970, Zoology
University of Wisconsin-Milwaukee, M.S. 1973, Zoology
Washington State University, Ph.D. 1976, Zoology

RESEARCH AND PROFESSIONAL EXPERIENCE

1999-present Senior Research Scientist (ST3104), U.S. Geological Survey
1976-1999 Research Scientist, U.S. Geological Survey, Menlo Park, CA
1997-1998 Lecturer, University of California-Santa Cruz, Department of Earth Sciences
1997-present Consulting Professor, Stanford University, Department of Civil Engineering
1993 Distinguished Visiting Scientist, National Institute of Water and Atmospheric Research, Hamilton, New Zealand
1993-1994 Directeur de Recherche, Université d'Aix-Marseille, France
1974-1976 Teaching Assistant, Washington State University.
1972-1973 Teaching Assistant, University of Wisconsin-Milwaukee

RESEARCH INTERESTS

Ecology and biogeochemistry of aquatic ecosystems, focused around a long term (28-year) investigation of San Francisco Bay that has included study of: primary production, algal and zooplankton community dynamics, plankton diversity, net ecosystem metabolism, carbon budgets, resource limitation of algal growth, grazing by benthic suspension feeders, disturbance by introduced species, impacts of climatic/hydrologic variability, mechanisms and biogeochemical significance of algal blooms, benthic and pelagic nutrient regeneration, stable isotopes and lipid biomarkers to characterize sources of organic matter, coastal eutrophication, and ecosystem variability at time scales from hours to decades and spatial scales from thin layers to watersheds.

HIGHLIGHTS

Associate Editor, *Limnology and Oceanography*, 2004-
Golden Screen Award, National Association of Government Communicators, for the documentary "Delta Revival: Restoration of a California Ecosystem", 2003
U.S. Department of Interior Distinguished Service Award, 2000
U.S. Federal Senior Scientist ST3104, 1999
Steering Committee, 1997 Aquatic Sciences Meeting, Santa Fe
Fulbright Research Scholar, 1993-94 (Centre d'Océanologie de Marseille)
U.S. Department of Interior Meritorious Service Award, 1991
Editorial Board, *Limnology and Oceanography*, 1989-1992
Associate Editor, *Estuaries*, 1989-1994
Associate Editor, *Oceanologica Acta*, 1999-present
Program Chair, 1991 Estuarine Research Federation Meeting, San Francisco
Member, Science Advisory Committees: (examples) Florida Bay Program, San Francisco Bay-Delta Interagency Ecological Program, Bay of Brest Program (France), USEPA Eagles Program on Estuarine Indicators, Tampa Bay Program, CALFED Environmental Water Account

Postdoctorates: Dr. Linda Huzzey, Dr. Richard Miller, Dr. Jane Caffrey, Dr. Joseph Rudek, Dr. Elizabeth Canuel, Dr. Lisa Lucas (2003 recipient of ERF's Eugene Cronin Young Investigator Award), Dr. William Sobczak (2004 recipient of ASLO's Raymond Lindeman Award), Dr. Jean-Marc Guarini, Dr. Laurent Chauvaud, Dr. Nancy Monsen

PEER-REVIEWED PUBLICATIONS SINCE 1995

Cloern, J.E. and Jassby, A.D., 1995, Yearly fluctuation of the spring phytoplankton bloom in South San Francisco Bay: An example of ecological variability at the land-sea interface, *in* Steele, J.H, Powell, T.M., and Levin, S., eds., *Ecological Time Series*, Chapman Hall, p. 139-149.

Canuel, E.A., Cloern, J.E., Ringelberg, D., Guckert, J., and Rau, G., 1995, Molecular and isotopic tracers used to understand sources of organic matter and trophic relationships in the San Francisco Bay estuary: *Limnology and Oceanography*, v. 40, p. 67-81.

Jassby, A.D., Kimmerer, W.J., Monismith, S., Armor, C., Cloern, J.E., Powell, T.M., Schubel, J.R., and Vendliniski, T. 1995, Isohaline position as a habitat indicator for estuarine resources: San Francisco Bay-Delta, California, U.S.A.: *Ecological Applications*, v. 5, pp. 272-289.

Cloern, J.E., Grenz, C., and Vidergar-Lucas, L., 1995. An empirical model of the phytoplankton chlorophyll/carbon ratio -- the conversion factor between productivity and growth rate: *Limnology and Oceanography*, v. 40, p. 1313-1321.

Canuel, E.A., and Cloern, J.E., 1996, Regional differences in the origins of organic matter in the San Francisco Bay ecosystem. Evidence from lipid biomarkers, *in* J.T. Hollibaugh, editor, *San Francisco Bay: The Ecosystem*, Pacific Division, AAAS, San Francisco, p. 305-324.

Rudek, J., and Cloern, J.E., 1996, Planktonic respiration rates in San Francisco Bay, *in* J.T. Hollibaugh, editor, *San Francisco Bay: The Ecosystem*, Pacific Division, AAAS, San Francisco, p. 289-304.

Cloern, J.E., 1996. Phytoplankton bloom dynamics in coastal ecosystems: A review with some general lessons from sustained investigation of San Francisco Bay, California. *Reviews of Geophysics*, Vol. 34, No. 2, p. 127-168.

Cole, B.E., Cloern, J.E., and Alpine, A.E., 1997, The photosynthetic response of phytoplankton in Shingobee Lake and Williams Lake: USGS Water-Resources Investigations Report 96-4215, pages 105-110.

Cloern, J.E., Alpine, A.E., and Cole, B.E., 1997, Seasonal comparisons of seston abundance and sedimentation rate in a closed-basin lake (Williams) and an open-basin lake (Shingobee): USGS Water-Resources Investigations Report 96-4215, pages 111-117.

Jassby, A.D., Cole, B.E., and Cloern, J.E., 1997. The design of sampling transects for characterizing water quality in estuaries: *Estuarine, Coastal and Shelf Science*, v. 45: 285-302.

Luoma, S.N., van Geen, A., Lee, B.-G., and Cloern, J.E., 1998, Metal uptake by phytoplankton during a bloom in South San Francisco Bay: Implications for metal cycling in estuaries: *Limnology and Oceanography*, v. 43, pp. 1007-1016.

Lucas, L, J.E. Cloern, J.R. Koseff, S.G. Monismith, and J.K. Thompson, 1998, Does the Sverdrup Critical Depth Model explain bloom dynamics in estuaries? *Journal of Marine Research*, v. 56: 1-41.

Cloern, J.E. 1998. Book Review: "Eutrophication in Coastal Marine Ecosystems", Jørgensen, B.B. and K. Richardson [Eds.]. *Limnology and Oceanography*, v. 43, pp. 1018-1019.

Caffrey, J.M., C. Grenz, and J.E. Cloern, 1998. Changes in production and respiration during a spring phytoplankton bloom in San Francisco Bay, California: implications for net ecosystem metabolism. *Marine Ecology Progress Series* 172:1-12.

Cloern, J.E. 1999. The Relative Importance of Light and Nutrient Limitation of Phytoplankton Growth: A Simple Index of Coastal Ecosystem Sensitivity to Nutrient Enrichment: *Aquatic Ecology* 33: 3-15.

Lucas, L.V., J.R. Koseff, J.E. Cloern, S.G. Monismith and J.K. Thompson. 1999. Processes governing phytoplankton blooms in estuaries. Part I. The local production-loss balance. *Marine Ecology Progress Series* 187:1-15.

Lucas, L.V., J.R. Koseff, J.E. Cloern, S.G. Monismith and J.K. Thompson. 1999. Processes governing phytoplankton blooms in estuaries. Part II. The role of transport in global dynamics. *Marine Ecology Progress Series* 187: 17-30.

Grenz C., Cloern J.E., Hager S.W., Cole B.E. 2000. Dynamics of nutrient cycling and related benthic nutrient and oxygen fluxes during a spring phytoplankton bloom in South San Francisco Bay (USA). *Marine Ecology Progress Series* 197: 67-80

Ning, X., Cloern, J.E., and Cole, B.E. 2000. Spatial and temporal variability of picocyanobacteria *Synechococcus* sp. in San Francisco Bay. *Limnology and Oceanography* 45: 695-702.

Jassby, A.D. and J.E. Cloern. 2000. Organic matter sources and rehabilitation of the Sacramento-San Joaquin Delta (California, USA). *Aquatic Conservation: Marine and Freshwater Ecosystems* 10: 323-352.

Howarth, R., D. Anderson, J. Cloern, C. Hopkinson, B. LaPointe, T. Malone, N. Marcus, K. McGlathery, and A. Sharpley. 2000. Nutrient Pollution of Coastal Rivers, Bays, and Seas. *Issues in Ecology* 7:1-15.

Cloern, J.E. 2001. Our evolving conceptual model of the coastal eutrophication problem. *Marine Ecology Progress Series* 211: 223-253.

Cloern, J.E., E.A. Canuel, D. Harris. 2002. Stable carbon and nitrogen isotope composition of aquatic and terrestrial plants of the San Francisco Bay estuarine system. *Limnology and Oceanography* 47: 713-729.

Jassby, A.D., J.E. Cloern, B.E. Cole. 2002. Annual primary production: patterns and mechanisms of change in a nutrient-rich tidal ecosystem. *Limnology and Oceanography* 47: 698-712.

Guarini, J.-M., J.E. Cloern, J. Edmunds, P. Gros. 2002. Microphytobenthic potential productivity estimated in three tidal embayments of the San Francisco Bay: A comparative study. *Estuaries* 25: 409-417.

Lucas, L.V., J.E. Cloern, J.K. Thompson, N.E. Mosen. 2002. Functional variability of habitats within the Sacramento-San Joaquin Delta: restoration implications. *Ecological Applications* 12: 1528-1547.

Lucas, L.V. and J.E. Cloern. 2002. Effects of tidal shallowing and deepening on phytoplankton production dynamics: a modeling study. *Estuaries* 25: 497-507.

Sobczak, W.S., Cloern, J.E., Jassby, A.D and Mueller-Solger, A. 2002. Bioavailability of organic matter in a highly disturbed estuary. The role of detrital and algal resources. *Proceedings of the National Academy of Sciences* 99: 8101-8105.

Monsen, N.E., Cloern, J.E., Lucas, L.V., and Monismith, S.G. 2002. A comment on the use of flushing rate, residence time and age as transport time scales. *Limnology and Oceanography* 47: 1545-1553.

Chauvaud, L., Thompson, J.K., Cloern, J.E. and Thouzeau, G. 2002. Clams as CO₂ generators: The *Potamocorbula amurensis* example in San Francisco Bay. *Limnology and Oceanography* 48: 2086-2092.

Jassby, A.D., J.E. Cloern, A. Mueller-Solger. 2003. Phytoplankton fuels the food web in Delta waterways. *California Agriculture* 57:104-109.

May, C.L., J.R. Koseff, L.V. Lucas, J.E. Cloern, and D.H. Schoellhamer. 2003. Effects of spatial and temporal variability of turbidity on phytoplankton blooms. *Marine Ecology Progress Series* 254: 111-128.

Cloern, J.E., T.S. Schraga, C.B. Lopez, R. Labiosa. 2003. Lessons from monitoring water quality in San Francisco Bay. In 2003 Pulse of the Estuary, San Francisco Estuary Institute, pp. 15-20.

Cloern, J.E. Phytoplankton community ecology: principles applied in San Francisco Bay. 2004. *Marine Ecology Progress Series*, in press.

Chauvaud, L., J.-M. Guarini, Y.-M. Paulet, G. Thouzeau and J.E. Cloern. 2004. Modelling the shell growth of scallops (*Pecten maximus*) as an intermittent non-steady-state process. *Journal of Experimental Marine Biology and Ecology*, in press.

Sobczak, W.V., J.E. Cloern, A.D. Jassby, B.E. Cole, T.S. Schraga, and A. Arnsberg. 2004. Detritus fuels ecosystem metabolism but not metazoan foodwebs in San Francisco Estuary's freshwater Delta. *Estuaries*. In press.

Manuscripts in Review:

Monsen, N.E., J.E. Cloern, J.R. Burau. Water diversion as an ecosystem disturbance: examples from the Sacramento-San Joaquin River Delta (California). Submitted to *Water Resources Research*

Burns Lopez, C., J.E. Cloern, T.S. Schraga, A.J. Little, L.V. Lucas. Ecological values of shallow-water habitats: implications for restoration of a highly disturbed ecosystem. Submitted to *Ecosystems*

MICHAEL D. DETTINGER

*U.S. Geological Survey
Scripps Institution of Oceanography, Dept 0224
9500 Gilman Drive, UC San Diego, La Jolla, CA 92093-0224
(858) 822-1507; mddettin@usgs.gov
<http://tenaya.ucsd.edu/~dettinge>*

ACADEMIC HISTORY

- 1977 -- BA Physics, U.C. San Diego (Revelle College)**
Summa cum laude, Phi Beta Kappa.
- 1979 -- MS Civil Engineering, Massachusetts Institute of Technology**
"Numerical Modeling of Aquifer Systems under Uncertainty: A Second Moment Analysis"
- 1991-- MS Atmospheric Sciences, University of California, Los Angeles**
"Interannual and Interdecadal Variability of United States Temperatures"
- 1997-- Ph.D., Atmospheric Sciences, University of California, Los Angeles**
"Variations of Continental Climate and Hydrology on Diurnal-to-Interdecadal Scales"
- 1986—Master's degree committee, Paul MacBeth, University of Nevada, Reno**
"LANDSAT Lineaments and Regional Ground-water Pathways in Southern Nevada"
- 2002-04—Doctoral committee, Jessica Lundquist, Scripps Institution of Oceanography**
"Diurnal Cycles of Streamflow in the Western United States"

PROFESSIONAL HISTORY

- 1979-81: Engineer-scientist, Camp Dresser & McKee, Inc., Walnut Creek, California: Consulting**
Water-resource evaluations, ground-water flow/transport modeling, and water quality management studies for DOE, Guam EPA, Santa Ana-San Jacinto Basin water-quality districts, and chemical industry.
- 1981-89: Hydrologist, U.S. Geological Survey, Nevada District, Carson City, Nevada: Ground-water**
Assessments of geochemistry in bedrock and alluvial aquifers; ground-water flow modeling; regional evaluations and synthesis of hydrogeologic framework and regional flow systems in valley fill, volcanic- and deep carbonate-rock aquifers, eastern Great Basin; and District Ground-water Specialist, including program development and review, and representation of USGS to public forums, Legislative committees, and State Engineer.
- 1989-90: USGS Graduate Studies Program, UCLA Atmospheric Sciences.**
Advisor: Michael Ghil. Emphasis: Climate Dynamics.
- 1991-94: Hydrologist, U.S. Geological Survey, San Diego, California: Hydroclimatology**
Study of sensitivity of water resources of California to climate change by analysis of historical hydroclimate and simulations of snowmelt/watershed responses.
- 1994-97: Research Hydrologist, California District, USGS, San Diego, CA: Hydroclimatology**
Studies of sensitivity of water resources of California to interannual-decadal climate variations and change by analysis of historical hydroclimate and simulations of snowmelt/watershed responses. Analyses of freshwater-inflow variations to San Francisco Bay and Delta Analysis of large-scale basis and predictability of global, hemispheric, and Western US hydroclimatic variations using historical and paleo-records of atmospheric circulations, trace gases, ocean temperatures, streamflow, ground water, and water quality. Modeling and nonlinear dynamics of

land-air interactions through planetary-boundary layers. Co-developer of UCLA Singular-Spectrum-Analysis Toolkit, 1995.

1996-97: Research Hydrologist, USGS, at NOAA/Climate Diagnostics Center, Boulder, CO

Study of hemispheric-scale ENSO effects on streamflow. Initial medium-range forecasts of Sierra Nevada snowmelt and streamflow. Co-developer of CDC Global Streamflow dataset.

1997-2001: Research Hydrologist, California District, USGS, & Research Associate, Climate Research Division, Scripps Institution of Oceanography, La Jolla, CA: Hydroclimatology

Continuations of global, Western, and Sierra Nevada hydroclimatology of precipitation and streamflow using historical and paleo-records of atmospheric circulations, trace gases, ocean temperatures, streamflow, ground water, and water quality. Global- to watershed-scale climate downscaling. Medium-range streamflow forecasting, Sierra Nevada, and long-range streamflow forecasting nationwide. Analysis and simulations of ground-water/surface-water sensitivities to climate variations. Simulation of Sierra Nevada watershed sensitivities to projected climate changes.

2002-present: Research Hydrologist, Branch of Western Regional Research, USGS, & Research Associate, Climate Research Division, Scripps Institution of Oceanography, La Jolla, CA

Studies of global, Western North American, and Sierra Nevada hydroclimatology of precipitation, snowpacks, and streamflow using historical and paleo-records of atmospheric circulations, ocean temperatures, streamflow, ground water, and water quality. Occasional long-range national-scale streamflow forecasting. Development of innovative resampling and downscaling approaches for use in evaluating global-change and shorter term climate predictions and their hydrologic consequences. Evaluation of climate-change projections for changes in large-scale Pacific-basin climate modes and resulting streamflow sensitivities. Development and implementation of new and innovative hydrometeorological monitoring methods, Yosemite National Park and Santa Margarita Ecological Reserve. Team leader, CALFED climate-science white paper.

OTHER PROFESSIONAL ACTIVITIES

- **Vice President's National Performance Review Award** for leadership in Mojave Desert Ecosystems planning efforts, 1996. **Water Resources Division representative** on USGS Steering Group for Mojave Desert Ecosystem Initiative Activities, and **Leader** of the Interagency Physical Sciences Subgroup of Mojave Desert Science and Data Management Interagency Working Group, 1995-96 .
- **Program chair and fundraiser**, Pacific Climate (PACLIM) Workshops, 1998 (El Nino 1998), 1999 (Climate and Society), 2000 (Planning for the 2000s), 2001 (Decadal Climate Variations of the Last 1000 Years), 2002 (Solar Influences on Climate), 2003 (Integrated Mountain Science), and 2004 (Coastal Climates).
- **Panelist**, CALFED Water Management Science Board, October 2004. **Team leader**, CALFED Bay-Delta Program white paper on CALFED's climate-science needs, 2001-present. **Organizer and co-chair**, "Climate Variability and CALFED" sessions, First to Third Biennial CALFED Science Conferences, Sacramento, CA, October 2000, January 2003 and October 2004.
- **Invited speaker**, "Global Implications of Climate Change for Water Supplies", National Academy of Sciences' Sackler Colloquium on the Role of Science in Solving the World's Emerging Water Problems, Irvine, October 2004. **Climate group co-leader**, National Research Council Committee on Hydrologic Science's Workshop on Groundwater Fluxes across Interfaces, Green Bay, May 2002.
- **Moderator**, "Effects of climate change on major California water suppliers" panel, Water Education Foundation's 2003 Climate Change and California Water Resources briefing on California's water future, November 2003.

- **Co-chair** for NASA Working Group on Climate Responses to Direct Solar Forcings, Institute for Study of Planet Earth, Tucson, AZ, March 2000.
- **Invited Climate-Science speaker**, Department of the Interior’s Water 2025 Science-Needs Workshop, November 2003.
- **Convener** of sessions on Natural Variations of Groundwater Systems at Fall AGU Meeting, 2000.
- **Hydroclimate representative**, USGS National Ground-water Levels Network Committee, 1995-97. **Keynote speaker**, USGS Western Region Ground-water Availability Workshop, November 2000.
- **Organizing committees**, USGS/Western Governors Association 2004 Southwest Drought Workshop, 2003; Mountain Climate Sciences Symposium, 2003. **Founding member**, CIRMONT Western Mountain Climate Sciences Consortium, 2002-
- **Co-organizer and chair**, “Atmospheric Circulations and the Hydrology of the Pacific Rim” session, American Water Resources Association Annual International Symposium, Honolulu, HI, June 1995.
- **Reviewer** on USGS Research Grade Evaluation peer-review panel, Surface-Water Discipline, Spring 1999. **Review-panel member**, USGS Geologic Division’s annual “Multi-disciplinary workshops on the arid southwest” funding program, 2000-2001. **Member** of the national-level Internal Review Team for the USGS Water Resources Division Strategic Plan, Reston, VA, October 1997.
- **Member** of USGS national committee for Report to Congress on a Program for Periodic Assessments of the Nation’s Water Availability, Fall 2001 and Summer 2003.
- **Organizer** of 1995, 1996, & 2000 USGS Water Resources Division Hydroclimatology Workshops. **Invited briefing** to USGS Policy Council, “Climate Variability and Runoff Prediction”, 1999.
- **Associate Editor**, Water Resources Research, 1998-2000. **Reviewer** for Climatic Change, Journal of Climate, International Journal of Climatology, Geophysical Research Letters, Journal of Hydrometeorology, Journal of Applied Meteorology, Water Resources Research, Journal of Geophysical Research, and various grant programs (e.g., NASA, NOAA, NSF, WRRCs), ongoing.
- **Consulting Editor**, April 1996 issue of Odyssey Magazine (children’s science magazine), major theme: “Taking the Earth’s Temperature: Too Hot or Not?” **Invited reviewer**, Environmental Defense Fund’s “Climate Change and Los Angeles’ Water Supply” report, December 2000.

- **Recent invited outreach presentations to:** California Snow Cooperative Survey Workshops, 1997 thru 2001; National Water Resources Forum, 1998; keynote speech for Third National Conference of the National Hydrologic Warning Council, 1999; National Park Service Pacific West Region Annual Meeting, 2000; NASA Earth Sciences Innovations Showcase, 2001; State of San Francisco Estuary Conference, 2001; Desert Tortoise Council, 2002; Sierra Nevada Science Conference, 2002; San Diego City Sustainability Forum, 2002; Northern Arizona University 2003 Southwest Drought Forum, 2003; Natural Resources Law Center, U. Colorado, June 2003; Council for State Governments—West, July 2003; Water Education Foundation’s briefing on California’s water future, November 2003, US Business Council on Sustainable Development, December 2003; and American Water Works Research Association Foundation briefings, March and November 2004.

- **Recent Collaborators:** David Peterson, Gregory McCabe, Anne Jeton, Randall Hanson, Kate Koczot, David Naftz, Jan vanWagtendonk, and Robert Webb, USGS; Daniel Cayan, Noah Knowles, Jim Simpson, Anthony Westerling, and Warren White, Scripps Institution of Oceanography; Michael Ghil and Ferenc Varadi, UCLA; David Battisti, U. Washington; Henry Diaz, Climate Diagnostics Center; Malcolm Hughes and David Meko, U. Arizona Treering Laboratory; David Stahle, U. Arkansas Treering Laboratory; Kelly Redmond, Western Regional Climate Center; Lynn Ingram and Francis Malamud-Roam, UCB; Norman Miller, LBL; Timothy Brown, Climate Ecosystems and Fire Applications Center; Frank Gehrke, California Cooperative Snow Surveys; Tom Pagano and Phil Pasteris, NRCS; Michael Mann, U. Virginia; Robert Wilby, University of Derby, UK; Myles Allen, Rutherford Appleton Lab, UK; Pascal Yiou, Laboratoire des Sciences du Climat et de l’Environnement, France; Patrick Ng’ang’a, Texas AMU-C; and Jose Marengo, INPE, Brazil.

SELECTED PUBLICATIONS AND REPORTS

- Dettinger, M.D., and Wilson, J.L., 1981, First-order analysis of uncertainty in numerical models of groundwater flow, 1, *Mathematical development: Water Resources Research*, 17, 149-161.
- Dettinger, M.D., 1987, Ground-water quality and geochemistry of Las Vegas Valley, Clark County, Nevada, 1981-83: Implementation of a monitoring network: U.S. Geological Survey Water-Resources Investigations Report 87-4007, 69 p.
- Dettinger, M.D., 1989, Reconnaissance estimates of natural recharge to desert basins in Nevada, U.S.A., by using chloride-balance calculations: *Journal of Hydrology*, v. 106, 55-78.
- Dettinger, M.D., 1989, Distribution of carbonate-rock aquifers in southern Nevada and the potential for their development--Summary of findings, 1985-88: Special Summary Publication of the Nevada Carbonate Aquifers Program, 20 p.
- Dettinger, M.D., and Cayan, D.R., 1995, Large-scale atmospheric forcing of recent trends toward early snowmelt in California: *Journal of Climate* 8(3), 606-623.
- Dettinger, M.D., Ghil, M., and Keppenne, C.L., 1995, Interannual and interdecadal variability of United States surface-air temperatures, 1910-1987: *Climatic Change*, 31, 35-66.
- Dettinger, M.D., Ghil, M., Strong, C.M., Weibel, W., and Yiou, P., 1995, Software expedites singular-spectrum analysis of noisy time series: *Eos, Transactions of American Geophysical Union* 76(2), pp. 12, 14, 21.
- Dettinger, M.D., and Schaefer, D.H., 1996, Hydrogeology of structurally extended terrain in the eastern Great Basin of Nevada, Utah, and adjacent states from geologic and geophysical models: U.S. Geological Survey Hydrologic-Investigations Atlas HA-694-D, 1 sheet.
- Jeton, A.E., Dettinger, M.D., and Smith, J.L., 1996, Potential effects of climate change on streamflow, eastern and western slopes of the Sierra Nevada, California and Nevada: U.S. Geological Survey Water Resources Investigations Report 95-4260, 44 p.
- Morgan, D.S., and Dettinger, M.D., 1996, Ground-water conditions in Las Vegas Valley, Clark County, NV: 2, Hydrogeology and simulation of ground-water flow: US Geological Survey Water-Supply Paper 2320-B, 124 p.
- White, W.B., Lean, J., Cayan, D.R., and Dettinger, M.D., 1997, Response of global upper ocean temperature to changing solar irradiance: *Journal of Geophysical Research*, 102 (C2), 3255-3266.
- Cayan, D.R., Dettinger, M.D., Diaz, H.F., and Graham, N., 1998, Decadal variability of precipitation over western North America: *Journal of Climate*, 11, 3148-3166.
- Dettinger, M.D., Cayan, D.R., Diaz, H.F., and Meko, D., 1998, North-south precipitation patterns in western North America on interannual-to-decadal time scales: *Journal of Climate*, 11, 3095-3111.
- McCabe, G.J., Jr., and Dettinger, M.D., 1999, Decadal variability in the relations between ENSO and precipitation in the western United States: *International Journal of Climatology*, 19, 1399-1410.
- Dettinger, M.D., Cayan, D.R., McCabe, G.M., and Marengo, J.A., 2000, Multiscale streamflow variability associated with El Niño/Southern Oscillation, *in* H.F. Diaz and V. Markgraf, V. (eds.), *El Niño and the Southern Oscillation--Multiscale Variability and Global and Regional Impacts*: Cambridge University Press, 113-146.
- Dettinger, M.D., and Diaz, H.F., 2000, Global characteristics of streamflow seasonality and variability: *Journal of Hydrometeorology*, 1, 289-310.
- Pandey, G.R., Cayan, D.R., Dettinger, M.D., and Georgakakos, K.P., 2000, A hybrid model for interpolating daily precipitation in the Sierra Nevada of California during winter: *Journal of Hydrometeorology*, 1, 491-506.
- Peterson, D.H., Smith, R.E., Dettinger, M.D., Cayan, D.R., and Riddle, L., 2000, An organized signal in snowmelt runoff over the western United States: *Journal of American Water Resources Association*, 36 (2), 421-432.

- Wilby, R.L., and Dettinger, M.D., 2000, Streamflow changes in the Sierra Nevada, California, simulated using statistically downscaled general circulation model output, *in* S. McLaren and D. Kniveton (eds.), “Linking Climate Change to Land Surface Change”: Advances in Global Change Research, v. 6, Kluwer Academic Publishers, 99-121.
- Cayan, D.R., Kammerdiener, S., Dettinger, M.D., Caprio, J.M., and Peterson, D.H., 2001, Changes in the onset of spring in the western United States: *Bulletin, American Meteorological Society*, 82, 399-415.
- Dettinger, M.D., Battisti, D.S., Garreaud, R.D., McCabe, G.J., and Bitz, C.M., 2001, Interhemispheric effects of interannual and decadal ENSO-like climate variations on the Americas, *in* V. Markgraf (ed.), *Interhemispheric climate linkages: Present and Past Climates in the Americas and their Societal Effects*: Academic Press, 1-16.
- Stahle, D.W., Therrell, M.D., Cleaveland, M.K., Cayan, D.R., Dettinger, M.D., and Knowles, N., 2001, Ancient blue oaks reveal human impact on San Francisco Bay salinity: *Eos*, 82, 141, 144-145.
- Ghil, M., Allen, M.R., Dettinger, M.D., Ide, K., Kondrashov, D., Mann, M.E., Robertson, A.W., Saunders, A., Y.Tian, Varadi, F., and Yiou, P., 2002, Advanced spectral methods for climatic time series: *Reviews of Geophysics*, 40(3), 1003, doi:10.1029/2000RG000092, 1-41.
- McCabe, G.J., and Dettinger, M.D., 2002, Primary modes and predictability of year-to-year snowpack variations in the western United States from teleconnections with Pacific Ocean climate: *Journal of Hydrometeorology*, 3, 13-25.
- Cayan, D.R., Dettinger, M.D., Redmond, K.T., McCabe, G.J., Knowles, N., and Peterson, D.H., 2003, The transboundary setting of California’s water and hydropower systems--Linkages between the Sierra Nevada, Columbia River, and Colorado River hydroclimates: Chapter for Diaz, H.F., and Woodhouse, B. (eds.), *Climate and Transboundary Issues*: 237-262.
- Dettinger, M.D., and Cayan, D.R., 2003, Interseasonal covariability of Sierra Nevada streamflow and San Francisco Bay salinity: *Journal of Hydrology*, 277 (3/4), 164-181 [doi:10.1016/S0022-1694(03)00078-7].
- Dettinger, M.D., Cayan, D.R., Meyer, M.K., and Jeton, A.E., 2004, Simulated hydrologic responses to climate variations and change in the Merced, Carson, and American River basins, Sierra Nevada, California, 1900-2099: *Climatic Change*, 62, 283-317.
- Lundquist, J.D., Cayan, D.R., and Dettinger, M.D., 2004, Spring onset in the Sierra Nevada—When is snowmelt independent of elevation?: *Journal of Hydrometeorology*, 5, 325-340.
- Pagano, T., Pasteris, P., Dettinger, M., Cayan, D., and Redmond, K., 2004, Water year 2004—Western water managers feel the heat: *Eos, Transactions of the American Geophysical Union*, 85, 385-387.
- Simpson, J.J., Dettinger, M.D., Gerhke, F., McIntyre, T.J., and Hufford, G.I., 2004, Hydrologic scales, cloud variability, remote sensing and models—Implications for forecasting snowmelt and streamflow: *Weather and Forecasting*, 19, 251-276.
- Stewart, I., Cayan, D.R., and Dettinger, M.D., 2004 Changes in snowmelt runoff timing in western North America under a ‘Business as Usual’ climate change scenario: *Climatic Change*, 62, 217-232.
- Dettinger, M.D., Redmond, K.T., and Cayan, D.R., in press, Winter orographic-precipitation ratios in the Sierra Nevada—Large-scale atmospheric circulations and hydrologic consequences: *Journal of Hydrometeorology*.
- Hidalgo, H.G., Cayan, D.R., and Dettinger, M.D., in press, Sources of variability of evapotranspiration in California: *Journal of Hydrometeorology*.
- Stewart, I., Cayan, D., and Dettinger, M., in press, Changes towards earlier streamflow timing across western North America: *Journal of Climate*.
- Dettinger, M.D., in journal review, From climate-change spaghetti to climate-change distributions for 21st Century California: submitted to *San Francisco Estuary and Watershed Science*, 30 p.

Neil Kamal Ganju

Hydraulic Engineer
U.S. Geological Survey
Placer Hall
6000 J Street
Sacramento, CA 95819-6129

Education

2001-present: Ph.D. student, Civil and Environmental Engineering, University of California, Davis

Adviser: David H. Schoellhamer

Research: Estuarine geomorphic prediction

1999-2001: M.S., Coastal and Oceanographic Engineering, University of Florida, Gainesville

Adviser: Ashish J. Mehta

Thesis: Trapping organic-rich fine sediment in an estuary

1994-1998: B.S., Civil and Environmental Engineering, University of Michigan, Ann Arbor

Current Research at the USGS – July 2001 to present

Seasonal study of tidal wetland fluxes, measuring dissolved organic carbon and suspended-sediment fluxes to and from Browns Island, California. Funded by CALFED, in collaboration with USGS Carbon Project.

Measurement of sediment fluxes through large estuarine cross-sections, for establishing long-term trends of sediment transport through Suisun Bay, California. Funded by Regional Water Board, in collaboration with USGS Hydrodynamics Project.

Investigation of microscale fine sediment properties, such as the response of flocculation to sediment concentration, salinity, and hydrodynamic conditions. Funded by USGS Priority Ecosystem Science program.

Development of 1, 2, and 3-D models for simulating long-term estuarine geomorphology. Funded by multiple programs, in collaboration with UC Davis.

Selected publications

1. Buchanan, P.A., and Ganju, N.K., 2002, Summary of suspended-sediment concentration data, San Francisco Bay, California, water year 2000: U.S. Geological Survey Open File Report 02-146. URL <http://water.usgs.gov/pubs/of/ofr02146/>
2. Gartner, J. W. and Ganju, N. K., 2002, A preliminary evaluation of near-transducer velocities collected with low-blank acoustic Doppler current profiler: Proceedings, ASCE 2002 Hydraulic Measurements and Experimental Methods Conference, Estes Park, Colorado, July 28 – August 1, 2002.
3. McKee, L., Ganju, N., Schoellhamer, D., Davis, J., Yee, D., Leatherbarrow, J., and Hoenicke, R., 2002, Estimates of suspended sediment flux entering San Francisco Bay from the Sacramento and San Joaquin Delta: Report prepared for the Sources Pathways and Loading Workgroup of Regional Monitoring Program for Trace Substances in the San Francisco Estuary, San Francisco Estuary Institute, Oakland, California, 28 p.
http://www.sfei.org/watersheds/reports/Delta_sediment_loads/MallardIssedimentloads.pdf
4. Schoellhamer, D.H., Shellenbarger, G.G., Ganju, N.K., Davis, J.A., and McKee, L.J., 2003, Sediment dynamics drive contaminant dynamics: The Pulse of the Estuary: Monitoring and Managing Contamination in the San Francisco Estuary, San Francisco Estuary Institute, Oakland, California, p. 21-26.
<http://www.sfei.org/rmp/pulse/pulse2003.pdf>
5. Ganju, N.K., Schoellhamer, D.H., Murrell, M.C., Gartner, J.W., and Wright, S.A., in press, Constancy of the relation between floc size and density in San Francisco Bay: journal article, Proceedings of the 7th International Conference on Estuarine and Nearshore Cohesive Sediment Transport Processes, Gloucester Point, Virginia, October 1-4, 2003.
6. Downing, B., Wheeler, G., Emerson, S., Ganju, N., and Bergamaschi, B., 2003, Continuous, real-time optical measurement of DOC fluxes in a tidal wetland: Proceedings of the 6th biennial State-of-the-Estuary Conference, Oakland, California, October 21-23, 2003, p. 73.
7. Swanson, K., Shellenbarger, G.G., Schoellhamer, D.H., Ganju, N. K., Athearn, N., and Buchanan, P., 2003, Desalinization, erosion, and tidal changes following the breaching of Napa salt pond 3: Proceedings of the 6th biennial State-of-the-Estuary Conference, Oakland, California, October 21-23, 2003, p. 156.
8. Takekawa, J., Demers, S., Woo, I., Athearn, N., Ganju, N., Shellenbarger, G., Schoellhamer, D., and Perry, W.M., 2003, A bathymetry system for measuring sediment accumulation in tidal marsh restoration projects: Proceedings of the 6th biennial State-of-the-Estuary Conference, Oakland, California, October 21-23, 2003, p. 157.
9. Buchanan, P.A., and Ganju, N.K., 2003, Summary of suspended-sediment concentration data, San Francisco Bay, California, water year 2001: U.S. Geological Survey Open-File Report 03-312. URL <http://water.usgs.gov/pubs/of/2003/ofr03312/index/index.htm>

10. Ganju, N.K., Schoellhamer, D.H., Warner, J.C., Barad, M.F., and Schladow, S.G., 2004, Tidal oscillation of sediment between a river and a bay: a conceptual model: *Estuarine, Coastal and Shelf Science*, v. 60, no. 1, p. 81-90.
11. Buchanan, P.A., and Ganju, N.K., 2004. Summary of suspended-sediment concentration data, San Francisco Bay, California, Water Year 2002: U.S. Geological Survey Open File Report 2004-1219.
<http://pubs.water.usgs.gov/ofr2004-1219/>
12. Ganju, N.K., Bergamaschi, B., and Schoellhamer, D.H., Measurement of water, sediment, and carbon fluxes from a tidal wetland: submitted to *Estuaries*.
13. McKee, L., Ganju, N.K., and Schoellhamer, D.H., Estimates of suspended sediment entering San Francisco Bay from the Sacramento and San Joaquin Delta, San Francisco Bay, California: submitted to *Journal of Hydrology*.
14. Buchanan, P.A., and Ganju, N.K., in preparation, Summary of suspended-sediment concentration data in San Francisco Bay, California, water year 2003: USGS Open File Report.

BIOGRAPHICAL SKETCH- BRUCE E. JAFFE

EDUCATION

University of California-Santa Cruz, B.S. 1980, Earth Science
University of Washington, M.S. 1983, Geological Oceanography
University of California-Santa Cruz, Ph.D. 1993, Earth Science,

RESEARCH AND PROFESSIONAL EXPERIENCE

1983-present Research Oceanographer, US. Geological Survey
2000 Lecturer, University of California-Santa Cruz, Earth Sciences
1991-83 Research and Teaching Assistant, University of Washington

RESEARCH INTERESTS

My research focus is coastal geologic and physical processes. In recent years I have emphasized research on modeling and understanding the geologic record of catastrophic events (e.g., tsunamis, hurricanes and landslides). I have studied coastal areas on the Pacific, Atlantic, Gulf, and Great Lakes coasts of U. S., as well as areas in Peru, Puerto Rico, Samoa, Hawaii, Java, Papua New Guinea, and Guam.

Current Areas of Research:

- Historical sediment transport, sedimentation, and coastal change (projects: Project Chief and PI, Historical bay-floor and shoreline changes in San Francisco Bay)
- Paleotsunami interpretation and tsunami sediment transport (projects: Chief and PI, Tsunami Risk Assessment Project: Conducts research on tsunami deposition including studies of the 2001 Peru, 1998 Papua New Guinea and 1994 East Java, and 1700 Cascadia tsunamis)
- Nearshore sediment transport and hydrodynamics (projects: PI, Coral Reef Project: Conducts research on sediment transport affecting coral reefs in Maui)

SELECTED PUBLICATIONS SINCE 1995

- Jaffe, B. E., and Rubin, D. M., 1996, Using nonlinear forecasting to determine the magnitude and phasing of time-varying sediment suspension in the surf zone: *Journal of Geophysical Research*, v. 101, no. C6, p. 14,283-24,296.
- Jaffe, B. E., List, J. H., and Sallenger, A. H. Jr., 1997, Massive sediment bypassing on the lower shoreface offshore of a wide tidal inlet; Cat Island Pass, Louisiana: *Marine Geology*, v. 136/3, p. 131-149.
- List, J. H., Sallenger, A. H., Jr., Hansen, M. E., and Jaffe, B. E., 1997, Accelerated relative sea-level rise and rapid coastal erosion: testing a causal relationship for the Louisiana barrier islands, *Marine Geology*, v.140, p. 347-365.
- Jaffe, B. E., Smith, R. E., and Torresan, L. Z., 1998, Sedimentation and bathymetric change in San Pablo Bay: 1856 to 1983: U.S. Geological Survey Open-File Report 98-759.
- Jaffe, B., Kayen, R., Gibbons, H., Hendley III, J. W., and Stauffer, P. H., 1998, Popular beach disappears underwater in huge coastal landslide—Sleeping Bear Dunes, Michigan: USGS Fact Sheet 020-98.

- Gelfenbaum, G., Jaffe, B., Neal, T., and Davies, H., 2000. 1998 Tsunami: Papua New Guinea: InterCoast, vol. 35, p. 7-8.
- Storlazzi, C. and Jaffe, B. E., 2002, Flow and sediment suspension events on the inner shelf in Central California, Marine Geology, v. 181(1-3), p. 195-213.
- Gelfenbaum, G., and Jaffe, B., 2003, Erosion and sedimentation from the 17 July 1998 Papua New Guinea tsunami: Pure and Applied Geophysics, v. 60, no. 10-11.
- Parsons, T., R. Sliter, E. L. Geist, R. C. Jachens, B. E. Jaffe, A. Foxgrover, P. E. Hart, and J. McCarthy, 2003, Structure and mechanics of the Hayward-Rodgers Creek fault stepover, San Francisco Bay, California, Bull. Seismol. Soc. Am., Vol. 93, No. 5, pp. 2187–2200.
- Storlazzi, C.D. and Jaffe, B.E., 2003, Coastal Circulation and Sediment Dynamics along West Maui, Hawaii, Part 1: Long-term measurements of currents, temperature, salinity, and turbidity off Kahana, West Maui: 2001-2003, U.S. Geological Survey Open-File Report 03-482.
- Marvin-DiPasquale M., Agee J., Bouse R., Jaffe B., 2003, Microbial Cycling of Mercury in Contaminated Wetland and Open-Water Sediments of San Pablo Bay, California. Environmental Geology, v. 43(3) p. 260-267.
- Barnhardt, W.A., Jaffe, B.E., Kayen, R.E., and Cochran, G.R., 2004, Influence of near-surface stratigraphy on coastal landslides at Sleeping Bear Dunes National Lakeshore, Lake Michigan, USA: Journal of Coastal Research, v. 20, no. 2, p. 510-522.
- Jaffe, B., Gelfenbaum, G., Rubin, D., Peters, R., Anima, R., Swensson, M., Olcese, D. Bernales L., Gomez, J., and Riega, P., 2003, Tsunami Deposits: Identification and Interpretation of Tsunami Deposits from the June 23, 2001 Peru Tsunami, Proceedings of the International Conference on Coastal Sediments 2003, CD-ROM Published by World Scientific Publishing Corp and East Meets West Productions, Corpus Christi, TX, USA. ISBN 981-238-422-7, 13 p.
- Foxgrover, A.C., Higgins, S.A., Ingraca, M.K., Jaffe, B.E., and Smith, R.E., 2004, Deposition, erosion, and bathymetric change in South San Francisco Bay: 1858-1983: U.S. Geological Survey Open-File Report 2004-1192, 25 p. [URL: <http://pubs.usgs.gov/of/2004/1192>]Jaffe, B. E., Smith, R. E., and Foxgrover, A., in press, Anthropogenic Influence on Sedimentation and Intertidal Mudflat Change in San Pablo Bay, California: 1856 to 1983, Estuarine, Coastal and Shelf Science.

SELECTED WEB SITES

San Pablo Bay Historical Sedimentation and Bathymetric Change:

<http://sfbay.wr.usgs.gov/access/sanpablobay/bathy/home.html>

Peru Tsunami Deposits:

<http://walrus.wr.usgs.gov/peru2/>

Papua New Guinea Tsunami Deposits:

<http://walrus.wr.usgs.gov/tsunami/itst.html>

U.S. Geological Survey, WRD
MS 496, Bldg. 15, Rm. 3024
345 Middlefield Rd.
Menlo Park, CA 94025

Phone: 650 329 4476
E-mail: nknowles@usgs.gov
FAX: 650 329 4327

Noah Knowles

Education

2000	University of California	San Diego, CA
Ph.D. Oceanography		
1996	University of California	San Diego, CA
M.S. Oceanography		
1993	University of Illinois	Urbana, IL
M.S. Physics		
1991	University of Illinois	Urbana, IL
B.S. Engineering Physics		

Employment

2002-present	U.S. Geological Survey	Menlo Park, CA
USGS National Research Council Research Associate		
Studying role of climate variability in estuarine contaminant fluxes, particularly benthic trace metal fluxes.		
Analyzing vegetation's role in determining watershed response to climate variability and change using satellite observations and numerical models.		
Investigating historical trends in runoff, snowpack, and precipitation form (rain vs. snow) across the Western U.S.		
2000-2002	University of California	San Diego, CA
Postgraduate Researcher		
Applied estuarine and hydrologic models to assess the potential impacts of global warming in the San Francisco Bay-Delta estuary and watershed.		
Studied dependence of meteorological and hydrologic processes on elevation in California in the context of climate variability and change.		
Developed Statewide model of California hydrology.		
1996-2000	University of California	San Diego, CA
Graduate Student Researcher		
Investigated seasonal to interdecadal variability of San Francisco Bay salinity and the hydrology of its upstream watershed using simulated and observed data.		
Developed and applied new hydrologic modeling techniques to the San Francisco Bay-Delta watershed, resulting in the first combined model of the estuary/watershed system.		
Delineated mechanisms by which climate variability propagates through the managed watershed into the estuary, and participated in interdisciplinary collaborations to investigate the ecological implications of such effects.		

1993-1996 University of California San Diego, CA

Graduate Student Researcher

Studied nonlinear processes driving atmospheric circulation using numeric models.

1992-1993 University of Illinois Urbana, IL

Research Assistant

Developed and applied computer and analytical models of simple nonlinear systems. These studies had applications in fiber optic transmission, microelectronics and condensed matter theory.

Publications

Peer-reviewed

Knowles, N., Cayan, D.R., Peterson, D.H., and R.J. Uncles (1995). "Modeling and Predicting Intertidal Variations of the Salinity Field in the Bay/Delta." Interagency Ecological Program Newsletter **8**(Fall).

Knowles, N. (1996). Simulation and Prediction of Salinity Variability in San Francisco Bay. Scripps Institution of Oceanography. La Jolla, CA, University of California, San Diego.

Knowles, N., Cayan, D.R., Ingram, L., Peterson, D.H., and R.J. Uncles (1997). "Diagnosing the Flood of 1997 in San Francisco Bay with Observations and Model Results." Interagency Ecological Program Newsletter **10**(Summer).

Knowles, N., Cayan, D.R., Peterson, D.H., and R.J. Uncles (1998). "Simulated Effects of Delta Outflow on the Bay: 1998 Compared to Other Years." Interagency Ecological Program Newsletter **11**(Fall): 29-31.

Knowles, N. (2000). Modeling the Hydroclimate of the San Francisco Bay-Delta Estuary and Watershed. Doctoral Dissertation, Scripps Institution of Oceanography. La Jolla, CA, University of California, San Diego.
<http://tenaya.ucsd.edu/~knowles/html/SFBayHydroclimate.html>

Stahle, D., M. Therrell, M.K. Cleaveland, D.R. Cayan, M.D. Dettinger and N. Knowles (2001). Ancient Blue Oaks Reveal Human Impact on San Francisco Bay Salinity. EOS: Transactions, American Geophysical Union, 82:12.

Knowles, N., 2002: Natural and Human Influences on Freshwater Inflows and Salinity in the San Francisco Estuary at Monthly to Interannual Scales. Water Resources Research, 38, 25-1 to 25-11.
http://tenaya.ucsd.edu/~knowles/papers/knowles_wrr_2002.pdf

Knowles, N., and D. Cayan, 2002: Potential effects of global warming on the Sacramento/San Joaquin watershed and the San Francisco estuary. Geophysical Research Letters, 29, 38-1-38-4.
http://tenaya.ucsd.edu/~knowles/papers/knowles_grl_2002.pdf

Cayan, Dettinger, Redmond, McCabe, Knowles, and Peterson, 2003: "The transboundary setting of California's water and hydropower systems--Linkages between the Sierra Nevada, Columbia, and Colorado hydroclimates", book chapter. <http://tenaya.ucsd.edu/~dettinge/transboundary.pdf>

Knowles, N., and D. Cayan, 2004: Elevational Dependence of Projected Hydrologic Changes in the San Francisco Estuary and Watershed. *Climatic Change*, 62, 319-336.
http://tenaya.ucsd.edu/~knowles/papers/knowles_cc_2004.pdf

In Review:

Knowles, N. and K. P. Georgakakos (2004). "A Describing Function Approach to Aggregating High-Resolution Land-Surface Data for Macroscale Hydrologic Modeling." Water Resources Research, **submitted**.

**Selected
Presentations**

American Geophysical Union Meeting 1995-1998, 2002, 2004

Pacific Climate Workshop 1995-2003

Bay-Delta Modeling Forum 2000

Interagency Ecological Program Conference 1997

State of the Estuary Conference 1995, 1997, 1999, 2001

CALFED Science Conference 2000, 2002

Sierra-Nevada Science Conference 2003

California (CEC) Climate Change Conference 2004

Mountain Climate Sciences Symposium 2004

LISA VIDERGAR LUCAS

U.S. Geological Survey
345 Middlefield Road, MS #496
Menlo Park, California 94025

Phone 650-329-4588
Fax 650-329-4327
llucas@usgs.gov

RESEARCH INTERESTS

Develop, adapt, and use numerical models of coupled hydrodynamics, biology, and water chemistry---in conjunction with field investigations---to understand the physical-biological-chemical relationships governing variability in water quality and habitat function in surface water systems such as estuaries, lakes, and rivers.

EDUCATION

Stanford University, Palo Alto, California
Ph.D. in Civil and Environmental Engineering, Environmental Fluid Mechanics Program (1997)

Stanford University, Palo Alto, California
M.S. in Civil Engineering, Environmental Fluid Mechanics Program (1992)

University of Notre Dame, South Bend, Indiana
B.S. in Civil Engineering (1989), Graduated with Honors

RESEARCH AND PROFESSIONAL EXPERIENCE

ECOHYDRODYNAMICIST/RESEARCH ENGINEER, U.S. Geological Survey, Menlo Park, CA (April 2000-Present)

CONSULTING ASSISTANT PROFESSOR, Stanford University, Dept. of Civil and Environmental Engineering, Stanford, CA (October 2002-Present)

NRC POSTDOCTORAL RESEARCH ASSOCIATE, U.S. Geological Survey, Menlo Park, CA (May 1998-April 2000)

VISITING SCIENTIST, Stanford University, Dept. of Civil and Environmental Engineering, Stanford, CA (September 1997-October 2002)

HYDROLOGIST, U.S. Geological Survey, Menlo Park, CA (July 1997-April 1998)

RESEARCH ASSISTANT, Stanford University, Dept. of Civil and Environmental Engineering, Stanford, CA (January 1992-June 1997)

TEACHING ASSISTANT, Stanford University, Dept. of Civil and Environmental Engineering, Stanford, CA (September 1992-June 1996)

STRUCTURAL ENGINEER, Badger Engineers, Inc., Cambridge, MA (August 1989-July 1991)

HIGHLIGHTS

- Recipient of Estuarine Research Federation Cronin Early Career Award (September 2003)
- Elected Secretary of the Estuarine Research Federation (September 2003)
- U.S. Dept. of Interior Star Award (November 2001)
- U.S. Dept. of Interior Star Award (June 2001)
- U.S. Dept. of Interior Star Award (September 2000)
- NRC Postdoctoral Fellowship (1998-2000)
- U.S. Department of Agriculture Postdoctoral Fellowship (1998, declined)
- Josephine de Karman Fellowship (1995)
- Stanford Fellowship for Masters Study (1991-1992)
- McCarthy Scholarship (1988) and Sidney-Kelsey Outstanding Scholar Award (1989), for top Notre Dame Civil Engineering Junior and Senior, respectively
- Graduated from Notre Dame with Honors, Notre Dame Scholar

TECHNICAL PUBLICATIONS

Lucas, L.V., J.E. Cloern, J.K. Thompson, and N. E. Mosen. 2002. Functional variability of habitats in the Sacramento-San Joaquin Delta: restoration implications. *Ecological Applications* 12(5): 1528-1547.

Lucas, L.V., T. Schraga, C.B. Lopez, J.R. Burau, and A.D. Jassby. 2002. Pulsey, Patchy Water Quality in the Delta: Implications for Meaningful Monitoring. *Newsletter, Interagency Ecological Program for the Sacramento-San Joaquin Estuary* 15(3): 21-27.

Lucas, L.V. and J.E. Cloern. 2002. Effects of tidal shallowing and deepening on phytoplankton production dynamics: a modeling study. *Estuaries* 25(4A): 497-507.

Mosen, N. E., J. E. Cloern, L. V. Lucas, and S. G. Monismith. 2002. A comment on the use of flushing time, residence time and age as transport time scales. *Limnology and Oceanography* 47(5): 1545-1553.

Lucas, L.V., J.R. Koseff, J.E. Cloern, S.G. Monismith, and J.K. Thompson. 1999. Processes Governing Phytoplankton Blooms in Estuaries. I: The Local Production-Loss Balance. *Marine Ecology Progress Series* 187: 1-15.

Lucas, L.V., J.R. Koseff, S.G. Monismith, J.E. Cloern, and J.K. Thompson. 1999. Processes Governing Phytoplankton Blooms in Estuaries. II: The Role of Horizontal Transport. *Marine Ecology Progress Series* 187: 17-30.

Lucas, L.V., J.E. Cloern, J.R. Koseff, S.G. Monismith, and J.K. Thompson. 1998. Does the Sverdrup Critical Depth Model Explain Bloom Dynamics in Estuaries? *Journal of Marine Research* 56: 375-415.

Lucas, L.V. 1997. A Numerical Investigation of Coupled Hydrodynamics and Phytoplankton Dynamics in Shallow Estuaries. Ph.D. Dissertation, Stanford University.

Cloern, J.E., C. Grenz, and L.V. Lucas. 1995. An empirical model of the phytoplankton chlorophyll/carbon ratio -- the conversion factor between productivity and growth rate. *Limnology and Oceanography* 40(7): 1313-1321.

Vidergar, L.L., J.R. Koseff, and S.G. Monismith. 1993. Numerical models of phytoplankton dynamics for shallow estuaries, in: *Hydraulic Engineering '93*, ed. H.W. Shen, S.T. Su, and F. Wen. ASCE, 1025-1030.

May, C., J. R. Koseff, L. V. Lucas, J. E. Cloern, and D. H. Schoellhamer. 2003. Effects of spatial and temporal variability of turbidity on phytoplankton blooms. *Marine Ecology Progress Series* 254: 111-128.

Lopez, C.B., J.E. Cloern, T.S. Schraga, A.J. Little, and L.V. Lucas. Ecological values of shallow-water habitats: Implications for restoration of a highly disturbed ecosystem. (In review, *Ecosystems*)

Lucas, L.V., D.M. Sereno, J.R. Burau, T.S. Schraga, C.B. Lopez, M.T. Stacey, K.V. Parchevsky, and V.P. Parchevsky. High frequency variability in a small tidal habitat: indications of underlying process. (In prep.)

Lucas, L.V., J.R. Koseff, S.G. Monismith, and J.K. Thompson. Shallow water processes govern systemwide bloom dynamics: A Modeling Study. (In prep.)

Thompson, J.K., J.R. Koseff, S.G. Monismith, and L. V. Lucas. Shallow water processes govern systemwide bloom dynamics: A Field Study. (In prep.)

Brown, L.R., J.K. Thompson, and L.V. Lucas. Distribution, abundance, and possible effects of an invasive clam, *Corbicula fluminea*, in the lower San Joaquin River watershed, California. (In prep.)

Nancy Elizabeth Monsen

U.S. Geological Survey
Water Resources Division
345 Middlefield Road, MS/496
Menlo Park, CA 94025
Ph:(650) 329-4337

1091 Peninsular Court
Los Altos, CA 94024
(650) 968-8585
nemonsen@usgs.gov

Education

- 1994-2001 Stanford University Stanford, California
Ph.D., Civil and Environmental Engineering, Environmental Fluid Mechanics
A Study of Sub-tidal Transport in Suisun Bay and the Sacramento-San Joaquin Delta
Advisor: Stephen G. Monismith
- 1993-1994 University of Colorado/Boulder Boulder, Colorado
M.S., Civil Engineering, Water Resources and Environmental Engineering Emphasis
- 1989-1993 University of Colorado/Boulder Boulder, Colorado
B.S., Civil Engineering with Distinction

Research Interests/Skills

Study hydrodynamics and associated transport mechanisms in estuary systems using 3D numerical hydrodynamic models. Integrate hydrodynamic knowledge with research in biology/ecology/geochemical disciplines. Primarily interested in Western USA water issues.

Research Experience

Physical Scientist, Post Doctoral Position, U.S. Geological Survey 7/2000-present
Extending transport model developed in Ph.D. research. This interdisciplinary research will focus on how selenium is transported through the Sacramento-San Joaquin Delta and potential pathways of Se to Suisun Bay.

Research Assistant, Stanford University 9/1996-1/2001
Developed a two- (depth averaged) and three-dimensional model of Suisun Bay and the Sacramento-San Joaquin Delta using the TRIM3D hydrodynamic code. Three main questions were addressed during this research. First, how important are mean flows to transport? Second, what type of flow patterns exist at the junctions of larger channels and how do these patterns influence dispersion in the Delta? Finally, how do tidal friction and tidal waves influence the filling and emptying of the Delta during the fortnightly spring-neap tidal cycle? This research was funded by the California Interagency Ecological Program and CALFED.

Research Assistant, CADSWES, University of Colorado/Boulder 6/1993-8/1994
Incorporated temperature and salinity modeling into the reservoir element of PRSYM, a watershed operations model. This application is currently used by the Tennessee Valley Authority (TVA) and Bureau of Reclamation for water management of the TVA and the Colorado River Basin.

Honors and Distinctions

- National Science Foundation Fellowship 1993-1996
Top student presentation at the CALFED Science Conference 2000
Colorado Engineering Council Certificate of Merit 1993
American Society of Civil Engineers/Colorado Section Annual Student Award 1993
Milo S. Ketchum Award 1993

Publications

- Monsen, N.E., J.E. Cloern, L.V. Lucas, and S.G. Monismith (2002), "A comment on the use of flushing time, residence time, and age as transport time scales," *Limnology and Oceanography* 47(5): 1545-1553.
- Lucas, L.V., J.E. Cloern, J.K. Thompson, and N.E. Monsen (2001), "Functional Variability In Shallow Tidal Habitats: Implications for Restoration of the Sacramento-San Joaquin Delta," *Ecological Applications* 12: 1545-1553.
- Monsen, N.E. (2001), *A Study of Sub-Tidal Transport in Suisun Bay and the Sacramento-San Joaquin Delta, California*, PhD Thesis, Stanford University.
- Monsen, N.E., and S.G. Monismith (1999), "Calibration and Verification of Delta TRIM," *IEP Newsletter*, 12(4):28-34.

Manuscript in review:

- Monsen, N.E., J.E. Cloern, J.R. Burau, "Water diversion as an ecosystem disturbance: examples from the Sacramento-San Joaquin River Delta, California," submitted to *Water Resources Research*.

Presentations at Scientific Meetings

- CALFED Science Conference, Sacramento, CA** October 6, 2004
Oral presentation: "Water diversion as an ecosystem disturbance: Four examples from the Delta"
- California Water and Environmental Modeling Forum, Asilomar, CA** February 25, 2004
Oral presentation: "Lessons learned from specific Delta habitats: when, where, and how I use a multi-dimensional model"
- Estuarine Research Federation Conference, Seattle, Washington** September 16, 2003
Invited oral presentation: "Transport Timescales: What do the really mean?"
- CALFED Science Conference, Sacramento, CA** January 14, 2003
Oral presentation: "Circulation and Mixing within Delta Flooded Island Habitats: Implications for Ecosystem Restoration"
- Ocean Sciences Conference (ASLO/AGU) Honolulu, Hawaii** February 13, 2002
Oral presentation: "Transport Timescales: No Two Approaches are Alike"
- Estuarine Research Federation Conference, St. Pete Beach, FL** November 5, 2001
Oral presentation: "The Importance of Tidal Dispersion with Application to the Sacramento-San Joaquin Delta, CA"
- CALFED Science Conference, Sacramento, CA** October 3-5, 2000
Oral presentation: "Transport Mechanisms for Water and Scalars in the Delta"
Oral presentation: "Impact of Temporary Barriers and the Yolo Bypass on Transport of Organic Carbon Through the Delta"
- Interagency Ecological Program Workshop, Asilomar, CA** March 2, 2000
Oral presentation: "Applications of Delta TRIM3D: Residence Times, Water Sources, and Mixing in Shallow Water Habitats"
- Bay Delta Modeling Forum Workshop, Sacramento, CA** February 4, 2000
Oral presentation: "Analysis of November/December 1999 Salinity Intrusion Event: Real Time Modeling Effort"
- AGU Ocean Sciences, San Antonio, TX** January 27, 2000
Oral presentation: "Circulation and Salt Transport in the Sacramento-San Joaquin Delta, CA: A Comparison of Two- and Three-Dimensional Modeling approaches using Delta TRIM"
- Interagency Ecological Program Workshop, Asilomar, CA** February 24, 1999
Poster presentation: "Two Dimensional Modeling of the Sacramento-San Joaquin Delta"
- American Geophysical Union Fall Meeting, San Francisco, CA** December 8, 1998

Poster presentation: “Two Dimensional Modeling of the Sacramento-San Joaquin Delta”

Other publications/posters where my work has appeared:

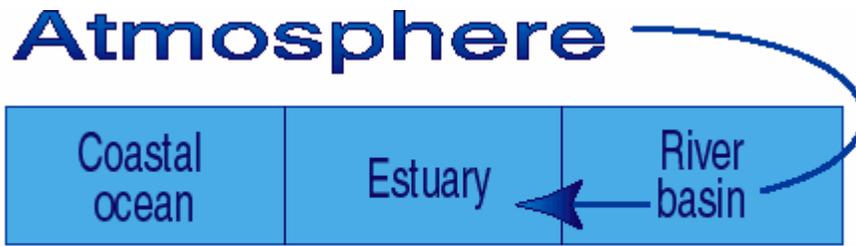
Rubissow-Okamoto, Ariel. December 2001. Puzzling Over the Shallows. News from the CALFED Bay-Delta Science Program, Science in Action. Pamphlet.

Lucas, L.V., J. E. Cloern, J.K. Thompson, and N.E. Monsen. 2001. Frank and Millie’s Secrets: Comparison of “Similar” Shallow Tidal Habitats in the Sacramento-San Joaquin River Delta. Poster.

USGS Film Documentary: “Delta Revival: Restoration of a California Ecosystem” 2003

Consultation/Outreach Beyond USGS

1. Guest lecture, Stanford University, GES 50 (The Coastal Environment) November 4, 2004
2. USGS Public Lecture, May 27, 2004, Presentation of “Delta Revival: Restoration of a California Ecosystem”
3. USGS Community Open House, May 31-June 1, 2003
4. Meeting with California Boats and Waterways and US Department of Agriculture to discuss application of Pesticides on *Egeria Densa* in Franks Tract, June 7, 2002, Davis, CA
 - a. Presented model results to discuss circulation patterns and residence time of Franks Tract.
5. CALFED Science Board Workshop on Adaptive Management, March 19-20, 2002, Tiburon, CA
 - a. Invited as an expert to assist drafting an adaptive management plan for Yolo Bypass floodplain restoration that could be funded by the CALFED Science Board.
6. Interagency Ecological Program Annual Meeting, February 28, 2002, Pacific Grove, CA, February 28, 2002
 - a. Showed a video of the Mildred Island September 2001 Field Experiment at the poster session to inform other agencies of this field program.
7. Reviewed journal manuscripts
 - a. *Limnology and Oceanography* – 5 manuscripts (2002-2004)
 - b. *Estuarine, Coastal and Shelf Science* –1 manuscript (2004)
 - c. *San Francisco Estuary and Watershed Science* –1 manuscript (2004)
8. USGS State Regional Directors Meeting, May 23, 2001, Rio Vista, CA
9. Clarified assumptions about flow routing through the Delta (influence of temporary barriers and export pumps) for the CALFED Science Board, March 15, 2001
10. Suisun Bay Place-based meeting 2001, March 22-23, 2001, Ryde, CA
11. Stockton teachers workshop about the Delta, Stockton, CA, March 13, 2001
 - a. Gave a general overview of Delta hydrodynamics to Elementary, Jr. High, and High School science teachers who were developing a science curriculum (K-12) based on the Delta.
12. Interagency Ecological Program Estuary Ecology Team Project Work Team meeting, Tiburon, CA, August 24, 2000
 - a. Presented an overview of findings from my PhD dissertation
13. Meet occasionally with Rachel Simon, a PhD student in the Environmental Fluid Mechanics Laboratory, Department of Civil/Environmental Engineering, Stanford University to answer questions about the hydrodynamic model TRIM3D.



Estuarine system and pathway of atmospheric influence on estuary.

C.V.

David H. Peterson, Research Oceanographer, USGS, WRD, WR

EDUCATION: Ph.D., University of Washington, Seattle, Washington, 1967, Oceanography (minor in geochemistry); M.S., University of Minnesota, Minneapolis, Minnesota, 1962, geology (minors in physical chemistry and petroleum engineering); B.A., Augustana College, Rock Island, Illinois, 1959, Geology.

Position: Project Chief "Geochemistry and Hydroclimatology of Riverine and Estuarine Waters" 1967-present

Present Research

Alpine hydroclimatology: Defining the linkages between large scale atmospheric circulation, snowmelt river discharge, and river chemistry and geology. Our research is largely observationally based, and part of a multi-institutional/multi-agency effort including developing/maintaining a hydroclimate monitoring network in central Sierra Nevada.

Motivation: Water is the most important natural resource in western U.S., climate is the most important source of variability in water resources and snow water is an important scientific and management issue.

Study area: Western U.S., with a focus on California.

Scientific Leadership

Grandpa of the USGS San Francisco Bay estuarine program, 1967, father (with the assistance of Chris Mooers) of the Pacific Climate Workshop (PACLIM), 1983, and brother of the

Sierra Nevada hydroclimate monitoring and research effort, 1999, with a Yosemite National Park focus.

Collaborations

Calibration and prediction of Tuolumne River inflow to the head of the Hetch Hetchy reservoir (SFPUC, SF Water and Power, USGS, Denver); Calibration of Tenaya River flow, Tenaya Bridge (USGS, Denver, YNP); lightning as a nitrate source in YNP (SIO, UC, Merced, YNP, SF Water and Power); hydroclimate characteristics of volcanic vs. granitic watersheds (UC, Berkeley), hydroclimatology of central Sierra Nevada including river chemistry (too numerous to list); snowmelt river discharge characteristics western U.S. (USGS, Mapping Division, Menlo Park, CA and NOAA, Sacramento, CA.).

Scientific Presentations/Workshops

Too numerous to list (over 50). Examples include: invitations to international and national workshops (Goldberg, et.al., 1971; Biggs, et.al., 1983; Peterson, et.al., 1987; Peterson et. al., 1988; Peterson, 1989 and White House sponsored meeting 1995; Presentations to NAS review panel of USGS, WRD, 1987; Western USGS District Chiefs, 1987; numerous Universities, Government Agencies (most recent 3rd annual Yosemite National Park Hydroclimate meeting Oct. 2004, which I started and YNP now sponsors this meeting).

Outreach

Too numerous to list (over 50). Examples include: talks to k-6, audiences from San Joaquin farmers to the Commonwealth Club, part of a national 1-hour TV program on SF Bay (NOVA series), Women League of Voters docent on SF Bay cruise, article in American Scientist, provide materials to Yosemite Institute, and most recently, an article published in Nature Notes.

AWARDS

American Chemical Society Research Assistant, 1959
Pre Doctoral Research Associate, 1962
Special Service Award, March 1971
Group Special Achievement Award, December 1978
Meritorious Program Award, March 1980
U.S.G.S., Geologic Division Branch Best Paper 1986
Dept. of Interior Superior Service Award, 1988
Superior Performance Award, 1991
Meritorious Service, 2000

BIBLIOGRAPHY (Last 5 years plus a few earlier examples cited herein)

- Goldberg, E.D., R. Carpenter, J. Chow, J. Duce, J. Noakes, A. Preston, J. Ui, D. Peterson, K. Szekiela, T. Metcalf, 1971, Fluxes of materials to the marine environment. In: Marine Environmental Quality: Suggested Research Programs for Understanding Man's effect on the Oceans, National Academy of Sciences, Washington, p. 5-28.
- Biggs, R., J. Coleman, E. Cronian, T. Fischer, C. Officer, J. Pierce and D. Peterson, 1983, Suspended and Dissolved Matter in Estuaries. In: Fundamental Research in Estuaries: The Importance of an Interdisciplinary Approach. Studies in Geophysics NRC Report, National Academy of Science Press, Washington, p. 63-79.
- Peterson, D.H., D.R.Cayan, J. DiLeo-Stevens, and T.G. Ross, 1987: Some effects of climate variability on hydrology in western North America. Proceedings of the Vancouver Symposium, August 1987. IAHS Publ. No. 168, 45-62.
- Peterson, D.H., Hager, S.W., Schemel, L.E. and Cayan, D.R., 1988 Riverine C,N, Si, and P transport to the Coastal Ocean: An overview. In: Lecture Notes on Coastal and Estuarine studies, Vol. 22. B.O. Jansson (Ed.) Coastal-Offshore Ecosystem Interactions. Springer-Verlag Berlin, p. 227-253.
- Peterson, D.H., 1989, (Ed.) Geophysical Monograph 55, Aspect of Climate Variability in the Pacific and the Western Americas, American Geophysical Union. Wash., D.C., 445pp.
- Peterson, Cayan, DiLeo, Noble and Dettinger, 1995, The Role of Climate in Estuarine Variability, American Scientist 83: 58-67.
- Peterson, D.H., Smith, R.E., Dettinger, M.D., Cayan, D.R., and Riddle, L.G., 1999, An organized signal in snowmelt runoff over the west: Proceedings, Specialty Conference on Potential Consequences of Climate Variability and Changes to Water Resources of the United States, American Water Resources Association (B.D. Adams, ed.), 129-137.
- Cayan, D.R., Peterson, D.H., Riddle, L.G., Dettinger, M.D., and Smith, R.E., 1999, The spring runoff pulse from the Sierra Nevada: Preprints, American Meteorological Society's 14th Conference on Hydrology, Dallas, January 1999, 77-79.
- Peterson, D.H., Smith, R.E., Dettinger, M.D., and Cayan, D.R., 2000, Forecasting spring discharge in the West: A step toward forecasting stream chemistry, in D.W. Morganwalp and H.T. Buxton, eds. Proceedings of the Technical Meeting, Contamination of Hydrologic Systems and Related Ecosystems, Charleston, SC, March 1999: U.S. Geological Survey Water Resources Investigations Report 99-4018B, 8p.

- Cayan, D.R., Peterson, D.H., Riddle, L., Dettinger, M.D., and Smith, 2000, The spring runoff pulse from the Sierra Nevada. Preprints, American meteorological Society's 14th Conference of Hydrology, Dallas January 1999, 77-79.
- Peterson, D.H., Cayan, D.R., Smith, R.E., Dettinger, M.D. and Riddle, L.G., 2000, Retrospective Appraisal of the 200 Maximum Flow Forecasts (http://meteora.ucsd.edu/cap/max_discharge_fest.html)
- Stacey, P.E., Greening, H., Peterson, D. and Tomasko, D., 2000, Summary and Conclusions, Chapter 8, AGU monograph, Contributions of Atmospheric Nitrogen Deposition to U.S. Estuaries.
- Peterson, D.H., Dettinger, M.D., Cayan, D.R., Smith, R.E., and Riddle, L." 2000, An organized signal in snowmelt runoff over the Western United States: Journal of the American Water Resources Association, v. 36, no. 2, pp. 421-432.
- Cayan, D.R., Kammerdiener, S., Dettinger, M.D., Caprio, J.M., and Peterson, D.H., 2001, Changes in the onset of spring in the western United States: Bulletin, American Meteorological Society, v.82, no. 3, p. 399-415.
- Peterson, D.H., Cayan, D.R., Smith, R.E., Dettinger, M.D. and Riddle, L., 2002, An Experimental Forecast of Maximum Daily Snowmelt Discharge for the year 2002. ([http://meteora.ucsd.edu/cap/max discharge 2002. html](http://meteora.ucsd.edu/cap/max_discharge_2002.html)).
- DiLeo, J., Butler, M., Cayan, D., Clow, D., Dettinger, M., Gehvke, F., Hager, S., Lundquist, J., McCurdy, G., Peterson, D., Redmond, K., Riddle, L., Smith, R. and Van Wagtenonk, J., 2003, A Notebook of Hydroclimatology Sites/Activities, Yosemite National Park, USGS Open File Report, 39 p. [http://sfbay.wr.usgs.gov/access_1 hydroclim/site book.pdf](http://sfbay.wr.usgs.gov/access_1_hydroclim/site_book.pdf)
- Peterson, D., Smith, R., Hager, S., Huber, K., Dettinger, M. and DiLeo, J., 2003, Alpine Hydroclimatology, exploring the mystery of salinity change in portions of the Stanislaus and Merced Rivers, <http://sfbay.wr.usgs.gov/access/HydroClim/HydroClimTutorial.pdf>
- Peterson, D., Smith, R. and Hager, S. 2004, A walk through the hydroclimate network in Yosemite National Park: River Chemistry, 16p. [http://sfbay.wr.usgs.gov/access/HydroClim/NatNote Dhpet.pdf](http://sfbay.wr.usgs.gov/access/HydroClim/NatNote_Dhpet.pdf)
- Peterson, D., Smith, R., Hager, S., Cayan, D. and Dettinger, M., 2004, Air Temperature and

Snowmelt Discharge Characteristics, Merced River at Happy Isles, Yosemite National Park, Central Sierra Nevada, Proceedings of the Twentieth Annual Pacific Climate Workshop, p.53-64.

Cayan, D.R. Dettinger, M.D., Redmond, K.T., McCabe, G.J., Knowles, N., and Peterson, D.H., 2005, The transboundary Setting of California's Water and Hydropower Systems-Linkages between the Sierra Nevada, Columbia River, and Colorado River Hydroclimates: Chapter for Diaz, H.F., and Woodhouse, B (eds.), Climate and Transboundary Issues: 25 p.

Directors Approval for Publication:

Peterson, D., Smith, R., Hager, S., Hickie, J., Dettinger, M., and Huber, K., A top-Down Hydroclimate Monitoring Network in Yosemite National: Response of Alpine Riverine Chemistry to Atmospheric Drivers (to be submitted to EOS).

In Review

Peterson, D., Smith, R., Stewart, I., Knowles, N., Souldard, C., and Hager, S., Snowmelt Discharge Characteristics, Sierra Nevada, California to be submitted to San Francisco Estuary and Watershed Science.

December 2004

David Schoellhamer

Research Hydrologist, U.S. Geological Survey, Sacramento
Associate Adjunct Professor of Civil and Environmental Engineering, UC Davis
Email: dschoell@usgs.gov

Research and work experience relevant to geomorphic modeling, the Delta, and Suisun Bay

1993-present: Research Hydrologist, U.S. Geological Survey, Sacramento, California. Chief of the San Francisco Bay suspended-sediment transport processes project. I am responsible for the study design, technical direction, technical quality, research products, funding, reporting, colleague and agency relations, supervision, and administration of the project. I am the co-PI for the CALFED supported project *Sedimentation in the Delta and Suisun Bay*. More information is available at <http://ca.water.usgs.gov/sfbay/sedtrans/> .

2003-present: Associate Adjunct Professor, Civil and Environmental Engineering Department, UC Davis: I conduct research in collaboration with faculty and graduate students, serve on thesis and dissertation committees, teach classes on sediment transport and San Francisco Bay, give seminars, and I have helped organize guest speakers for seminars. I am co-PI (with Dr. Bassam Younis) on a project developing an estuarine landscape model for Suisun Bay that is funded by the UC Water Resources Center. More information is available at <http://cee.engr.ucdavis.edu/faculty/schoellhamer/> .

Scientific Leadership relevant to geomorphic modeling, the Delta, and Suisun Bay

U.S. Geological Survey Federal Engineer of the Year, December 2004.

Program co-chair for the 2004 California Bay-Delta Authority Science Conference, October 2004.

Organizing Committee for the Seventh International Conference on Nearshore and Estuarine Cohesive Sediment Transport Processes held in Virginia in October 2003. Co-editor of the peer-reviewed proceedings.

U.S. Army Corps of Engineers, Fine Sediment Engineering Research Needs Advisory Panel, Vicksburg, Mississippi, July 24-25, 2001. The panel included leading scientists from academia, government, and the private sector and made recommendations to the Corps on what research topics they should pursue during the next decade to help advance science and to better accomplish the Corps' mission.

San Francisco Airport Runway Expansion Science Panel, 1999-2003. The panel was chaired by Dr. Jerry Schubel and includes scientists from around the country. Sediment management was a key issue regarding the planned multibillion dollar airport expansion.

Hydro-geomorphic Advisory Team of the Bay Area Regional Wetlands Ecosystem Goals Project, 1996-1999

Peer reviewed publications relevant to geomorphic modeling, the Delta, and Suisun Bay

Brennan, M.L., Schoellhamer, D.H., Burau, J.R., and Monismith, S.G., 2002, Tidal asymmetry and variability of bed shear stress and sediment bed flux at a site in San Francisco Bay, USA, in Winterwerp, J.C. and Kranenburg, C., ed., *Fine Sediment Dynamics in the Marine Environment*: Elsevier Science B.V., p. 93-108.

Ganju, N.K., Schoellhamer, D.H., Murrell, M.C., Gartner, J.W., and Wright, S.A., in press, Constancy of the relation between floc size and density in San Francisco Bay: *Proceedings of the 7th International Conference on Estuarine and Nearshore Cohesive Sediment Transport Processes*, Gloucester Point, Virginia, October 1-4, 2003.

Ruhl, C.A., and Schoellhamer, D.H., 2004, Spatial and Temporal Variability of Suspended-Sediment Concentrations in a Shallow Estuarine Environment: *San Francisco Estuary and Watershed Science*. v. 2, no. 2, article 1. <http://repositories.cdlib.org/jmie/sfews/vol2/iss2/art1>

Schoellhamer, D.H., 2001, Influence of salinity, bottom topography, and tides on locations of estuarine turbidity maxima in northern San Francisco Bay, in McAnally, W.H. and Mehta, A.J., ed., *Coastal and Estuarine Fine Sediment Transport Processes*: Elsevier Science B.V., p. 343-357. URL: <http://ca.water.usgs.gov/abstract/sfbay/elsevier0102.pdf>

Schoellhamer, D.H., and Wright, S.A., 2003, Continuous monitoring of suspended sediment discharge in rivers by use of optical backscatterance sensors, in Bogen, J., Fergus, T., and Walling, D.E., ed., *Erosion and Sediment Transport Measurement: Technological and Methodological Advances*: International Association for Hydrological Science Publication 283, p. 28-36. <http://www.cig.ensmp.fr/~iahs/redbooks/a283/28304.htm>

Warner, J.C., Schoellhamer, D.H., Ruhl, C.A., and Burau, J.R., 2004, Floodtide pulses after low tides in shallow subembayments adjacent to deep channels: *Estuarine, Coastal and Shelf Science*, v. 60, no. 2, p. 213-228.

Wright, S.A., and Schoellhamer, D.H., 2004, Trends in the Sediment Yield of the Sacramento River, California, 1957 – 2001: *San Francisco Estuary and Watershed Science*. v. 2, no. 2, article 2. <http://repositories.cdlib.org/jmie/sfews/vol2/iss2/art2>

Wright, S.A., and Schoellhamer, D.H., submitted, Suspended sediment transport where rivers become estuaries: Sacramento – San Joaquin River Delta, water years 1999-2002: *Water Resources Research*.

Education

University of Florida, Ph.D., Coastal and Oceanographic Engineering, 1993

University of California at Davis, M.S. Civil Engineering, 1983

University of California at Davis, B.S. Civil Engineering, 1982

A complete curriculum vitae is available at <http://cee.engr.ucdavis.edu/faculty/schoellhamer/> .

Curriculum vitae
ANDREA ROBIN STEWART

U.S. Geological Survey
Water Resources Division
345 Middlefield Rd. MS 465
Menlo Park, CA 94025
650-329-4550
arstewar@usgs.gov

EDUCATION

Ph.D. February 1998. Dept. of Botany University of Manitoba, Winnipeg, Manitoba.
B.Sc. May 1991. Dept. of Biology, University of Victoria, Victoria, British Columbia.

HIGHLIGHTS

- Eight International Conference on Mercury as a Global Pollutant 2006 – Planning committee
- Co-recipient of a 2.6 Million dollar grant from CALFED (September 2001-2004)
- Co-recipient of a 2.3 Million dollar grant from CALFED (May 2003-2006)
- National Institutes of Water Resources (NIWR) – U.S. Geological Survey (USGS) research competition review panel 2003
- Invited lecture at the USGS, Biological Research Division, National Contaminants Review, Washington 2002
- Invited lecture at Stanford's Civil and Environmental Engineering Department 2002
- Invited lecture at the State of the Estuary Conference, San Francisco 2001
- Plenary lecture at the Canadian Zoological Society Conference, Sudbury, Ontario 2000

RESEARCH & PROFESSIONAL EXPERIENCE

Research Hydrologist, USGS, Menlo Park, CA (April 1999 – Present)

Research area: *Contaminants in the food web of San Francisco Bay and Delta*

- Evaluate feeding relationships in the food webs of San Francisco Bay and the San Joaquin Delta using stable carbon, nitrogen and sulfur isotopes. Investigate mechanisms and compare different pathways of trophic transfer of Se.
- Identify relationships between spatial and temporal flow patterns, sills and suspended sediments, clam energetics (e.g., growth and reproduction) and Se contamination in clams.
- Co-PI coordinating a team of geochemists, toxicologists, hydrodynamic engineers and modelers, and ecologists in a study to understand carbon and selenium transport and transformation (CASTT) in the Sacramento/San Joaquin Delta.
- Evaluate the pathways of mercury bioaccumulation using stable isotopes in the food web of the Camp Far West Reservoir, Bear River Watershed, CA.
- USGS National Water Quality Assessment Program (NAWQA) Topical Work Team for Hg. Advisor on a 3 yr study to assess the roles of food web structure, methylation efficiency and mercury source in determining national trends in mercury concentrations in top predator fish.

Postdoctoral Research Associate, Freshwater Institute, Dept. of Fisheries & Oceans, Arctic and Marine Contaminants, Winnipeg, Manitoba, Canada (February 1998 – March 1999)

Research area: *Transport, Fate and Bioaccumulation of Persistent Organic Pollutants and Metals*

A. Robin Stewart

- Assessed the impacts of the 1997 Red River flood on the transport and fate of persistent organochlorine pesticides, hydrocarbons and metals (Cd, Se and Hg) and their accumulation in the food chain of Lake Winnipeg.
- Identified a new source of toxaphene released into the Red River during the flood and traced its transport and accumulation in the sediments and biota of Lake Winnipeg using high resolution gas chromatography/electron capture negative ion/high resolution mass spectrometry (HRGC/ECNI/HRMS) – one of 3 laboratories in North America with this technology.
- Related statistical increases in chlorinated benzenes (CBZs), PCBs and DDT in predator fish to changes in the partitioning of contaminants at the base of the food web.
- Supervised an analytical staff 9 employees.

Ph.D. Research Associate, Freshwater Institute, Dept. of Fisheries & Oceans, Ecotoxicology, Winnipeg, Manitoba, Canada (September 1991 – January 1998). Dr. Diane Malley (Supervisor)

Research area: ***Bioavailability/Bioaccumulation of Metals and Metal Mixtures***

- Determined the effect of a mixture of metals (Cu, Zn, Pb and Ni) on Cd fate, bioavailability and accumulation in a freshwater mussel (*Pyganadon grandis*) and a rooted macrophyte (*Eriocaulon septangulare*) using *in situ* mesocosm experiments at the Experimental Lakes Area, northwestern Ontario.
- Sampled and analyzed water, sediment, porewaters and biota. Analyses included water chemistry, metal analysis by graphite furnace atomic absorption spectrophotometry and flame atomic absorption spectrophotometry (including geochemical fractionation procedures) and biochemical analysis (e.g. metallothionein).

Scientific Consultant, Natural Resources Canada, Canadian Center for Mineral and Energy Technology, Aquatic Effects Evaluation Program, Ottawa, Canada (Fall 1996 – Spring 1997)
Research area: ***Environmental Effects Monitoring Using Biological Indicators***

Research Assistant, Freshwater Institute, Department of Fisheries and Oceans, Ecotoxicology, Winnipeg, Manitoba, Canada (Summers 1990, 1991, 1989 & 1988)
Research area: ***Whole-Lake Experimentation, Metal Toxicity & Biochemical Indicators in Freshwater Mussels***

Research Assistant, British Columbia Ministry of Environment, Water Research Branch, Victoria, British Columbia, Canada (Fall 1989)
Research area: ***Water Quality Assessment and Management***

Research Assistant, Department of Health and Welfare, Health Protection Branch, Ottawa, Ont. Canada (Spring 1989)
Research area: ***Environmental Health Assessment***

RESEARCH GRANTS

\$2,262,567 CALFED. 2003-2006. *Evaluation of Mercury transformations and trophic transfer in the San Francisco Bay/Delta: Identifying critical processes for the ecosystem restoration program (ERP)*. Co-applicant with M. Marvin Di-Pasquale (USGS, CA), R. Mason (University of Maryland, MD), and N. Fisher (SUNY, NY).

\$2,600,000 CALFED. 2001-2004. *Transport, transformation and effects of Se and C in the Delta: Implications for ERP*. Co-applicant with J. Cloern, L. Lucas, and J. Burau (USGS,

A. Robin Stewart

CA), S. Monismith (Stanford University, CA), M. Stacey (UC Berkeley, CA), G.A. Cutter and M. Doblin (Old Dominion University, VA), N. Fisher and S. Baines (SUNY, NY). \$90,462 SWRCB. 2001-2004. *Mercury methylation and bioaccumulation in reservoirs, sediments, and the food web of the Bear River watershed, California*.
\$75,000. International Joint Commission Red River Task Force. 1998 – 99. *Contaminant issues of the 1997 Red River Flood*. Co-applicant with Gary Stern and Lyle Lockhart, Freshwater Institute, Winnipeg, Manitoba, Canada.

AWARDS AND DISTINCTIONS

NSERC Visiting Postdoctoral Fellowship in Government Laboratory. 1998-1999
Society of Environmental Toxicology and Chemistry (SETAC) Best Poster Presentation. 1996
University of Manitoba Graduate Fellowship. 1991-1995
Manitoba Society of Soil Science Conference - Best Student Poster. 1995
Australian Cooperative Research Center for Freshwater Ecology. National Postgraduate Scholarship 1993.

PUBLICATIONS

- Stewart, A.R., Luoma, S.N., Schlekat, C.E., Doblin, M.A. and Hieb, K.A. 2004. Food web pathway determines how selenium affects aquatic ecosystems: A San Francisco Bay case study. *Environ. Sci. Technol.* 38:4519-4526.
- Stewart, A.R., Stern, G.A., Lockhart, W.L., Kidd, K.A., Salki, A., Stainton, M., Koczanski, K., Rosenberg, D.M., Savoie, D.A., Billeck, B.N., Wilkinson, P., and Muir, D.C.G. 2003. Assessing trends in organochlorine concentrations in Lake Winnipeg fish following the 1997 Red River flood. *J. Great Lakes Res.* 29: 332-354.
- Baines, S.B., N.S. Fisher, and A.R. Stewart. 2002. Assimilation of Se and trace metals from food in juvenile striped bass. *Limnol. Oceanogr.* 47: 646-655.
- Stewart, A.R. and others. 2001. Applications of stable isotopes research in understanding complex ecological processes in the San Francisco Estuary. *Interagency Ecological Program for the San Francisco Estuary. IEP Newsletter* 14(4): 27-32.
- Stewart, A.R. 1999. Accumulation of cadmium by a freshwater mussel (*Pyganodon grandis*) is reduced in the presence of other metals. *Can. J. Fish. Aquat. Sci.* 56: 467-478.
- Stewart, A.R. and Malley, D.F. 1999. The effect of a metal mixture (Cu, Zn, Pb and Ni) on cadmium bioavailability and accumulation by the freshwater macrophyte *Eriocaulon septangulare*. *Environ. Toxicol. Chem.* 18:436-447.
- Malley, D.F., A.R. Stewart and B.D. Hall. 1996. Uptake of methyl mercury by the floater mussel, *Pyganodon grandis* (Bivalvia, Unionidae), caged in a flooded wetland. *Environ. Tox. Chem.* 15: 928-936.

MANUSCRIPTS IN REVIEW

Croteau, M-N., Luoma, S.N. and Stewart, A.R. Trophic transfer of metals along freshwater food webs: Evidence of cadmium biomagnification in nature. Submitted to L&O October 18, 2004

CURRICULUM VITA

Janet Kay Thompson

U.S. Geological Survey
Water Resources Division
345 Middlefield Road MS 496
Menlo Park, California 94025
(650)329-4364
jthomps@usgs.gov

Education

- Stanford University, Stanford, California, Ph.D. Civil and Environmental Engineering
- California State University, San Francisco, California, M.A. Marine Biology
- Lewis and Clark College, Portland, Oregon, B.S. Biology

Experience

- 1982-present: Research Scientist, U.S. Geological Survey Menlo Park, California:
- 1972: Teaching Assistant, Oregon Institute of Marine Biology, University of Oregon; Lewis and Clark College
- 1971: Teaching Assistant, Lewis and Clark College

Research Interest:

Ecology and physical dynamics of aquatic systems based on long term (30 year) investigations of the San Francisco Bay and freshwater Delta that has included studies of the following: the coupling between, and interdependence of benthic and pelagic communities; biogeochemical processes related to benthic organism accumulation of natural and anthropogenic elements; the physical dynamics of organic and inorganic particle transfer to the bed; the study of benthic community dynamics in response to natural and anthropogenic stress; and the response of aquatic ecosystems to non-indigenous species.

Highlights:

U.S. Department of the Interior, Superior Service Award, 2003

Science Advisory Committees: California Bay/Delta Food Chain Committee-1999-

present: California Sea Grant Committee on Exotic Species 1996-present;

Interagency Ecological Program Review of Long-term Fish Monitoring Program;

CALFED Exotic Species Program 2000-present

Editorial Board: Aquatic Nuisance Species Digest (1999-present)

Postdoctorates: Dr. Laurent Chauvaud, Dr. Rene Takesue

Relevant Publications:

Carlton, J.T., Thompson, J.K., Schemel, L.E., Nichols, F.H., 1990. Remarkable invasion of San Francisco Bay (California, USA) by the Asian clam *Potamocorbula*

- amurensis*. I. Introduction and dispersal, *Marine Ecology Progress Series*, 66, pp. 81-94.
- Nichols, F.H., Thompson, J.K., Schemel, L.E., 1990. Remarkable invasion of San Francisco Bay (California, USA) by the Asian clam *Potamocorbula amurensis*. II. Displacement of a former community, *Marine Ecology Progress Series*, 66, pp. 95-101
- Monismith, Stephen G., Koseff, J. R., Thompson Janet K., O'Riordan, Catherine A., and Nepf, Heidi M. 1990. A study of Model Bivalve Siphon Currents: *Limnology & Oceanography* v. 35, no. 3, p. 680-696
- Cole, B.E., J.K. Thompson, and J.E. Cloern. 1992. Measurement of filtration rates by infaunal bivalves in a recirculating flume. *Marine Biology*, 113: 219-225.
- Lucas, L.V., J.E. Cloern, J.R. Koseff, S.G. Monismith, and J.K. Thompson. 1998. Does the Sverdrup critical depth model explain bloom dynamics in estuaries? *Journal of Marine Research*, 56:375-415
- Lucas, L.V., J.E. Cloern, J.R. Koseff, S.G. Monismith, and J.K. Thompson. 1999. Processes governing phytoplankton blooms in estuaries. Part I: The local production-loss balance. *Marine Ecology Progress Series* v. 187, pp. 1-15
- Lucas, L.V., J.E. Cloern, J.R. Koseff, S.G. Monismith, and J.K. Thompson. 1999. Processes governing phytoplankton blooms in estuaries. Part II: The role of horizontal transport. *Marine Ecology Progress Series* v. 187, pp. 17-30
- Thompson, J. K., 1999. The effect of infaunal bivalve grazing on phytoplankton bloom development in South San Francisco Bay, PhD Thesis, Stanford University, Dept. of Civil and Environmental Engineering, Stanford, CA: 419p.
- Lucas, L.V., J. E. Cloern, J.K. Thompson, and N.E. Monsen. 2002. Functional variability of shallow tidal habitats in the Sacramento-San Joaquin Delta: restoration implications. *Ecological Applications* 12(5): 1528-1547.
- Crimaldi, J.P. J.K. Thompson, J.H. Rosman, R. J. Lowe, J. R. Koseff. 2002. Hydrodynamics of larval settlement: The influence of turbulent stress events at potential recruitment sites. *Limnology and Oceanography*. 47(4):1137-1151
- Parchaso, F. and J.K. Thompson, 2002, The influence of hydrologic processes on reproduction of the introduced bivalve *Potamocorbula amurensis* in Northern San Francisco Bay, California, *Pacific Science*, 56(3):329-345
- Brown, C.L., F. Parchaso, J.K. Thompson, S.N. Luoma. 2003. Assessing toxicant effects in a complex estuary: A case study of effects of silver on reproduction in the bivalve, *Potamocorbula amurensis*, in San Francisco Bay. *Human and Ecological Risk Assessment*. 9(1):95-119
- Chauvaud, L., J. K. Thompson, J. E. Cloern, and G. Thouzeau. 2003. Clams as CO₂ generators: The *Potamocorbula amurensis* example in San Francisco Bay. *Limnology and Oceanography* 48(6):2086-2092
- Thompson, JK. 2004. One estuary, one invasion, two responses: phytoplankton and benthic community dynamics determine the effect of an estuarine invasive suspension feeder. *In press*, The comparative Roles of Suspension Feeders in Ecosystems, S. Olenin and R. Dame Editors.