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**GMA GRAHAM MATTHEWS  
& ASSOCIATES**

Hydrology -- Geomorphology -- Stream Restoration

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**STATEMENT OF QUALIFICATIONS -- 2010**

**STREAM RESTORATION**



1998



2001

The Wood River Project was selected for the prestigious Grand Environmental Achievement Award by the International Erosion Control Association in 2002.

**SEDIMENT SOURCE ANALYSIS**



Indian Creek Landslide

**HYDROLOGIC AND GEOMORPHIC DATA COLLECTION**



# **GMA** GRAHAM MATTHEWS & ASSOCIATES

Hydrology -- Geomorphology -- Stream Restoration  
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## **STATEMENT OF QUALIFICATIONS**

Graham Matthews & Associates (GMA) is an experienced environmental consulting firm established in 1990, comprised of hydrologists, geomorphologists, and fish biologists. The company is led by Graham Matthews, who has over 28 years experience in hydrology, fluvial geomorphology, and stream restoration design and construction. GMA specializes in: (1) stream and watershed restoration design, implementation and monitoring; (2) hydrologic and hydraulic data collection and analysis; and (3) geomorphic data collection and analysis, and in particular data related to sediment transport. The firm has worked on hydrologic/geomorphic issues and stream and watershed restoration designs in California, Nevada, Oregon, and Idaho. Recent major restoration projects include the Wood River Channel and Wetland Restoration Project, Phases 1-3 for Oregon Trout, the Williamson River Restoration Project for The Nature Conservancy, the Clear Creek Channel Restoration Project, Phases 2, 3a and 3b for the Western Shasta Resource Conservation District, and the South Fork Mountain Road Decommissioning and Upgrade Project for the Trinity County Resource Conservation District. Our project approach involves the restoration of watershed and channel form and function in accordance with sound geomorphic principles. Our designs focus almost exclusively on “soft” approaches, using bio-technical engineering. Three of our recent projects have received significant awards: the Wood River Project received the Grand Environmental Achievement Award from the International Erosion Control Association in 2003, the Clear Creek Floodway Rehabilitation Project received a Governor’s Environmental and Economic Leadership Award (GEELA) in 2006, and the Angora Creek Stream Environment Zone Restoration Project was awarded 2007 Project of the Year by APWA in the \$2-10 million category.

GMA is noted for the development of technically sound management and restoration plans for rivers, estuaries and watersheds, and provides expertise and consulting services over a full range of hydrologic, and geomorphic services. Our staff of physical scientists has extensive experience in hydrologic and hydraulic data collection and analyses, computer modeling, flood hazard determination, sediment transport, and the design and construction of stream and watershed restoration projects. Sediment budget development and sediment transport monitoring and analysis are some of our specialties, particularly when the project objectives are related to the development, implementation, and monitoring of management and/or restoration plans where sediment issues are prominent: for instance (1) downstream of dams; (2) reaches impacted by gravel mining; (3) upland controllable sediment discharge source reduction; (4) fish passage barriers; and (5) other watershed locations affected by various management actions (e.g., roads, timber harvest and mining).

GMA is committed to both the development and implementation of projects that improve and restore the natural environment. In the current state of resource planning and regulation, we believe that environmental solutions must be optimized for a variety of competing goals and interests. GMA’s primary focus is on the quality and efficacy of work produced, with special attention paid to identifying and defining the specific, relevant issues of a project, and providing thorough, concise analysis. We are able to offer this high-quality work at a better value, since, as a small business, we can more readily adapt to the needs of a given project and direct our resources where they can best be utilized: investment in state-of-the-art equipment and personnel training. GMA couples this value with the highest data-quality standards and produces data and reports regularly reviewed and published by the US Geological Survey.

GMA recognizes the primary importance of field work and field data collection in understanding and modeling hydrologic systems. Accordingly, our staff has extensive field experience. To optimize our client’s investment in fieldwork we have assembled an extensive collection of state-of-the-art hydrologic

and geomorphic data collection equipment, as well the most modern robotic survey equipment. GMA has extensive AutoCAD experience, using Civil3D2010 for mapping and design projects. We fully integrate aerial photo mosaics into our design projects. We have in-house GIS capabilities for stream reach and watershed scale analysis and graphics. Given the extreme nature of some projects, GMA staffs experts in safety kayaking, whitewater navigation and swiftwater rescue. High-flow crews are completely outfitted with drysuits, wetsuits, helmets and rescue vests. We employ skilled welders, capable of fabricating custom equipment on short notice from steel or aluminum.

GMA has completed more than 260 projects since 1990 for a full range of clients, including federal, state, and local agencies, tribal organizations, citizen's groups, private industry, and other consultants. GMA has offices in Weaverville, Arcata, Placerville, CA, and in Klamath Falls, OR. In the last five years, projects have been located in the Trinity Watershed, Southern Oregon, Central Valley, Lake Tahoe Basin, and the Northern California Coast. Committed to remaining at the forefront of our field, we regularly present our findings at conferences including: CALFED Science Conferences, Federal Interagency Sedimentation Conferences, and various regional hydrologic, water quality and sedimentation conferences and workshops.

We are particularly proud of our long record of service with many of our clients: 12 years on Clear Creek, 14 years on the Trinity River, 15 years with The Nature Conservancy, including 12 years on the Williamson River Delta Restoration Project, 15 years with Oregon Trout, and 8 years with the Klamath Basin Rangeland Trust. The projects involve some of the larger stream restoration projects on the West Coast over the past decade.

The scope of many of our restoration projects is substantial; many phases of work on various projects have been in the \$1-3 million construction cost range. We also have designed and constructed in-house several moderate size restoration projects, as one staff member is a skilled excavator operator and we own specialized low-ground pressure equipment for working in challenging terrain. We are a licensed contractor in Oregon and anticipate expanding these services to California in the near future.

## **SERVICES OFFERED:**

### **Stream and Watershed Restoration Design:**

- Development of stream restoration projects emphasizing geomorphic considerations and bio-technical design elements and re-establishment of native riparian vegetation;
- Complete package of restoration assessment and design, from conception through construction and monitoring, including:
- Civil engineering services for these projects using AutoCAD Civil3D software;
- Detailed topographic mapping of project sites including bathymetric mapping and integration of LiDAR datasets and bathymetry;
- On occasion we have completed environmental documents for projects;
- Development of contract specifications for bid documents;
- Obtaining required permits: State, Federal and local; and
- Construction management, inspection, documentation, project monitoring, and as-built surveys.

### **Hydrologic/Hydraulic Data Collection and Analysis:**

- Installation and operation of monitoring stations for streamflow and other hydrologic and climatic parameters;
- Streamflow measurements and discharge rating curves;
- Streamflow computations using the WISKI Suite to USGS standards;
- Installation of continuous turbidimeters and datalogger/pump sampling stations following the TTS protocols developed by Redwood Sciences Lab;

- Collection of water quality data: temperature, pH, DO, ORP, etc with multi-parameter data collection platforms;
- Collection and analysis of nutrient data (TP, SRP, TN, etc.);
- Acoustic Doppler Current Profiler (ADCP) for discharge, velocity profiles, and
- GPS/Depth sounder on catarafts and jet boats for bathymetric surveys.

#### **Hydrologic/Hydraulic Analyses:**

- Computer modeling and analysis of open channel, riverine, wetland and estuarine systems using 1-d and 2-d models; and
- Computer modeling and analysis of hydrologic systems, including terrain analysis.

#### **Geomorphic Data Collection:**

- Sediment transport: suspended sediment and bedload (complete equipment available for wading/bridge/boat sampling), development of physically-based sediment budgets;
- Surface and sub-surface (bulk sample) grain size measurement and analysis;
- Assessment of thresholds of bed mobility and subsequent bed scour;
- Spawning gravel quality and analysis via bulk samples, permeability testing, and pebble counts;
- Cross section, planform and profile surveys, volumetric measurement;
- Detailed topographic and bathymetric surveys along rivers and floodplains and in reservoirs; and
- Residual pool volume surveys and analysis.

#### **Laboratory Analysis:**

- Suspended sediment laboratory analysis following ASTM D 3977 and USGS methods;
- Suspended sediment size analysis; and
- Mass and grain size analysis of bedload samples or bulk samples.

#### **Geomorphic Data Analyses:**

- Channel stability analyses using historical information, sediment source analyses;
- Aerial photograph mapping and interpretation;
- Effects of dam construction and operation on flow, sediment, and channel characteristics;
- Effects of in-stream gravel mining on channel stability and other geomorphic characteristics; and
- Effects of channelization and flood control measures on flow, sediment transport, and channel stability.

#### **Design and Fabrication of Custom Environmental Assessment Equipment**

- V-notch weirs
- Fish ladders
- Headgates
- Bedload sediment samplers

## RECENT AND REPRESENTATIVE **GMA** PROJECTS

<b>Project</b>	<b>Client</b>
<b><u>TMDL and Watershed Assessment Projects</u></b>	
Mad River Sediment Source Analysis, 2005-7	Tetra Tech, Inc.
Fourmile-Sevenmile Watershed Assessment, 2006-2008	Oregon Trout
Stony Creek Watershed Assessment, 2005-2007	Glenn County RCD (through Harvey Associates and Matt Kondolf)
Hunter Creek Geomorphic Assessment, 2005-2006	Green Diamond Resources, Inc.
Upper Trinity Sediment Source Analysis, 2004-2006	Trinity County RCD
Sprague River Geomorphic Assessment, 2003-2006	The Klamath Tribes
Lower Smith River Geomorphic Assessment, 2004-2005	MFG, Inc.
Trinity River Sediment Source Analysis, 2001	Tetra Tech, Inc.
Big River Sediment Source Analysis, 2001	Tetra Tech, Inc.
Albion River Sediment Source Analysis, 2001	Tetra Tech, Inc.
Ten Mile River Sediment Source Analysis, 2000	Tetra Tech, Inc.
Noyo River Sediment Source Analysis, 1999	Tetra Tech, Inc.
SF Trinity River Geomorphic Assessment, 1998	Tetra Tech, Inc.
<b><u>Hydrologic/Geomorphic Data Collection and Analysis</u></b>	
Trinity River Sediment Monitoring, 2004-09 (5-yr Contract)	US Bureau of Reclamation
Clear Creek Gravel Management Plan Update, 2007-2009	US Bureau of Reclamation
Green River Bathymetry and Velocity Data, 2007	Lang, Railsback, & Associates
Sandy River Bathymetric Mapping and Sediment Transport	US Forest Service/Johns Hopkins Univ.
Marmot Dam Removal Geomorphic Monitoring 2007-2010	Sandy River Basin Watershed Council
Big Creek Watershed Assessment, 2007-2008	The Watershed Center, Hayfork
Sheridan Site Discharge, Bathymetry, and Velocity Data	US Forest Service, Redwood Sciences Lab
Trinity River Flow/Sediment Monitoring, 2000-2003	Hoopa Valley Tribe
Clear Creek Gravel Management Plan, 2004-2006	Western Shasta RCD
Redwood National Park – Lost Man Creek Streamflow and Sediment Transport, 2002-2010	Psomas (started new 3-yr contract in 2007)
Angora Creek Streamflow, Sediment, and Nutrient Monitoring, 2002-2007	El Dorado County DOT
Clear Creek Restoration Project Streamflow and Geomorphic Monitoring, 2002-2010	Western Shasta RCD
Wood River Valley Streamflow, Sediment, Nutrient, and Geomorphic Monitoring, 2002-2008	Klamath Basin Rangeland Trust
Agency Creek Restoration Project Monitoring, 2003-2007	Fort Klamath Properties, LLC
Sprague River Sediment Budget, 2003-2006	The Klamath Tribes
Trinity River Substrate Monitoring, 2001	Trinity County Planning Dept.
Trinity River Pool Volume and Long Profile Surveys	Trinity County Planning Dept.
Trinity River Flow/Sediment Monitoring, 1996-1999	McBain & Trush
Hayfork Creek Monitoring, 1997-2003	Trinity County RCD
SF Noyo Streamflow/Sediment Monitoring, 2001-2002	California Department of Forestry
SF Ten Mile River Streamflow/Sediment, 2001-2007	Campbell Timberland Mgmt. LLC
SF Trinity River Hydrologic and Geomorphic Monitoring, 2000-2003	Trinity County RCD
Olema Creek (Pt Reyes) TTS Gage Installation	Psomas
Clackamas River Sediment Transport Monitoring	McBain & Trush
Lowden Fire Water Quality Monitoring, 2000-02	Trinity County RCD
Oregon Fire Water Quality Monitoring	Trinity County RCD

**Project****Client****Hydrologic/Geomorphic Data Collection and Analysis (continued)**

Martin Slough Streamflow Monitoring	RCAA
Walker River Sediment Transport Monitoring, 2008-2009	US Fish and Wildlife Service
EF Carson Hydrologic and Geomorphic Scoping, 2008-2009	The Nature Conservancy
NF Battle Creek Geomorphic Assessment, 2007-2010	US Fish and Wildlife Service
Williamson River Bathymetric Surveys, 2002-2005	The Nature Conservancy
Williamson River Sediment Transport, 1999-2003	The Nature Conservancy
Goose Bay Farms Topographic Surveys	The Nature Conservancy
Irongate Delta Volume Surveys	CH2M Hill
Klamath River Sediment Transport and Budget	G. Mathias Kondolf
Tuolumne River Sediment Transport Monitoring	McBain & Trush
Rush Creek (Mono Basin) Sediment Transport Monitoring	McBain & Trush
Elk River Cross Section Surveys	Bill Bertain

**Stream and Watershed Restoration Design and Construction**

Stony Creek Conservation Plans	Glenn County RCD
Crane Creek Restoration Project (Design-Build), 2006-2007	Klamath Basin Rangeland Trust
Clear Creek Channel Restoration Project, Phases 2a, 2b, 3a, 3b	Western Shasta RCD
Clear Creek Gravel Injections (4 sites)	Western Shasta RCD
Williamson River Restoration Project, 1996-2007	The Nature Conservancy
Wood River Channel and Wetland Restoration Project – Phases 1-3, 1996-2003	Oregon Trout
South Fork Mountain Road Decommissioning	Trinity County RCD
Hidden Valley Stream-Road Crossing Upgrade	Trinity County RCD
Agency Creek Dam Removal and Channel Restoration Project, 2000-2002 (Design-Build)	Fort Klamath Properties, LLC
Angora Creek SEZ Restoration Project, 2001-2007	El Dorado County DOT
Arroyo Seco Stabilization and Restoration Project	Sandia National Laboratories
Carmel River Restoration Projects (various)	Monterey Peninsula Water Mgmt Dist.
Goose Bay Farms Levee Breaching Project	The Nature Conservancy
Grotzman Creek Restoration Project	RCAA and City of Arcata
Crooked Creek Channel Restoration Project	Jim and Valerie Root
Thomason/Fourmile Restoration Project	Oregon Trout
Clear Creek Channel Restoration Project	McBain & Trush
Martin Gulch Restoration Reconnaissance	Redwood Community Action Agency
Widow White Creek Restoration Project	Redwood Community Action Agency
Salmon Creek Delta Restoration Evaluation	PCFWWRA
Bear Creek Meadow Restoration Project	California Trout, 1000 Springs Ranch
Tassajara Creek Improvement Project	BKF Engineers, Alameda County

**Fish Passage**

Crane Creek Restoration Project	Klamath Basin Rangeland Trust
Packers Creek Culvert Replacement Bridge Scour Design	USDA Forest Service
Goods Creek Culvert Replacement Grade Control Design	USDA Forest Service
Rocky Gulch Culvert Replacement Project	Redwood Community Action Agency
Arroyo Mocho Improvement Project Fishway Design	Ruggeri, Jensen, Azar & Associates

**Hydraulic Analysis**

Willits Wastewater Project Hydraulic Analysis	City of Willits
Arroyo Mocho Improvement Project Hydraulic Analysis	Ruggeri, Jensen, Azar & Associates

## **HYDROLOGIC AND GEOMORPHIC FIELD MEASUREMENT QUALIFICATIONS**

### **Installation of Streamflow Monitoring Stations:**

GMA has installed over 130 streamflow stations on California, Nevada, Utah and Oregon rivers and streams such as: the Carmel River and tributaries, the Garcia River, North Fork Stanislaus River, Trinity River and tributaries, Clear Creek and tributaries, Sprague River and tributaries, numerous streams in the Wood River Valley, Upper Truckee River and tributaries, Jameson Creek, SF Noyo, SF Ten Mile Creek, SF Wages Creek, North Fork Battle Creek, and the Walker River. GMA currently operates 6 stations in the Klamath basin of Oregon, 5 stations in the SF Ten Mile watershed, 5 stations in Redwood National Park, 2 Stations on the North Fork Battle Creek, 3 stations on Clear Creek, and 2 stations in the Trinity River basin. In addition, we have installed and operated manual stations (staff gages and crest stage gages) for at least another 125 locations. We have experience with Campbell Scientific, Design Analysis, Handar, Unidata, Van Essen, and Global dataloggers. Installations include 6 Design Analysis H350/355 bubbler systems including several with GOES telemetry.

### **Flow Monitoring:**

GMA collects hundreds of discharge measurements every year with its staff of hydrologists and field technicians. We have developed discharge rating curves for more than 100 stations based on actual flow measurements and measurement of peak flows by indirect methods over the past 28 years of hydrologic practice. All measurements are made using standard (i.e. USGS approved) field techniques and equipment. GMA utilizes an Acoustic Doppler Profiler for discharge measurements on deep and/or large rivers and streams. GMA has experience using stationary Doppler Profilers and index velocity methods to produce continuous velocity records in areas with variable backwater conditions. GMA is one of very few firms that compute all streamflow records using the WISKI Suite software by Kisters AG, a complete time series management hydrologic package. The WISKI Suite streamlines the process of publishing surface water records through the USGS due to the fact that it uses USGS techniques in the computational process.

### **Sediment Transport Monitoring:**

GMA has extensive experience with all aspects of sediment transport measurement, including the bedload and suspended load components. We maintain a complete collection of sediment transport monitoring equipment. We have designed, built, and operated five bank-operated cableways for both streamflow and sediment transport data collection. We have collected large numbers of both bedload and suspended load measurements on the following streams in California: (1) Trinity River and tributaries; (2) Mad River and tributaries; (3) Redwood Creek; (4) Clear Creek and tributaries; (5) Angora Creek; (6) Tuolumne River; (7) South Fork Noyo River and tributaries; (8) South Fork Ten Mile River and tributaries; and (9) South Fork Trinity River and tributaries. In Oregon on the: (1) Klamath River; (2) Williamson River; (3) Sprague River and tributaries; (4) Sandy River, and (5) various streams in the Wood River Valley. Current data collection programs include SF Ten Mile River and tributaries, Mainstem Trinity River and tributaries, Sandy River, Lost Man Creek and tributaries, Clear Creek and tributaries, and Walker River. GMA has developed equipment and protocols for the collection of high flow sediment transport data using cataraft-based sampling platforms, which have been used on the Klamath, Sandy, Smith, Trinity, and Tuolumne Rivers, as well as on Clear Creek, a tributary to the Sacramento River, the Walker River (East and West Forks), and on Rush Creek, a tributary to Mono Lake. We maintain a complete suspended sediment laboratory, which processes 3000-5000 samples each year. The lab follows all ASTM D 3977 and USGS procedures and has been reviewed and approved by the USGS. The lab participates in the USGS SLQA program. GMA also has a USGS-approved coarse sediment lab to process bulk and bedload samples. GMA is involved with the calibration of bedload samplers for the Federal Interagency Sedimentation Project, working with the USGS, Bureau of Reclamation, and Bureau of Land Management at the National Center for Earth Surface Dynamics/University of Minnesota's St. Anthony Falls Hydraulic Laboratory. GMA computes sediment records using the WISKI Suite hydrologic package and is one of the few consulting firms that furnishes sediment records to the USGS for publication

### **Turbidity and Multi-Parameter WQ Monitoring:**

GMA has installed nine YSI 6820 multi-parameter water quality monitoring stations and three Hydrolab Quanta multi-parameter water quality monitoring stations as well as a number of continuous turbidity probes, typically D&A Instruments OBS-3 sensors (5) or Forest Technology Systems DTS-12 (20). We have installed and operated a number of ISCO pump samplers, typically attached to Campbell Scientific dataloggers. GMA maintains 3 YSI 6820 sondes and at least 5 DTS-12 turbidimeters on the shelf and ready for immediate deployment or replacement of damaged units.

### **Substrate Monitoring:**

GMA maintains a complete set of field and lab equipment for substrate monitoring, including McNeil-type bulk sampling (12", 18", and 24" cylinders), permeability testing, and pebble counts. Our lab equipment includes a Gilson TS-1 sample separator, which allows large samples to be processed quickly. This sample separator can also be trailer mounted and brought to the field site for greatest efficiency. We generally adhere to the "1% rule" for bulk samples, which requires very large sample volumes (frequently 200-700kg), but also provides unbiased datasets. We have conducted substrate investigations on the Trinity River and tributaries, Williamson River, Cottonwood Creek, SF Trinity River, Clear Creek, Smith River and in the Big-Albion watersheds. Our lab processes samples for a number of other consulting firms and watershed groups.

### **Equipment Available:**

Graham Matthews & Associates maintains a complete set of survey, streamflow, and sediment sampling equipment.

### **High Streamflow Measurement Equipment**

Eight bridge cranes, five of which may be used on floating platforms, cataraft-based platforms or can be trailer-mounted

Six E-reels for heavy sediment samplers and high flow measurements from bank-operated cableways

Two B-Reel for suspended sediment or discharge measurements

Four variable speed Power Drives for Iso-kinetic suspended sediment sampling, one regular Power Drive

Eight A-reels for bridgeboard uses and two handlines.

Six Catarafts (13', 16', 19', 20', and 2-24') for on-river high flow sampling of flow and sediment

Wing 12' Cataraft w/20" tubes for single-person ADCP deployment

14' and 15' SOTAR whitewater rafts with custom oar frames

Lowe 16' welded Jon Boat w/25HP 4-stroke Honda Motor for ADCP Discharge and Bathymetric Surveys

Crestliner 18' Aluminum Boat w/50HP jet drive Honda for ADCP Discharge and Bathymetric Surveys

Portable Honda 3500 watt generator and floodlights for night sampling

21 Price AA flow meters (17 magnetic head, 4 regular head). 10 Pygmy meters (all mag head).

12 Aquacalc 5000 dataloggers (professional model).

15 top-set wading rods (15-4', 2-6', 1-10').

15(x2), 30(x7), 50 (x5) and 100 (x5) lb sounding weights for bridge or cataraft flow measurements.

10 Helley-Smith 3" bedload samplers – wading, five US-BLH84 3" bedload samplers – wading .

Three Helley-Smith 6" (Model 167) cable deployed bedload samplers -.

Five TR-2 6"x12" cable-deployed bedload samplers

Four aluminum TR-2 6"x12" hand-deployed bedload samplers

Two aluminum Elwha 4"x8" hand-deployed bedload samplers

20 DH-48 - wading suspended sediment samplers.

10 D-76 – rope-deployed suspended sediment samplers

Six D-74 – Cable-deployed suspended sediment samplers, one D-77 Suspended Sampler with 3/ bottles.

240 cases (of 24) of pint suspended sediment sample bottles, 300 cases (of 12) of quart sample bottles.

Two Van Dorn horizontal water quality sampling devices, 14/ churn splitter

### **Survey Equipment**

Automatic Level (x5) (25-32x) for field surveys of cross sections, profiles, level-loops, etc.  
Leica TPS-1200 Robotic Total Station with various prisms and rods, tripod, and Leica data collector.  
Topcon APL-1A Robotic Total Station with five prisms, tripods, rods, etc. with two Husky MP2500 data collectors.  
Topcon GTS-802AR Robotic Total Station w/data collector  
Trimble R8-3, Survey-grade RTK GPS Equipment (1 Base Station and two rovers)  
Trimble 4700, 4800 Survey-grade RTK GPS equipment (1 Base Station and two rovers)  
Ohmex SonarMite v3 echo sounder  
Reson Navisound 110 echo sounder  
Juniper Systems Allegro Field PCs for data collection

### **Substrate Sampling Equipment**

Two 24"x24", two -- 18"x18", and one 12"x12" McNeil-type sampler for substrate bulk sampling  
Two Permeability Pumps and standpipes, five gravelometers for pebble counts  
Gilson rocker sieves (three sets) for field sieving of bulk substrate samples.  
Gilson 8" sieves (two sets of 22 sieves, ½ Phi sizes) to 0.01 mm for grain size analysis, Gilson shaker, and electronic balance (x2), drying oven (x3).  
Gilson TS-1 Lab Sample Separator, 12- ½ Phi trays (Rate: 1 cubic foot/5 minutes)  
AMS Split Core Auger, with hammer, AMS Augers in 2 ¾", 5" diameters (2 sets)

### **Turbidity and Suspended Sediment Equipment**

Lamotte 2020 Field Turbimeter (x8), Hach 2100P Field Turbidimeter (x2), Hach 2100 AN Lab Turbidimeter.  
YSI 6820 Multi-Parameter Sondes (x4), Hydrolab Quanta Multi-Parameter Water Quality Instrument (x4)  
Complete Suspended Sediment Concentration and Size Analysis Lab  
50 Global WL-14 and WL-15 dataloggers, 3 Van Essen Instruments "Diver" dataloggers  
3 Onset Hobo stage recorders, 30 HoboTemp Water Temperature loggers  
5 Campbell Scientific CR850 dataloggers  
15 Campbell Scientific CR10x dataloggers with Design Analysis H-310 PT sensors or Druck 1830 sensors  
10 Campbell Scientific CR510x dataloggers with Design Analysis H-310 PT sensors  
14 Campbell Scientific CR200 dataloggers with various PT sensors  
2 ISCO 6712 Pump Samplers  
4 Unidata Ultrasonic Doppler Starflow datalogger, 5 Unidata DWP 10m dataloggers, 1 Analite Turbidity Probe  
22 DTS-12 turbidity probes, 1 OBS-3 turbidity probe  
5 Nortek EasyQ Doppler Profilers  
Sontek 3.0 Mhz ADCP for discharge measurements, velocity profiles.

### **Various**

Complete metal and woodshops, including MillerMatic 210 MIG welder (steel) and spool gun (aluminum)  
Chainsaws, 9,000 lb winches, swiftwater rescue equipment, line thrower, Pionjar rock drill  
Two Panasonic CF-29 Toughbooks for reliable foul-weather field-data transmission, 15 foot SOTAR premium whitewater raft and 7 catarafts (12 to 24 feet).