***Dr. Nicolaas Bouwes***

Dr. Bouwes has a strong foundation in biometric and data analyses, modeling, experimental and monitoring design, fisheries research and aquatic ecology and has detailed knowledge of the salmon, steelhead, and bull trout issues in the Columbia River Basin. Nick is the owner of Eco Logical Research, Inc. Nick is also an adjunct professor at the Watershed Sciences Department, Utah State University, Logan UT. Projects he is currently working on include: Asotin Creek Intensively Monitored Watershed Project in southeast Washington and the Integrated Status and Effectiveness Monitoring Program to developed standardized status, trend, and effectiveness monitoring programs for salmon and steelhead in the Columbia River Basin. Other relevant projects he has worked on includes Collaborative Systemwide Monitoring and Evaluation Program to review information needs and development of monitoring and analyses for salmon and steelhead populations of the Columbia River Basin; technical review and validation of EDT and the KlamRAS models used in the FERC relicensing process of the Klamath River hydrosystem, and the Comparative Survival Study to compare steelhead and salmon smolt and adult survival rates across different regions and hydrosystem experiences. Nick was previously employed first as a fish population analyst and then as a biometrician/modeler for ODFW on regional issues related to the salmon and steelhead management in the Columbia River Basin. His project involvement included PATH, which was a multi-agency evaluation of the impacts of alternative management actions on survival and recovery of listed salmon and steelhead stocks in the Columbia River Basin. He also worked on the NMFS Technical Recovery Team to determine recovery goals and assessing risk to endangered salmonids of Lower Columbia/Willamette. Nick and employees from ELR recently completed a draft stream habitat monitoring protocol review and methods development for NOAA and Bonneville Power that will be used as the foundation of stream habitat monitoring in the throughout the Columbia River basin as part of the BiOP salmon and steelhead recovery process (Bouwes et al. 2011). Nick received a BS in zoology from the University of WI, Madison, and a MS and PhD in aquatic ecology from Utah State University, Logan UT.

***Dr. Stephen N. Bennett***

Dr. Bennett has been working for Eco Logical Research, Inc. since 2007 as the project coordinator of the Asotin Creek Intensively Monitored Watershed Project in southeast Washington. Stephen has also worked to aid in the development and assessment of regional salmonid monitoring programs and has been working as a Post Doctoral researcher with Dr. Brett Roper of the USDA Forest Service, Fish and Aquatic Ecology Unit. Stephen's Post Doctoral research has focused on writing a National Forest Fish Inventory and Monitoring Manual for the Forest Service involving a comprehensive review of the statistical design and analyses of fish abundance data. Stephen also co-authored a paper with Dr. Roper comparing the effectiveness of common stream habitat monitoring protocols (e.g. AREMP, PIBO, EMAP, ODFW, etc.) using a variety of measures of precision and estimating minimum sample size requirements to detect change (Roper et al. 2010). Stephen recently completed a PhD in Fisheries Biology in 2007 at the Watershed Sciences Department at Utah State University, Logan, Utah. Stephen's dissertation focused on invasion ecology and issues related to hybridization between native cutthroat trout and introduced rainbow trout. Prior to starting his PhD Stephen was a biological consultant for 12 years working on a variety of fisheries issues including fish inventory, fish passage assessment, watershed

analysis, habitat monitoring, impact assessments, and salmonid enhancement projects. Stephen also has a Masters in Resource and Environmental Management (M.R.M.) from Simon Fraser University, Canada, and a Wildlife Biology (B.Sc. Honors), University of Montana.

**Dr. Joseph Wheaton**

Dr. Wheaton is an Assistant Professor at Utah State University and a fluvial geomorphologist with over a decade of experience in river restoration, including working with beaver in restoration. Joe runs the Ecogeomorphology & Topographic Analysis Lab at Utah State University and is a leader in the monitoring and modeling of riverine habitats and watersheds. He has worked to develop monitoring protocols for the USFS, NOAA, USGS and National Park Service and he and his lab have produced software for monitoring applications and simulation modeling. He is the co-director of the Intermountain Center for River Rehabilitation & Restoration. He worked four years in consulting engineering before completing his B.S. in Hydrology (2003, UC Davis), M.S. and Ph.D. in Hydrologic Sciences (2003, UC Davis; 2008, U. of Southampton, UK). He has worked as a lecturer (U. of Wales 2006-08), Research Assistant Professor (Idaho State U. 2008-09) and is an Assistant Professor at Utah State U. (2009-present) where he teaches courses on GIS, Fluvial Hydraulics and Ecohydraulics as well as workshops on 'Restoration Monitoring: Geomorphic Change Detection', 'Partnering with Beaver in Restoration Design', and 'Geomorphology and Sediment Transport in Channel Design'. Projects he is currently working on include: Asotin Creek Intensively Monitored Watershed Project in southeast Washington, Intercomparing Monitoring Methods in the Lemhi Watershed of Idaho for the Integrated Status and Effectiveness Monitoring Program, Bridge Creek Intensively Monitored Watershed restoration project in Central Oregon, developing a Big River Monitoring Protocol for the National Park Service, working on sediment budgeting in the Grand Canyon with the USGS Grand Canyon Monitoring & Research Center.

**Dr. Mary Conner**

Dr. Conner is a population ecologist with an emphasis in biostatistics and the analysis of large and often messy data sets. Mary has extensive experience in inference methods for mark-reencounter (i.e., mark-recapture, mark-resight) data, and a strong background in the use of stochastic population projection modeling, meta-analyses of demographic data, simulation experiments to design or assess population monitoring programs, and application of information theoretic methods to management experiments with a focus on multi-model inference. In addition, Mary's Post Doctoral research included analysis of spatial and temporal epidemiology of chronic wasting disease. Mary has worked for academic and government agencies on a variety of projects; recent projects include developing a stochastic population model to assess the relative contribution of competition and disease to low population growth rates in a native cutthroat trout population, designing a meta-analyses to assess forest management strategies on California spotted owl demographics, developing a stochastic population model to assess impacts of disease and management interventions on endangered Sierra Nevada bighorn sheep, conducting a simulation experiment to compare precision and bias of Cormac-Jolly-Seber and Barker mark-resight models when data is collected by passive instream antennae, and conducting a simulation experiment to compare estimates of population growth rate from Pradel and occupancy models for a territorial species. The overarching goal of her work is to enable managers to evaluate effects of management actions or inaction in the face of temporal and/or spatial environmental variation. Mary is an adjunct professor in the Watershed Sciences and Wildland Resource Sciences Departments at Utah State

University. She received her BS in Agricultural Engineering from California Polytechnic State University, a MS in Wildland Resource Science from University of California, Berkeley, and a PhD in Wildlife Biology from Colorado State University.

**Nadine Trahan**

Nadine Trahan recently joined Eco Logical Research as GIS / Remote Sensing Analyst. She is implementing a process driven approach to the geomorphic classification of Columbia River Basin streams upon which to base geo-spatial data organization, analysis and results to support ELR's monitoring and assessment of salmonid habitat. Nadine has over 10 years experience in applying GIS and remote sensing technologies to interdisciplinary river research. Her research has focused on placing water quality assessment, macro-invertebrate indices and salmonid distributions into biophysical contexts via implementation of a geomorphic classification system, i.e., the River Styles Framework developed by Dr. Gary Brierley, (www.riverstyles.com). She has significant experience in GIS based watershed modeling associated with water quality, sediment and biological monitoring to support TMDL and BMP implementation. She has also spent several years researching remote sensing applications in extracting various parameters describing river systems, including the distribution of submerged aquatic vegetation (hyper-spectral imagery) in the St. Johns River, FL, topographic classification (Lidar) and wetland loss (multi-temporal Landsat) in the Mississippi River Delta, LA. Nadine received a Master's of Science degree in Environmental Science from the University of Auckland, New Zealand, where she spent two years working as research assistant in fluvial geomorphology to Dr. Gary Brierley. She co-authored a paper with Dr. Brierley focused on using geomorphic principles to frame eco-hydrological assessments of river condition (Brierley et al. 2010). Nadine also has a BA in Geography from Massey University, New Zealand.

## *B. Experience of the Consultant*

### 1. Within Asotin Creek Watershed and Monitoring Protocols

Eco Logical Research, Inc. (ELR) is uniquely qualified to implement the Asotin IMW design as outlined in the RFP for several reasons. First and foremost, ELR helped coordinate the selection of Asotin Creek as a location for an IMW in southeast Washington and then developed the experimental and monitoring design (Bennett and Bouwes 2009) and implemented four years of pre-treatment monitoring which included the design and installation of PIT tag antenna arrays in key locations within the study area (Bennett et al. 2010). Second, Eco Logical Research, Inc. also has experience and training in stock assessment, biometric and data analyses, modeling, experimental and monitoring design and implementation, fisheries research and aquatic ecology and has detailed knowledge of the salmon, steelhead, and bull trout issues in the Columbia River and Klamath River basins. In addition, ELR has particular specialized experience with the on-going development of the Northwest Fisheries Science Center's (NWFSC) Integrated Status and Effectiveness Monitoring Program (ISEMP) in the Wenatchee, Salmon, and John Day River basins. ELR is heavily involved in ISEMP and in the development of the IMWs portion of that program. Currently, ELR is involved in designing experimental and sampling programs for the John Day Basin, the Bridge Creek IMW (in the John Day), the Middle Fork John Day IMW, the Entiat IMW and the Lemhi IMW. Eco Logical Research, Inc. has also functioned as the ISEMP

John Day Pilot Project coordinator. As coordinator ELR summarized and synthesized current research and monitoring, collaborated with researchers and managers, and participated in the building and deployment of instream PIT tagged detectors, snorkel, seining, shocking, redd surveys, and habitat surveys.

## 2. Other Relevant Experience

Other related projects of ELR has participated in include: the Collaborative Systemwide Monitoring and Evaluation Project (CSMEP), administered through the Columbia Basin Fish and Wildlife Authority, that is working collaboratively with state, federal, and tribal fisheries agencies to review and develop status and effectiveness monitoring programs (including the development of an effectiveness monitoring program for the Lemhi IMW) addressing NOAA and USFWS Biological Opinions and Recovery Plans and the Northwest Power Planning Councils' Fish and Wildlife Program throughout the Columbia River Basin; providing analytical support to the US Forest Service Pacfish/Infish Biological Opinion (PIBO) Effectiveness Monitoring Project to determine the quality of their monitoring protocols, whether monitoring data can distinguish impacts to streams due to different management actions in the Columbia River Basin, and provide review and recommendations of associated fish monitoring protocols; the Comparative Survival Study, a collaborative project of state, federal, and tribal fisheries agencies, administered by the Fish Passage Center, that has monitored survival over different life-stages of spring/summer Chinook with different migrational experiences through the Columbia River hydropower system through the use of PIT-tags; review of the Ecosystem Diagnosis and Treatment (EDT) model and KlamRAS model in assessing anadromous species population responses to current habitat conditions and different management alternatives evaluated in the FERC relicensing of Pacific Corps hydroelectric projects in the Klamath River; and development of paired watershed experiment (an IMW approach) in Boulder Creek, UT, to look at the impacts of incremental impacts of water augmentation and non-native fish removal on the performance of the Colorado Cutthroat trout, considered a sensitive and conservation species, and are currently manage under a Conservation Agreement among resource agencies.

Given the level of involvement ELR has with other IMWs, ELR's development of the proposed IMW would help insure consistency with other IMWs in the region, would build off the experience in designing these other IMWs, would allow for access to infrastructure produced by ISEMP (e.g. databases, analytical tools, etc.), and would build on the network of collaborators in the region in a consistent manner. See Appendix 2 for selected report and publications.

# *C. Related Information*

1. Eco Logical Research Inc. has worked on two contracts for the state of Washington in the past 24 months. Both contracts were part of the Asotin IMW. Both contracts were with the Walla Walla Community College and the Snake River Salmon Recovery Board:

| | |
|---|---|
| Contract Number and Title: | 09-003; Intensively Monitored Watershed Project Implementation |

| | |
|---|---|
| Contract Description: | Implement the Asotin IMW Experimental and Monitoring Design in Charley, North Fork, and South Fork Creeks in the Upper Asotin Watershed. |
| Contract Monitor:<br>Contract Agency and contact information: | Gary Boone<br>Walla Walla Community College,<br>500 Tausick Way, Walla Walla, WA 99362<br>Phone: 509-527-4280, Fax: 509 527-4533 |
| Contract Number and Title: | 10-004; Intensively Monitored Watershed Project Implementation |
| Contract Description: | Implement the Asotin IMW Experimental and Monitoring Design in Charley, North Fork, and South Fork Creeks in the Upper Asotin Watershed. |
| Contract Monitor:<br>Contract Agency and contact information: | Gary Boone<br>Walla Walla Community College,<br>500 Tausick Way, Walla Walla, WA 99362<br>Phone: 509-527-4280, Fax: 509 527-4533 |

2. Reid Camp may be hired as a field technician if we are the successful applicants for the IMW implementation. Reid worked for the Washington State Fish and Wildlife Office in Clarkston, WA as a field technician in the spring of 2010 and at the same time helped ELR monitor PIT tag antennas in Asotin Creek.

3. No ELR contracts have been terminated in the last five years.

4. No termination of a contract for default has been experienced by Eco Logical Research Inc. within the last five years of the submission of this proposal.

## *D. OMWBE*

Eco Logical Research Inc. is not certified minority owned.

# COST PROPOSAL

We understand that the budget for the Asotin IMW will vary annually depending on available State and Federal funds. We have developed numerous budgets for the IMW implementation based on funding availability and in this cost proposal we provide our charge out rates for each staff member and all equipment costs/rentals based on the previous years contracts (Appendix 3a and 3b). We also provide and ***estimate*** what the annual costs of full implementation on the IMW design based on our four years of experience (Appendix 4). We propose that these estimates should be reviewed each year and that future budgets should be based on the funds available, schedule of the IMW design, and current status of the monitoring infrastructure (e.g., arrays, temperature loggers, etc.). We will work with the contract monitor and RTT to tailor each years work based on the available funds and the priorities of the IMW. We have also outlined value added work we can provide.

## A. Hourly Rates, Field Costs, and Annual Budget

Please refer to Appendix 3a for a break-down of our charge out rates for personnel and crew field rates and 3b for one time and annual equipment costs. In Appendix 4 we provide an estimate of a detailed budget for the period of November 1, 2011 to October 30, 2012 for implementing the IMW design and reporting the results of data collection activities. All costs and expenses will be based on cost recovery and therefore, any cost savings on equipment or wages will be used for other aspects of the project after approval of the contract monitor and the RTT.

## B. Value Added Work

In addition to the proposed Technical Proposal we have outlined, ELR will provide following value added work as part of our proposal:

***Foraging model development***: we currently have a graduate student working on the net energy intake of steelhead to evaluate response of proposed Asotin restoration actions. The addition of large wood in the study streams is expected to change the stream from high gradient plane-bed, to a step-pool system that should provide refugia to high velocity currents and reduce energy cost of steelhead. We are testing a foraging model that assess energy intake and losses, which we believe will help identify causal mechanisms of fish response to the proposed IMW treatments. The student will be using underwater video recorders and snorkel surveys to record fish behavior in different habitat types pre- and post-treatment.

***Statistical Modeling***: ELR is currently working with a statistician to run complex simulations of the IMW design to determine statistical power and better understand the potential to detect treatment effects. The statistician is one of the few people to have published literature on the effectiveness of staircase designs (employed in the Asotin IMW) and we hope to publish peer reviewed journal articles on the effectiveness of the IMW design and provide guidance for future IMW projects.

***Aerial Photography***: ELR is also developing expertise in aerial image acquisition and analysis and can provide these services at low cost for the Asotin Watershed because of our familiarity with the watershed and established control network. These data can be used to augment the change detection surveys we are currently implementing.

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# Appendix 1. Proposed Annual Work Plan for the Asotin Creek Intensively Monitored Watershed Implementation Project (November 1, 2011 to October 30, 2019). See Appendices 3 and 4 for the schedule, charge-out rates, and budget respectively.

| Work Item | Description and Rational | Period | |
|---|---|---|---|
| | | Start Date | End Date |
| ***Project Management*** | | | |
| Asotin IMW manager | Management of overall project goals including coordination with ISEMP, synthesis of data, and interpretation of results | 1-Nov-11 | 30-Oct-12 |
| Asotin IMW Coordinator | Coordination with WDFW, RTT, SRSRB, landowners, and interested parties with all aspects of IMW, as well as implementation and refinement of the IMW design, and coordination of all restoration activities. | 1-Nov-11 | 30-Oct-12 |
| Field Biologist Monitoring | Management of all field data collection, processing, uploading, and QAQC | 1-Nov-11 | 30-Oct-12 |
| ***Monitoring*** | | | |
| Monitoring Management | IMW Manager and Coordinator to visit field site regularly to train crews, coordinate monitoring activities, QA/QC field crews, and coordinate with WDFW crew members, develop and field test data logger applications and databases versions | 1-Nov-11 | 30-Oct-12 |
| Field Biologist Monitoring | Direct supervision of field technicians and planning of daily field activities, conduct redd counts and GPS locations throughout study streams | 1-Nov-11 | 30-Oct-12 |
| Annual Fish capture and tagging | Annual fish capture and tagging in Charley, North Fork, and South Fork Creeks. Steelhead >= 70 mm are pit tagged during two days of mark and recapture at each site (12 sites total). Also includes mobile surveys time permitting. | 1-Jun-12 | 30-Oct-12 |

| | | | |
|---|---|---|---|
| Annual Stream Habitat Surveys (CHaMP protocol) | Annual stream habitat surveys to measure habitat attributes and collect topographic survey data in Charley, North Fork, and South Fork Creeks. | 1-Aug-12 | 30-Oct-12 |
| Aerial Photography and LiDAR Surveys | Repeat surveys budget permitting to determine changes in riparian habitat and channel form. Expect to repeat every 3-4 years. | To be determined | To be determined |
| ***Equipment and Expenses*** | | | |
| Travel/Technical Meetings | Costs to travel to Dayton for presentations, technical meetings, and landowner negotiations for coordinator, manager, and support (hydrologist). | 1-Nov-11 | 30-Oct-12 |
| Computing/Office (annual) | annual office supplies | 1-Nov-11 | 30-Oct-12 |
| Field Camp (annual) | supplies and equipment to house crew, provide field office space, cook supplies, tents, etc. | 1-Nov-11 | 30-Oct-12 |
| Habitat Supplies (annual) | purchase and replacement of annual habitat monitoring equipment such as survey pins, tape measures, invertebrate nets, velocity meters, total station equipment, etc. | 1-Nov-11 | 30-Oct-12 |
| Invertebrate supplies (benthic and drift) | supplies for collecting and preserving samples | 1-Nov-11 | 30-Oct-12 |
| Invertebrate processing (benthic and drift) | contracting of species identification | 1-Nov-11 | 30-Oct-12 |
| Mobile Surveys (annual) | all mobile survey equipment has been purchased | 1-Nov-11 | 30-Oct-12 |
| Per Diem Field | 10/day to cover food expenses at field camp/person | 1-Nov-11 | 30-Oct-12 |
| Seining/Tagging (annual) | purchase and replacement of annual fish monitoring equipment such as nets, buckets, tagging supplies, electroshocker parts, etc. | 1-Nov-11 | 30-Oct-12 |
| Seining/Tagging (one time) | purchase of one time tagging supplies; PIT tags have been purchased through the end of 2012. | 1-Nov-11 | 30-Oct-12 |
| Topographic Surveys (Rental) | Rental of total station setups, map grade GPS and video gear | 1-Nov-11 | 30-Oct-12 |
| Utilities | power, phone lines, and internet at field house and arrays | 1-Nov-11 | 30-Oct-12 |
| Vehicle | cost on one 4x4 truck and 4 ATV rentals | 1-Nov-11 | 30-Oct-12 |
| Waders | annual cost of waders for field crews | 1-Nov-11 | 30-Oct-12 |
| Misc. Rentals | to cover unexpected rentals required | 1-Nov-11 | 30-Oct-12 |
| Misc. Supplies | to cover unexpected purchases | 1-Nov-11 | 30-Oct-12 |

| | | | |
|---|---|---|---|
| ***Reporting and Synthesis*** | | | |
| IMW Manager | Annual Reporting, Data Management, and Data Analysis | 1-Nov-11 | 30-Oct-12 |
| IMW Coordinator | Annual Reporting, Data Management, and Data Analysis | 1-Nov-11 | 30-Oct-12 |
| IMW Field Biologist | Annual Reporting, Data Management, and Data Analysis | 1-Nov-11 | 30-Oct-12 |
| Geofluvial Morphologist | To provide expertise and field support in restoration design, monitoring, assessment and data analysis and presentation | 1-Nov-11 | 30-Oct-12 |
| Analyst | Detailed modeling and analyses of mark recapture data to determine changes in survival, fidelity, movement, and abundance and role of covariates | 1-Nov-11 | 30-Oct-12 |
| GIS Specialist | Mapping and analysis of all geospatial data to explain fish movement and relationship between habitat units and restoration treatments | 1-Nov-11 | 30-Oct-12 |
| ***WDFW Cooperative Agreement*** | | | |
| Manager, Field Supervisor, 2 techs, support staff | Provide 2-3 months of monitoring support at IMW fish and habitat monitoring sites | 1-Nov-11 | 30-Oct-12 |
| | | | |
| Contract Monitoring | Walla Walla Community College to provide contract monitoring | 1-Nov-11 | 30-Oct-12 |

# Appendix 2. Selected publications and reports by ELR personnel.

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# Appendix 3a. Charge-out rates for all Eco Logical Research Inc. personnel. Rates include a 20% overhead and 29% fringe rate for most employees.

| Name | Role | Fringe | Indirect | Hourly | Fringe | Hourly + Fringe | Indirect | Total |
|---|---|---|---|---|---|---|---|---|
| N. Bouwes | Project Manager | 0.24 | 0.20 | 69.54 | 16.69 | 86.23 | 17.25 | 103.48 |
| S. Bennett | Project Coordinator | 0.24 | 0.20 | 60.00 | 14.40 | 74.40 | 14.88 | 89.28 |
| Bouwes/Bennett | Field Work | 0.24 | 0.20 | 50.00 | 12.00 | 62.00 | 12.40 | 74.40 |
| Dr Wheaton | Geofluvial Morphologist | 0.25 | 0.20 | 39.71 | 9.93 | 49.64 | 9.93 | 59.57 |
| Dr Conner | Analyst | 0.25 | 0.20 | 39.71 | 9.93 | 49.64 | 9.93 | 59.57 |
| Trahan | GIS Specialist | 0.29 | 0.20 | 39.71 | 11.52 | 51.23 | 10.25 | 61.47 |
| Camp | Field Biologist | 0.29 | 0.20 | 19.16 | 5.56 | 24.72 | 4.94 | 29.66 |
| To be named | Technician | 0.29 | 0.20 | 14.00 | 4.06 | 18.06 | 3.61 | 21.67 |
| To be named | Research Specialist | 0.1 | 0.20 | 10.63 | 1.06 | 11.69 | 2.34 | 14.03 |
| Crew1 | 2 Jr techs& 1 Res Specialist | 0.29 | 0.20 | 38.63 | 11.20 | 49.83 | 9.97 | 59.80 |
| Crew2 | Field Bio & 2 Jr techs | 0.29 | 0.20 | 47.16 | 13.68 | 60.84 | 12.17 | 73.00 |
| Crew 3 | 2 Jr techs | 0.29 | 0.20 | 28.00 | 8.12 | 36.12 | 7.22 | 43.34 |

# Appendix 3b. Eco Logical Research Inc. equipment cost and rental rates for the Asotin IMW project.

| Equipment/Utilities | Item | Unit Cost | Quantity | Total Cost to Buy or Rent | Equipment Life (Yrs) |
|---|---|---|---|---|---|
| Arrays | MUX | 9,015 | 4 | 36,060 | life of project |
| Arrays | antenna | 1,000 | 20 | 20,000 | life of project |
| Arrays | Support Equipment | 1,000 | 20 | 20,000 | life of project |
| Arrays | water level & temp transducer | 1,000 | 4 | 4,000 | life of project |
| Arrays | data loggers | 1,500 | 20 | 30,000 | life of project |
| Arrays | modems | 350 | 4 | 1,400 | life of project |
| Arrays | software | 500 | 1 | 500 | life of project |
| Arrays | electrical contract | 20,000 | 1 | 20,000 | life of project |
| Arrays | **Total Annual** | | | - | |
| Arrays | **Total One-Time** | | | 131,960 | |
| | | | | | |
| Computing/Office | Laptop | 1,000 | 1 | 1,000 | life of project |
| Computing/Office | Data logger | 2,700 | 1 | 2,700 | life of project |
| Computing/Office | laser printer | 350 | 1 | 350 | life of project |
| Computing/Office | Misc. USB Adapters/Splitters | 150 | 1 | 150 | life of project |
| Computing/Office | power cords, surge protectors | 100 | 1 | 100 | life of project |
| Computing/Office | Rite-in-rain notebooks | 10 | 5 | 50 | 1 |
| Computing/Office | Box Rite-in-rain printer paper | 50 | 4 | 200 | 1 |
| Computing/Office | Photocopying, printing, postage | 250 | 1 | 250 | 1 |
| Computing/Office | Field desks and chairs | 200 | 1 | 200 | life of project |
| Computing/Office | Thumb and external hard drives | 125 | 1 | 125 | life of project |
| Computing/Office | shoulder bag for laptop | 30 | 1 | 30 | life of project |

| | | | | | |
|---|---|---|---|---|---|
| **Computing/Office** | Memory Cards (SD) | 50 | 4 | 200 | life of project |
| **Computing/Office** | Office Supplies | 60 | 1 | 60 | 1 |
| **Computing/Office** | **Total Annual** | | | 560 | |
| **Computing/Office** | **Total One-Time** | | | 4,855 | |
| | | | | | |
| **Field camp (3-4 person crew)** | chairs | 10 | 3 | 30 | life of project |
| **Field camp** | table | 70 | 1 | 70 | life of project |
| **Field camp** | propane stove | 72 | 1 | 72 | life of project |
| **Field camp** | propane tank | 40 | 2 | 80 | life of project |
| **Field camp** | coolers | 25 | 2 | 50 | life of project |
| **Field camp** | cots | 80 | 3 | 240 | life of project |
| **Field camp** | frame packs | 150 | 3 | 450 | life of project |
| **Field camp** | cook wear | 100 | 1 | 100 | life of project |
| **Field camp** | tents | 150 | 3 | 450 | 1 |
| **Field camp** | tool set | 100 | 1 | 100 | life of project |
| **Field camp** | 68 quart storage totes | 40 | 1 | 40 | life of project |
| **Field camp** | Hand tools | 150 | 1 | 150 | life of project |
| **Field camp** | Tow Strap | 20 | 1 | 20 | life of project |
| **Field camp** | 6 gallon reliance water jugs | 40 | 1 | 40 | life of project |
| **Field camp** | Bungee Chords | 10 | 5 | 50 | 1 |
| **Field camp** | Batteries, AA, AAA, C, D, 9v, Lithium | 150 | 1 | 150 | 1 |
| **Field camp** | First Aid Kits | 150 | 2 | 300 | life of project |
| **Field camp** | Tape, duct | 5 | 3 | 15 | 1 |
| **Field camp** | WD40 | 10 | 1 | 10 | 1 |
| **Field camp** | zip ties | 5 | 1 | 5 | 1 |
| **Field camp** | 2 gallon gas can | 15 | 1 | 15 | life of project |
| **Field camp** | Rags, shop | 20 | 1 | 20 | 1 |
| **Field camp** | **Total Annual** | | | 700 | |
| **Field camp** | **Total One-Time** | | | 1,757 | |
| | | | | | |
| **Habitat** | Small Depth Rods | 30 | 3 | 90 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| Habitat | Large Depth Rods | 30 | 2 | 60 | 1 |
| Habitat | Compass | 10 | 1 | 10 | life of project |
| Habitat | Measuring Tape | 28 | 3 | 83 | life of project |
| Habitat | Hip chain | 120 | 1 | 120 | life of project |
| Habitat | Conductivity Meter | 58 | 1 | 58 | life of project |
| Habitat | Conductivity Solutions | 50 | 1 | 50 | 1 |
| Habitat | Alkalinity Test Kit | 30 | 1 | 30 | 1 |
| Habitat | Pool Tail Fines Grid | 50 | 1 | 50 | life of project |
| Habitat | Pool Tail Fines Viewer | 5 | 1 | 5 | life of project |
| Habitat | Clinometer | 130 | 2 | 260 | life of project |
| Habitat | Shovel | 15 | 1 | 15 | life of project |
| Habitat | Sieve | 200 | 1 | 200 | 1 |
| Habitat | Pebble Ruler | 70 | 1 | 70 | life of project |
| Habitat | Handheld GPS | 240 | 2 | 480 | life of project |
| Habitat | Solar Pathfinder | 260 | 1 | 260 | life of project |
| Habitat | Solar Pathfinder software | 190 | 1 | 190 | life of project |
| Habitat | Digital Camera | 325 | 1 | 325 | life of project |
| Habitat | Water temperature Loggers | 55 | 35 | 1,925 | life of project |
| Habitat | Water temperature usb dock | 150 | 1 | 150 | life of project |
| Habitat | Air temperature loggers | 38 | 15 | 570 | life of project |
| Habitat | Air temperature usb dock | 60 | 1 | 60 | life of project |
| Habitat | Clip Boards | 15 | 3 | 45 | life of project |
| Habitat | Flags - stream | 20 | 4 | 80 | 1 |
| Habitat | SPOT | 150 | 1 | 150 | life of project |
| Habitat | Maps | 10 | 1 | 10 | 1 |
| Habitat | Action Packers | 20 | 3 | 60 | life of project |
| Habitat | **Total Annual** | | | 520 | |
| Habitat | **Total One-Time** | | | 4,885 | |
| | | | | | |
| Invertebrates | Drift Nets | 160 | 2 | 320 | life of project |
| Invertebrates | Benthic Net | 300 | 1 | 300 | life of project |
| Invertebrates | Sample Jars | 140 | 1 | 140 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| **Invertebrates** | 500 um Sieve | 1 | 30 | 30 | life of project |
| **Invertebrates** | Spray Bottle | 1 | 10 | 10 | life of project |
| **Invertebrates** | Ethanol | 1 | 40 | 40 | 1 |
| **Invertebrates** | Flow Velocity Meter | 1 | 800 | 800 | life of project |
| **Invertebrates** | tweezers | 10 | 2 | 20 | life of project |
| **Invertebrates** | **Total Annual** | | | 180 | |
| **Invertebrates** | **Total One-Time** | | | 1,480 | |
| **Invertebrates** | **Processing per sample** | | | 150 | annual |
| | | | | | |
| **Mobile Surveys** | Back pack | 60 | 3 | 180 | life of project |
| **Mobile Surveys** | Button GPS | 39 | 3 | 117 | life of project |
| **Mobile Surveys** | Mobile wand | 430 | 3 | 1,290 | life of project |
| **Mobile Surveys** | Pole assembly | 75 | 4 | 300 | life of project |
| **Mobile Surveys** | FS2001 Tag Reader tuner | 160 | 3 | 480 | life of project |
| **Mobile Surveys** | f2001 Pittag Readers | 3,000 | 3 | 9,000 | life of project |
| **Mobile Surveys** | **Total Annual** | | | - | |
| **Mobile Surveys** | **Total One-Time** | | | 11,367 | |
| | | | | | |
| **Seining PIT Tagging** | Electrofishing Dipnets | 60 | 6 | 360 | life of project |
| **Seining PIT Tagging** | Power sonic sealed lead acid batteries | 75 | 3 | 225 | 1 |
| **Seining PIT Tagging** | Electrofishing electrode poles | 225 | 4 | 900 | life of project |
| **Seining PIT Tagging** | Electrode pole Rings (5) | 40 | 3 | 120 | life of project |
| **Seining PIT Tagging** | Multi Meter (AC/DC) | 15 | 1 | 15 | life of project |
| **Seining PIT Tagging** | Samus Electrofishers | 1,000 | 2 | 2,000 | life of project |
| **Seining PIT Tagging** | Pocket thermometers | 13 | 4 | 50 | 1 |
| **Seining PIT Tagging** | DNA sample vials | 0 | 100 | 28 | 1 |
| **Seining PIT Tagging** | Variable dispenser bottles | 150 | 1 | 150 | life of project |
| **Seining PIT Tagging** | Case of DNA storage boxes | 100 | 1 | 100 | 1 |
| **Seining PIT Tagging** | Neoprene Socks | 30 | 4 | 120 | 1 |
| **Seining PIT Tagging** | Neoprene Gloves | 55 | 4 | 220 | 1 |
| **Seining PIT Tagging** | Wader repair supplies | 50 | 1 | 50 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| Seining PIT Tagging | Daypacks | 75 | 2 | 150 | life of project |
| Seining PIT Tagging | External pack frames | 150 | 1 | 150 | life of project |
| Seining PIT Tagging | Carbineers | 10 | 6 | 60 | life of project |
| Seining PIT Tagging | Conductivity meter | 100 | 1 | 100 | life of project |
| Seining PIT Tagging | 3 gallon collapsible bucket | 30 | 1 | 30 | life of project |
| Seining PIT Tagging | Clipboards | 25 | 2 | 50 | life of project |
| Seining PIT Tagging | Maps (Forest/Topo) | 120 | 1 | 120 | life of project |
| Seining PIT Tagging | Field utility boxes | 35 | 1 | 35 | life of project |
| Seining PIT Tagging | DC 400 inverter | 60 | 1 | 60 | life of project |
| Seining PIT Tagging | rock bar | 40 | 1 | 40 | life of project |
| Seining PIT Tagging | Seines/Blocknets | 250 | 4 | 1,000 | life of project |
| Seining PIT Tagging | repair kits for nets | 25 | 1 | 25 | 1 |
| Seining PIT Tagging | Nylon Rope | 50 | 1 | 50 | 1 |
| Seining PIT Tagging | Cable wire | 5 | 1 | 5 | 1 |
| Seining PIT Tagging | Utility straps | 10 | 10 | 100 | life of project |
| Seining PIT Tagging | Rebar | 2 | 10 | 20 | life of project |
| Seining PIT Tagging | Lockable, waterproof Streamside Boxes (Ammo Cans) | 70 | 1 | 70 | life of project |
| Seining PIT Tagging | scale card containers Tupperware | 5 | 2 | 10 | life of project |
| Seining PIT Tagging | aluminum site marking tags | 100 | 1 | 100 | 1 |
| Seining PIT Tagging | 50 meter fiberglass measuring tape | 50 | 1 | 50 | 1 |
| Seining PIT Tagging | 100 meter fiberglass measuring tape | 75 | 1 | 75 | 1 |
| Seining PIT Tagging | Flagging Tape | 5 | 1 | 5 | 1 |
| Seining PIT Tagging | Digital Camera | 200 | 1 | 200 | life of project |
| Seining PIT Tagging | Tagging Needles | 2 | 500 | 1,000 | 1 |
| Seining PIT Tagging | PIT tags | 2 | 5000 | 11,600 | life of project |
| Seining PIT Tagging | Anesthetic | 25 | 2 | 50 | 1 |
| Seining PIT Tagging | Airstones for bubblers | 15 | 6 | 90 | life of project |
| Seining PIT Tagging | Aquarium Nets | 2 | 5 | 10 | 1 |
| Seining PIT Tagging | Misc. Nalgene Bottles | 100 | 1 | 100 | life of project |
| Seining PIT Tagging | Scales w/usb adapters | 250 | 2 | 500 | life of project |
| Seining PIT Tagging | Injector supplies | 150 | 1 | 150 | life of project |
| Seining PIT Tagging | 100 Round shotgun shell cases (Injector Rack) | 40 | 1 | 40 | life of project |

| | | | | | |
|---|---|---|---|---|---|
| **Seining PIT Tagging** | Aerators | 40 | 4 | 160 | life of project |
| **Seining PIT Tagging** | table top antenna | 280 | 1 | 280 | life of project |
| **Seining PIT Tagging** | tagging table/case | 50 | 1 | 50 | life of project |
| **Seining PIT Tagging** | Measuring Boards | 30 | 2 | 60 | life of project |
| **Seining PIT Tagging** | f2001 Pittag Readers | 3,000 | 3 | 9,000 | life of project |
| **Seining PIT Tagging** | Distilled H20 | 15 | 1 | 15 | 1 |
| **Seining PIT Tagging** | Buckets 5-gallon | 5 | 15 | 75 | life of project |
| **Seining PIT Tagging** | **Total Annual** | | | 2,178 | |
| **Seining PIT Tagging** | **Total One-Time** | | | 27,845 | |
| | | | | | |
| **Topographic Surveying and Video** | Total Station setup | 200 | 20 | 4,000 | 1 |
| **Topographic Surveying and Video** | Map Grade GPS | 75 | 20 | 1,500 | 1 |
| **Topographic Surveying and Video** | Under Water Video Camera | 50 | 20 | 1,000 | 1 |
| **Topographic Surveying and Video** | **Total Annual** | | | 6,500 | |
| **Topographic Surveying and Video** | **Total One-Time** | | | - | |
| | | | | | |
| **Utilities** | Phone lines x 4 | 125 | 12 | 1,500 | 1 |
| **Utilities** | Internet x 1 | 60 | 12 | 720 | 1 |
| **Utilities** | Power x 4 | 60 | 12 | 720 | 1 |
| **Utilities** | **Total Annual** | | | 2,940 | |
| | | | | | |
| **Vehicles** | 4x4 truck | 1,041 | 10 | 10,410 | 1 |
| **Vehicles** | ATV | 600 | 4 | 2,400 | 1 |
| **Vehicles** | **Total Annual** | | | 12,810 | |
| | | | | | |
| **Waders** | waders | 120 | 3 | 360 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| Waders | wading boots | 95 | 3 | 285 | 1 |
| Waders | Total Annual | | | 645 | |

## Appendix 4. Anticipated annual budget for the Asotin Intensively Monitored Watershed Project. * Note annual costs may vary depending on the IMW design schedule, available funds, and infrastructure needs.

| Item | Unit Type | Unit Cost | Fringe | Indirect | Units | Base Total | Fringe Total | Indirect Total | Estimated |
|---|---|---|---|---|---|---|---|---|---|
| **Personnel** | | | | | | | | | |
| **Coordination/Monitoring Fish & Habitat/Data Analysis and Reporting** | | | | | | | | | **subtotal** |
| Project Manager | Office Hr | 69.54 | 16.69 | 17.25 | 120 | 8,345 | 2,003 | 2,070 | 12,417 |
| Project Manager | Field Hr | 50.00 | 12.00 | 12.40 | 40 | 2,000 | 480 | 496 | 2,976 |
| Project Coordinator | Office Hr | 60.00 | 14.40 | 14.88 | 1,080 | 64,800 | 15,552 | 16,070 | 96,422 |
| Project Coordinator | Field Hr | 50.00 | 12.00 | 12.40 | 80 | 4,000 | 960 | 992 | 5,952 |
| Geofluvial Morphologist | Hour | 39.71 | 9.93 | 9.93 | 120 | 4,765 | 1,191 | 1,191 | 7,148 |
| Analyst | Hour | 39.71 | 9.93 | 9.93 | 120 | 4,765 | 1,191 | 1,191 | 7,148 |
| GIS Specialist | Hour | 39.71 | 11.52 | 10.25 | 120 | 4,765 | 1,382 | 1,229 | 7,377 |
| Field Biologist | Hour | 19.16 | 5.56 | 4.94 | 2,088 | 40,006 | 11,602 | 10,322 | 61,929 |
| Field Crew (2 technicians) | Hour | 28.00 | 8.12 | 7.22 | 870 | 24,360 | 7,064 | 6,285 | 37,709 |
| **Subtotal** | | | | | | | | | **239,078.28** |
| **Accommodation, Travel & Transportation** | | | | | | | | | |
| 4x4 truck rental and mileage | Month | 1,021 | | 204 | 9.0 | 9,189 | - | 1,838 | 11,027 |
| 4 ATVs rental from WDFW | ATV | 600 | | 120 | 4 | 2,400 | - | 480 | 2,880 |
| Field Per diem 10/day | Day | 10 | | 2 | 240 | 2,400 | - | 480 | 2,880 |
| Coordinator Travel | | | | | | | - | | - |
| Food | Day | 39 | | 8 | 10 | 390 | - | 78 | 468 |
| lodging | Day | 70 | | 14 | 10 | 700 | - | 140 | 840 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Airfare SLC to Lewiston | Flight | 600 | 120 | 4 | 2,400 | - | 480 | 2,880 |
| **Subtotal** | | | | | | | | **20,974.80** |
| **Supplies & Equipment** | | | | | | | | |
| Computing/Office (annual) | Supplies | 560.00 | 112.00 | 1.00 | 560.00 | - | 112.00 | 672.00 |
| Field Camp (annual) | Supplies | 700.00 | 140.00 | 1.00 | 700.00 | - | 140.00 | 840.00 |
| Field Camp (one time) | Supplies | 1,757.00 | 351.40 | 1.00 | 1,757.00 | - | 351.40 | 2,108.40 |
| Habitat Supplies (annual) | Supplies | 520.00 | 104.00 | 1.00 | 520.00 | - | 104.00 | 624.00 |
| Habitat Supplies (one time) | Supplies | 4,885.00 | 977.00 | 0.25 | 1,221.25 | - | 244.25 | 1,465.50 |
| Invertebrates (benthic and drift) | Supplies | 180.00 | 36.00 | 1.00 | 180.00 | - | 36.00 | 216.00 |
| Invertebrate (benthic and drift) | Processing | 150.00 | 30.00 | 12.00 | 1,800.00 | - | 360.00 | 2,160.00 |
| Mobile Surveys (one time) | Supplies | 11,367.00 | 2,273.40 | 0.25 | 2,841.75 | - | 568.35 | 3,410.10 |
| Seining/Tagging (annual) | Supplies | 2,177.58 | 435.52 | 1.00 | 2,177.58 | - | 435.52 | 2,613.09 |
| Seining/Tagging (one time*) | Supplies | 27,845.00 | 5,569.00 | 1.00 | 27,845.00 | - | 5,569.00 | 33,414.00 |
| Topographic Surveys (Rental) | Supplies | 6,500.00 | 1,300.00 | 0.50 | 3,250.00 | - | 650.00 | 3,900.00 |
| Utilities | Supplies | 2,940.00 | 588.00 | 1.00 | 2,940.00 | - | 588.00 | 3,528.00 |
| Waders | Supplies | 645.00 | 129.00 | 1.00 | 645.00 | - | 129.00 | 774.00 |
| Misc. Rentals | Supplies | 10.00 | 2.00 | 30 | 300.00 | - | 60.00 | 360.00 |
| Misc. Supplies | Supplies | 10.00 | 2.00 | 30 | 300.00 | - | 60.00 | 360.00 |
| **Subtotal** | | | | | | | | **56,445.09** |
| **WDFW Cooperative Agreement** | | | | | | | | |
| Manger, Field Supervisor, Two Field Technicians, and Support Staff to aid monitoring efforts | | | | | | | | **55,000.00** |
| **Annual Cost not including CONTRACT ADMIN** | | | | | | | | **371,498.18** |

* Pit tags have been purchased through the end of 2012.