

Andrew Collison, Ph.D.

Associate Principal

Dr. Collison is the senior geomorphologist at Philip Williams & Associates. He is a geomorphologist and hydrologist with thirteen years post-PhD experience in river and hillslope systems, especially the analysis of unstable river channels and the development of restoration and management plans. He is an expert in watershed, floodplain and river geomorphic assessments with experience in urban and rural environments in California and Southeastern USA. Dr. Collison has experience in the analysis and solution of problems for streams impaired by sediment, and was a member of the North Coast Regional Water Quality Board Independent Scientific Review Panel in its investigation of sediment issues in Humboldt. He led development of the curriculum and training for the State Water Resources Control Board on channel erosion and bank stabilization, as well as contributing the geomorphic component to the SWRCB's 401 training curriculum and training. He is also a member of Independent Technical Review Panel advising the US Army Corps of Engineers for flood projects on the Pájaro River. In addition to his work in fluvial geomorphology, he has extensive experience in hydrologic and geotechnical investigations and modeling including forest hydrology, slope stability, landslide stabilization and hydraulic modeling. Prior to PWA, Dr. Collison worked on channel erosion and sedimentation problems at the USDA Agricultural Research Service's National Sedimentation Laboratory, and was a geomorphology professor at the University of London, England.

Education	Ph.D. 1993	Department of Geography, University of Bristol, Bristol, UK. Hydrologic and mechanical effects of vegetation on hillslope stability and mass movements
	B.S. 1989	Department of Geography, University College London, London, UK
Career	1993 - 2000	Lecturer in Geomorphology, Department of Geography, King's College London, Strand, London WC2R 2LS, UK
	2000 - 2002	Visiting Senior Scientist, USDA Agricultural Research Service – National Sedimentation Laboratory, Oxford, MS
	2002 - 2005	Senior Associate, Philip Williams & Associates Ltd. Consultants in Hydrology.
	2005 - present	Associate Principal, Philip Williams & Associates Ltd. Consultants in Hydrology.

Selected Project Experience

Contra Costa County HydroModification Program, 2004. For Contra Costa County. Geomorphology lead. Developed the procedures to be used in the County's HMP plan for assessing stream vulnerability to hydrograph modification. The procedures developed in this project will form the basis for future permit applications in the county.

Newhall Ranch Development, Valencia, CA, 2006-present. For Newhall Land and Farming Company. Conducted geomorphic assessment and led channel design for five tributaries of the Santa Clara River that will be subject to hydromodification. Work focused on predicting stable channel morphology in response to reductions in sediment delivery and increases in flow.

Preventing erosion from clean water discharges, East Bay Municipal Utilities District, Oakland, CA. 2006-present. EBMUD periodically releases water from storage facilities, raising the potential for clean water scour in receiving streams. PWA developed a methodology to assess the risk of a receiving water eroding.

Poggi Canyon, Chula Vista, CA. 2004-05. For City of Chula Vista. Geomorphic assessment and channel design to stabilize for the effects of degradation.

Carrol Canyon, San Diego, CA, 2005-present. For Vulcan Materials. Geomorphic assessment and channel design for Carrol Canyon, an urban stream that is being reconstructed in a former gravel quarry.

Selected Project Experience

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State and Regional Water Quality Control Board Staff 401 Permit, and Bank Stabilization Training, California, 2004. For UC Davis Extension Service. Task Manager and Geomorphology lead. Dr Collison helped to develop the curriculum, wrote a manual, and provided the hydrology and geomorphology component of two training packages for Board Staff. The courses, certified by UC Davis Extension Service, provides staff with training in channel and watershed geomorphology so that they can make well-grounded decisions with regard to 401 Permit applications and mitigation requirements.

Sediment Impairment and Effects on Beneficial Uses of the Elk River and Stitz, Bear, Jordan and Freshwater Creeks, 2002. For Concur, Inc. Scientific Review panel member. The North Coast Regional Water Quality Control Board (NCRWQCB) convened an Independent Scientific Review Panel to address questions relating to timber harvest and sedimentation in Humboldt. The panel looked at the relationship between timber harvest and sediment yield, methods of reducing flood damages, and ways of refining approaches to address these issues in future. Dr Collison was one of seven panel members selected to review data from PALCO, the North Coast Regional Water Quality Control Board and other stakeholders, and to develop recommendations. He participated in public meetings, co-authored two reports and presented results to the NCRWQCB.

Identifying the Source, Rate and Fate of Sediment in the Laguna de Santa Rosa, Sonoma Co., CA, 2002-04. For US Army Corps of Engineers. Project Manager and lead geomorphologist. The Laguna de Santa Rosa is an ecologically important wetland and also functions as a flood water store, reducing flood potential on the Russian River. Both roles are threatened by accelerated sedimentation rates. PWA carried out a watershed assessment of sources, production rate, and delivery processes for sediment in the Laguna watershed, to help inform and prioritize management of the area.

Sediment Transport and Sediment Management on the Pajaro and San Benito Rivers. For the Pajaro River Watershed Flood Prevention Authority. Project Manager and lead geomorphologist. The Pajaro River is the subject of a proposed flood plan that is threatened by potential difficulties obtaining permits for sediment removal. Dr. Collison led three studies into sediment transport in the Pajaro River and its principal tributary and sediment source, the San Benito River. The studies involved one and two dimensional sediment transport modeling to identify the source and rate of sediment delivery, the fate of sediment and the effects of redesigning the flood project to better manage sediment. The recommendations of the study have led to a redesign of the USACE flood project.

Lower Sacramento River Regional Project, 2003. For SAFCA. Lead geomorphologist. PWA conducted a geomorphic analysis and sediment transport modeling of potential project elements, including erosion and deposition effects on levees, in the Sacramento River, Sutter Bypass, the lower Feather River, the Yolo Bypass, and the Sacramento Deep Water Ship Channel. PWA provided a conceptual-level assessment of the usefulness of potential actions in the Yolo Bypass to achieving large-scale, system-wide ecologic benefits.

Watershed Stewardship Initiative, Santa Clara, CA, 2004-05. For SCVWD. Project manager and technical lead for geomorphology and hydrology component. PWA is the lead on the geomorphology and hydrology components of this project to classify and assess all 18 watersheds between the Guadalupe River and San Francisquito Creek, and to develop detailed stewardship plans for three watersheds. We used a combination of GIS and field survey methods to rapidly and economically evaluate the 18 watersheds, and developed a selection system to identify the three best candidates for more detailed analysis and stewardship. This culminated in a more detailed geomorphic investigation of two creeks, leading to recommendations for creek management and stewardship. The work has involved working closely with the client and a large stakeholder group to develop the most appropriate watershed and creek analysis tools to meet the District's policies.

Selected Journal Articles

Simon, A. and Collison, A.J.C 2002. Quantifying the mechanical and hydrologic effects of riparian vegetation on streambank stability. *Earth Surface Processes And Landforms.*, 27(5), 527-546

Simon, A, and Collison, A.J.C. (2001) Pore pressure effects on the detachment of cohesive streambeds: seepage forces and matric suction. *Earth Surface Processes and Landforms.* 26, 1421–1442

Collison, A.J.C. (2001): The cycle of gully head retreat: slope unloading and fissure flow as controls on gully head failure. *Hydrological Processes*, 15(1), 3-13.

Collison, A.J.C, Wade, S.D, Griffiths, J. & Dehn, M. (2000): Modelling the impact of predicted climate change on landslide frequency and magnitude in SE England. *Engineering Geology*, 55(3), 205-218.

Collison, A.J.C, and Anderson, M.G (1996): Using a combined slope hydrology and stability model to identify suitable conditions for landslide prevention by vegetation cover in the humid tropics. *Earth Surface Processes And Landforms*, 21, 737-747.

Collison, A.J.C, Anderson, M.G & Lloyd, D.M. (1995): The impact of vegetation on slope stability in a humid tropical environment - a modelling approach. *Proceedings of the Institute of Civil Engineers: Water, Maritime and Energy*, 112, 168-175.

Brooks, S.M, Anderson, M.G & Collison, A.J.C (1995): Modelling the role of climate, vegetation and pedogenesis in shallow translational hillslope failures. *Earth Surface Processes and Landforms*, 20, 231-242.

Chapters in books

Collison, A., Pollen, N. and Simon, A. 2005. The effects of riparian buffer strips on streambank stability: root reinforcement, soil strength and growth rates. In: Zobel, R.W. (Ed.) *Roots And Soil Management : Interactions Between Roots And the Soil*, Soil Science Society of America.

Pollen, N., Simon, A., Collison, A. 2004. Advances in Assessing the Mechanical and Hydrologic Effects of Riparian Vegetation on Streambank Stability. In: Bennett, S.J., Simon, A., Editors. *Riparian Vegetation and Fluvial Geomorphology*. American Geophysical Union, Washington, Dc. P. 125-140.

Collison, A. and Griffiths, J. 2004. Modelling Slope Instability. In: Wainwright, J. and Mulligan, M. (Eds.) *Environmental Modelling: finding simplicity in complexity*. Wiley: 197-210.

Collison, A.J.C. (1996): Unsaturated strength and preferential flow as controls on gully head development. In: Brooks, S.M. & Anderson, M.G. (Eds.): *Advances in Hillslope Processes*. Wiley: 753-770.

Brooks, S.M, and Collison, A.J.C. (1996): The significance of soil profile differentiation to hydrological response and slope instability: a modelling approach. In: Brooks, S.M. & Anderson, M.G. (Eds.): *Advances in Hillslope Processes*. Wiley: 471-486.