

**Board of County Commissioners - Staff Report****Meeting Date:** October 4, 2016**Presenter:** Amy Ramage**Submitting Dept:** Engineering**Subject:** Consideration of award of a contract**Statement / Purpose:**

Approve the contract for Professional Services for the Teton County Wildlife Crossings Master Plan contract to Western Transportation Institute (WTI).

**Background / Description (Pros & Cons):**

County Engineering staff issued a Request for Qualifications (RFQ) for professional services for preparation of a Wildlife Crossings Master Plan document in late 2015. Proposals were received in January 2016 from 4 firms including the Patricia Cramer & Team, Western Transportation Institute, KLJ, and Y2 Consultants. A lengthy review process was performed by an advisory committee including County Engineering staff, WYDOT staff, USFS staff, WYG&F staff, Teton Conservation District Staff, and Greater Yellowstone coalition staff. The committee chose to interview two firms. Patricia Cramer & Team were selected after lengthy consideration.

After considerable effort went into the refinement of the scope of work and negotiations with the consultant, the cost came in at \$185,000. This contract was presented to the BCC at the May 3, 2016 regular meeting. Concern was raised by Commissioners regarding this amount exceeding the \$100,000 budget. It was requested that staff investigate other potential funding sources and present the findings at a workshop on May 31, 2016. Staff approached WYDOT, Teton Conservation District, JH Conservation Alliance and the Greater Yellowstone Coalition for the possibility of providing additional funds. None of those entities had funds available to assist with the project at this time. Direction was given to staff to re-solicit the Request for Proposals based upon the budget not-to-exceed \$100,000. It was also expressed by some on the Board that this was a technical document and did not require significant public input.

Given this direction, staff significantly reduced the scope of work and re-composed the request as a Request for Proposals (RFP) with a not-to-exceed budget of \$100,000. We requested proposals from the top two firms from the previous work that was done: Patricia Cramer and Western Transportation Institute. Both firms graciously re-prepared a proposal. The re-vamped proposals were reviewed by staff and the advisory committee.

*Both firms proposed a fee estimate of \$100,000.00.*

After significant deliberations, the advisory committee now has selected Western Transportation Institute. While both firms are well qualified, many of the elements of the request that Patricia Cramer's team had excelled in were no longer as important in the reduced scope of work – specifically the public outreach and interaction and the GIS products that were deleted from the scope of work. Therefore, the group elected to now select Western Transportation Institute. A significant factor influencing this selection is WTI's extensive local experience.

**Stakeholder Analysis & Involvement:**

There are many stakeholders that will be involved in this master plan process. WYDOT is the primary stakeholder that will be key in implementing any results from this master plan. Staff has assembled the advisory group that will attempt to include and coordinate various stakeholders. Invitations to a wide group of stakeholders to attend meetings and field trips will be made during the process.



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**Fiscal Impact:**

The fiscal impact of this contract is \$100,000 plus staff time.

\$100,000 was allocated in the FY2016 capital budget for this item. Account 37-4-037-008-003 Safe Wildlife Crossings.

Note that the way that a University-sponsored group bills out their personnel is somewhat different than standard consultants. Rather than charging an hourly rate which includes overhead, they invoice based on percentage of their time worked on the project each month. The monthly salary rates and their indirect cost worksheets are included within the contract. Montana State University will bill actual costs for all expenses, including salaries, benefits, and other direct costs, plus 44% indirect costs on all expenses. MSU salaries will increase by 2% on January 1, 2017, however this will not impact the overall not-to-exceed amount of \$100,000.

**Staff Impact:**

Engineering staff will manage this project. This project is expected to require significant staff time.

**Legal Review:**

Gingery

**Staff Input / Recommendation:**

The staff-assembled advisory committee recommends awarding the contract to Western Transportation Institute.

**Attachments:**

Proposed Contract with Western Transportation Institute

**Suggested Motion:**

I move to approve a contract with Western Transportation Institute for professional services for preparation of the Teton County Wildlife Crossings Master Plan in the amount not to exceed \$100,000.00.

# **OWNER – CONSULTANT AGREEMENT FOR PROFESSIONAL SERVICES**

This AGREEMENT is effective this 4th day of October, 2016 between **TETON COUNTY WYOMING**, hereinafter referred to as “OWNER” and **WESTERN TRANSPORTATION INSTITUTE** hereinafter referred to as “CONSULTANT”, for the Owner’s Project generally identified as the **Teton County Wildlife Crossings Master Plan** for services as described herein and subject to the following.

## **1. Services**

Consultant agrees to provide the scope of services as described in the attached Exhibit A – Scope of Services. Unless otherwise modified herein, the services shall be completed and performed according to descriptions in Western Transportation Institute’s proposal, attached as Exhibit C & D – Proposal for the Teton County Wildlife Crossings Master Plan

## **2. Schedule**

Specific periods of time for rendering services, or specific dates by which services are to be completed, are provided in Exhibit D – WTI Proposal, and are hereby agreed to be reasonable.

## **3. Compensation**

Compensation for the listed scope of services will be paid on a TIME AND MATERIALS basis at the Consultant’s salary and benefit rates plus reimbursable expenses at the rates shown on the attached Exhibit B – Schedule of Rates. The cost estimate for each phase of the scope of services is shown in the attached Exhibit C – Cost Proposal. Consultant may alter the distribution of compensation between individual phases of the work noted herein, but the total compensation shall NOT EXCEED \$100,000.00 unless mutually agreed upon by the parties to this Agreement as outlined in Paragraph 4. Change Orders.

## **4. Change Orders**

Should changes to the Scope of Services be initiated by the Owner or necessitated by others beyond the control of Consultant, subsequent to the date of the execution of this Agreement, it is agreed that the Scope of Services and the level of service set forth in the budget shall be modified to reflect these changes as mutually agreed upon by the parties to this Agreement. All changes to the budget will be provided based on rates shown in Exhibit B – Schedule of Rates.

## **5. Status of Parties**

The Consultant is an independent contractor and shall not be considered an employee of the Owner.

## **6. Third-Party Exclusion**

The Agreement shall not create any rights or benefits to parties other than Owner and Consultant except such other rights as may be specifically called for herein.

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## **7. Information Provided by Others**

Owner shall be responsible for all requirements and instructions that it furnishes to Consultant pursuant to this Agreement, and for the accuracy and completeness of all programs, reports, data, and other information furnished by Owner to Consultant pursuant to this Agreement. Consultant may use and rely upon such requirements, programs, instructions, reports, data, and information in performing or furnishing services under this Agreement, subject to any express limitations or reservations applicable to the furnished items.

## **8. Opinions of Probable Construction Costs**

It is understood that Consultant has no control over costs of materials, the price of labor and equipment, services furnished by others, the contractor's method of pricing, or over competitive bidding or market conditions. Therefore, if requested by the Owner, Consultant will provide opinions of probable construction costs based on experience, qualifications, and other available cost estimates of similar projects. Consultant makes no warranties, expressed or implied, as to the accuracy of such opinions as compared to proposals, bids, or actual construction costs. If Owner requires greater assurance as to probable construction cost, then Owner agrees to obtain an independent cost estimate by a professional cost estimator.

## **9. General Considerations**

The standard of care for all professional services performed or furnished by Consultant under this Agreement will be the care and skill ordinarily used by members of the subject profession practicing under similar circumstances at the same time and in the same locality. Consultant makes no warranties, express or implied, under this Agreement or otherwise, in connection with Consultant's services. Subject to the foregoing standard of care, Consultant and its consultants may use or rely upon design elements and information ordinarily or customarily furnished by others, including, but not limited to, specialty contractors, manufacturers, suppliers, and the publishers of technical standards.

Consultant shall not at any time supervise, direct, control, or have authority over any contractor's work, nor shall Consultant have authority over or be responsible for the means, methods, techniques, sequences, or procedures of construction selected or used by any contractor, or the safety precautions and programs incident thereto, for security or safety at the Project site, nor for any failure of a contractor to comply with laws and regulations applicable to such contractor's furnishing and performing of its work. Consultant neither guarantees the performance of any contractor nor assumes responsibility for any contractor's failure to furnish and perform its work in accordance with the contract between Owner and such contractor.

The parties acknowledge that Consultant's scope of services does not include any services related to a Hazardous Environmental Condition (the presence of asbestos, PCBs, petroleum, hazardous substances or waste as defined by the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq., or radioactive materials). If Consultant or any other party encounters a Hazardous Environmental Condition, Consultant may, at its option and without liability for consequential or any other damages, suspend performance of services on the portion of the Project affected thereby until Owner: (1) retains appropriate specialist consultants or contractors to identify and, as appropriate, abate, remediate, or remove the Hazardous Environmental Condition; and (2) warrants that the Site is in full compliance with applicable Laws and Regulations.

## **10. Termination**

Either party may terminate this Agreement by providing seven (7) days written notice in the event of a substantial failure by one party through no fault of the other party to perform in accordance with the terms

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and conditions of this agreement. Either party may terminate this Agreement without cause by fifteen (15) days written notice to the other.

Upon termination, payment will be made to Consultant for all services performed and reimbursable expenses up to the date of the termination. Deliverables will be turned over to the Owner upon full payment.

**11. Severability**

The Owner and Consultant have entered into this Agreement to communicate mutual understandings and responsibilities to one another. Any provision of the Agreement that violates a statute or regulation shall be deemed void, and all remaining provisions shall continue in force. Owner and Consultant shall endeavor to quickly replace a voided provision with a valid substitute that expresses the intent of or at least addresses the issues covered by the original provision.

**IN WITNESS WHEREOF**, this agreement, including all exhibits and attachments, has been fully executed on behalf of Harmony Design, Inc. by its duly authorized officers, and the Owner has caused the same to be executed in its name and in its behalf by its duly authorized officers as of the date indicated below.

**OWNER:**

**CONSULTANT:**

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

Printed name: Barbara Allen

Name: \_\_\_\_\_

Title: Chairperson

Title: \_\_\_\_\_

Date Signed: \_\_\_\_\_

Date Signed: \_\_\_\_\_

Direct Contact: Amy Ramage

Teton County Engineering

Address: PO Box 3594  
Jackson, WY 83001

Address: \_\_\_\_\_

Phone No. 307.732.8574

Phone No. \_\_\_\_\_

Email: [aramage@tetonwyo.org](mailto:aramage@tetonwyo.org)

Email: \_\_\_\_\_

ATTEST: \_\_\_\_\_

Sherry Daigle, Teton County Clerk

**EXHIBIT A: SCOPE OF WORK**

**EXHIBIT B: SCHEDULE OF RATES**

**EXHIBIT C: COST PROPOSAL**

**EXHIBIT D: W.T.I.'s RESPONSE TO REQUEST FOR PROPOSALS**

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## EXHIBIT A

### TETON COUNTY WILDLIFE CROSSINGS MASTER PLAN REQUEST FOR PROPOSALS REVISED SCOPE OF WORK - JULY 28, 2016

1. Conduct a literature review and synthesize and summarize the impacts to wildlife and habitat connectivity caused by roads in Teton County.

A current list of data sources and reports is attached as an appendix for reference. This list is not necessarily all encompassing. *Significant additional data gathering or on-the-ground research is not anticipated as part of this scope of work.*

2. Describe wildlife road crossing mitigation measures appropriate for specific locations within Teton County.
  - a. Develop a cost-benefit analysis to help evaluate the savings in reduced costs to society of the wildlife vehicle collisions that these structures would help prevent.
  - b. Provide site-specific mitigation solutions for the five highest priority ungulate crossing sites. These must include high-level design recommendations, including some general visualizations in PDF or JPG format suitable for public presentation purposes. Provide schematic level cost opinions for each site-specific solution.
  - c. A list of major stream crossings of the highways and county roads listed below will be prepared by county staff and an advisory group and will be supplied to the selected consultant. The selected consultant shall review the listed sites and provide generalized mitigation solutions for any impaired crossing sites that could provide a benefit to aquatic organism crossings. These must include high-level design recommendations and schematic level cost opinions.
  - d. Provide a strategy for monitoring of crossings and wildlife vehicle collisions to assess effectiveness of any proposed structures/measures.
3. Develop and describe the methodology used to identify and set priorities for county wildlife crossing sites.

This should account for values agreed upon by Teton County that may include but is not limited to motorist safety, important habitat, key species' habitat needs, land use/land security from development, and identified wildlife migration corridors. In particular, high-priority movement and migration corridors (summer-winter ranges, riparian areas, areas between public and permanently protected private lands), wildlife-vehicle collision hot-spots (which can be determined through existing Wyoming Department of Transportation and Jackson Hole Wildlife Foundation data) must be mapped as potential mitigation sites. Account for both localized & migratory movement.

4. Review the proposed mitigation sites via field trips with local experts (WYG&F, Jackson Hole Wildlife Foundation, Teton County Wildlife Crossings Advisory Group, etc.).

5. Describe potential sources of funding for wildlife crossing measures from federal, state, county, private groups and other sources.
6. Hold one public meeting, midway through the development of the master plan process to hear public comment. Provide visual aids and present information at the public meeting on the proposed Master Plan
7. Provide a final written wildlife crossings master plan document in a format ready for formal adoption by the Teton County Board of County Commissioners and attend the Board hearing to present the final master plan.
8. We encourage you to provide ideas within your proposal of any additional items that your team could provide that would enhance the plan that could be accomplished within our \$100,000 budget. (i.e. GIS products, website, etc.)

## **ROADS INCLUDED IN MASTER PLAN**

### U.S. Highways

- U.S. Highways 189/191 (Hoback Junction to Teton County line in Hoback Canyon)
- U.S. Highway 26/89 (Hoback Junction to Teton County line in Snake River Canyon)
- U.S. Highway 26/89/189/191 (Hoback Junction to Jackson). The area from Hoback Junction northerly to Melody Ranch have crossing structures already under design as part of the major highway project. The effect of those proposed structures on surrounding areas will be important.
- US Hwy 89 from the “Y” Junction with Hwy 22 northerly to the southern boundary of Grand Teton National Park. *This includes Broadway within the Town of Jackson.*
- U.S. Highway 26/287 (Eastern boundary of Grand Teton National Park to Teton County line near Togwotee Pass). Wildlife crossing structures have been constructed on the recently reconstructed portion of this roadway.

### State Highways

- WY Hwy 22 in its entirety from the “Y” to the Idaho State Line.
- WY Hwy 390 for its entirety

### Teton County Roads

- Analysis of the County Road infrastructure is anticipated to be limited to major culvert crossing sites and their impact to aquatic organisms.  
The priority culvert locations on County Roads shall be identified by County staff and the Wildlife Crossings Advisory Group and provided to the selected consultant for review of potential mitigation measures and inclusion within the report.

## APPENDIX

### List of data sources and recent studies in Teton County, WY:

#### Data

These include data on traffic, collision hot-spots and wildlife movements and habitat.

1. Teton County Wildlife Vehicle Collision Database. Jackson Hole Wildlife Foundation.  
[http://www.jhwildlife.org/index.php/blog/comments/jackson\\_hole\\_wildlife\\_foundations\\_teton\\_county\\_wildlife\\_vehicle\\_collision\\_d/](http://www.jhwildlife.org/index.php/blog/comments/jackson_hole_wildlife_foundations_teton_county_wildlife_vehicle_collision_d/)
2. Wyoming Department of Transportation, carcass, crash and collision data. Request from WYDOT.
3. WYDOT traffic data.  
[http://www.dot.state.wy.us/home/planning\\_projects/Traffic\\_Data.html](http://www.dot.state.wy.us/home/planning_projects/Traffic_Data.html)
4. Wyoming Game & Fish big game migration and range data.  
<https://wgfd.wyo.gov/Wildlife-in-Wyoming/Geospatial-Data/Big-Game-GIS-Data>
5. Grand Teton National Park wildlife collision reports. Available from GTNP on request.
6. Teton County Focal Habitat Feature project data (not yet public). Contact Teton County Planning (Susan Johnson)
7. Wyoming Department of Transportation safety statistics.  
[http://www.dot.state.wy.us/home/dot\\_safety/safety\\_statistics/2014-traffic-crash-information.html](http://www.dot.state.wy.us/home/dot_safety/safety_statistics/2014-traffic-crash-information.html)
8. Teton County ITP. <http://www.tetonwyo.org/compp/topics/integrated-transportation-plan/252992/>
9. Wyoming Game & Fish habitat information. <https://wgfd.wyo.gov/Wildlife-in-Wyoming/Geospatial-Data/Habitat-GIS-Information>
10. Wyoming Migration Initiative. <http://migrationinitiative.org/content/migration-viewer>
11. Wyoming Game and Fish Department Job Completion Reports:  
<https://wgfd.wyo.gov/Hunting/Job-Completion-Reports>
12. Wyoming Game and Fish Department State Wildlife Action Plans:  
<https://wgfd.wyo.gov/Habitat/Habitat-Plans/Wyoming-State-Wildlife-Action-Plan>
13. Brucellosis Research by the Brucellosis Feedground Habitat Section: GPS collared elk from South Park feedground- Ben Wise
14. National Elk Refuge migration data: Eric Cole, Refuge Biologist.
15. WYDOT Existing Crossing Location Maps: Darin Martens, BTNF WYDOT Liaison  
[darinmartens@fs.fed.us](mailto:darinmartens@fs.fed.us)

#### Reports

These include recent studies relevant to Teton County and a small selection of more general reports.

1. Huisjer, M.P., Ament, R.J., and Begley, J.S. (2010). Highway mitigation opportunities for wildlife in Jackson Hole, Wyoming. Western Transportation Institute. 137 pp.  
<https://jhalliance.org/wp-content/uploads/2015/09/WTIwildlifecrossingstudy.12-14-11.pdf>
2. Biota Research and Consulting, Inc. 2003. Final report: Jackson Hole roadway and wildlife crossing study, Teton County, Wyoming. Prepared for the Jackson Hole Wildlife Foundation, Jackson, Wyoming, USA.  
[http://www.jhwildlife.org/pdf/full\\_jh\\_roadway\\_wildlife\\_study.pdf](http://www.jhwildlife.org/pdf/full_jh_roadway_wildlife_study.pdf)
3. Huisjer, M.P., and Begley, J.S. (2015). An analysis of wildlife-vehicle collisions, wildlife connectivity concerns, and potential mitigation measures, US Hwy 89, National Elk Refuge, Jackson Hole, Wyoming, USA. 50 pp.
4. Riginos, C., K. Krasnow, E. Hall, M. Graham, S. Sundaresan, D. Brimeyer, G. Fralick, and D. Wachob. 2013. Mule deer (*Odocoileus hemionus*) movement and habitat use patterns in relation to roadways in northwest Wyoming. Final Report to the Wyoming Department of Transportation. FHWA-WY-13/08F 72 pp.
5. WYDOT general wildlife and fisheries and existing crossing structures information.  
[http://www.dot.state.wy.us/home/engineering\\_technical\\_programs/environmental\\_services/wildlife-1.html](http://www.dot.state.wy.us/home/engineering_technical_programs/environmental_services/wildlife-1.html)
6. Assessment of Wildlife-Transportation Impacts and Prioritization of Potential Migration Efforts in the Greater Yellowstone Ecosystem.  
<http://www.westerntransportationinstitute.org/research/425521.aspx>
7. WYDOT Jackson South Hwy 89 reconstruction Record of Decision.  
[http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Environmental\\_Services/Documents/Jackson%20South/Jackson%20South%20ROD.pdf](http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Environmental_Services/Documents/Jackson%20South/Jackson%20South%20ROD.pdf)
8. Jackson/Teton County Comprehensive Plan. (2012).  
<http://www.tetonwyo.org/compp/topics/jackson-teton-county-comprehensive-plan/251817/>
9. Huisjer, M.P., McGowen, P., Clevenger, A.P., and Ament, R.J. (2008b). Wildlife-Vehicle Collision Reduction Study: Best Practices Manual. Report to Congress. U.S. Department of Transportation, Federal Highway Administration. 204 pp.

10. Huijser, M.P., McGowen, P., Fuller, J., Hardy, A., Kociolek, A., Clevenger, A.P., Smith, D. and Ament, R. (2008a). Wildlife-Vehicle Collision Reduction Study: Report to Congress. U.S. Department of Transportation, Federal Highway Administration. FHWA-HRT-08-034 254 pp.
11. Huijser, M.P., Duffield, J., Clevenger, A.P., Ament, R.J., and McGowen, P. (2009). Cost benefit analysis of mitigation measures aimed at reducing collisions with large ungulates in North America: a decision support tool. Ecology and Society. 14:15 [online] URL: <http://www.ecologyandsociety.org/vol14/iss2/art15/>
12. Togwotee EIS. [http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Environmental\\_Services/Documents/Togwotee%20Final%20EIS.pdf](http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Environmental_Services/Documents/Togwotee%20Final%20EIS.pdf)
13. Snake River EIS [http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Environmental\\_Services/Documents/Archives/Snake%20River%20FEIS\\_91-01-F.pdf](http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Environmental_Services/Documents/Archives/Snake%20River%20FEIS_91-01-F.pdf)
14. Riginos, C., Graham, M.W., Davis, M., Smith, C., Johnson, A. (2015). Effects of Wildlife Warning Reflectors (“Deer Delineators”) on Wildlife-Vehicle Collisions in Central Wyoming. Report to Wyoming Department of Transportation. FHWA-WY-15/03F.
15. Cutthroat trout data: <http://www.fws.gov/mountain-prairie/species/fish/yct/YCTStatusReviewReport.pdf>

## EXHIBIT B

### SCHEDULE OF RATES

# OSP Information Sheet

**Leslie Schmidt**  
 Authorized Organizational  
 Representative  
 (406) 994-2381

## IDC/F&A Rates:

### Effective 9/17/15

- 44% Research-Federal
- 57% Instruction
- 34.5% Other Institutional Activities
- 26% Off-Campus
- 19.3% Off-Campus Other
- 17.5% CESU (MTDC)
- 17.5% National Park Service - YNP
- 17.5% USGS - MT Co-Op Fisheries

*Under the Uniform Guidance, the federally negotiated F&A rate for subcontractors must be honored. 10% de minimis rate is allowed for entities without a federally negotiated rate agreement. MSU's negotiated F&A rate must be accepted by all agencies unless restricted by statute, program or regulation. Refer to solicitation (RFP, RFQ, RFA, BAA)*

## Modified Total Direct Costs (MTDC) Base:

- Total direct costs less: Individual equipment items > \$5,000
- Subcontract expenditures over \$25,000
- Student tuition remission (awards)
- Participant support costs

## State Agencies:

**IDC Rate:** 25% of total direct costs, unless federal pass-through, then full federal rate applies

## Federal Maximums:

- NSF:** Max daily consulting rate: \$634 as of 1/14
- NIH:** Max annual salary; \$185,100 effective 1/10/16
- EPA:** Max hourly rate: \$74.50 effective 5/31/11

## Employee Benefit Estimates:

- (Percentages Based on Campus Wide Averages)
- 37.0% Faculty & Professional
  - 47.0% Classified
  - 1.0% Students (when registered full-time)
  - 9.0% Hourly (students part-time)
  - OSP Term Pool - 1%

## Student Benefit Estimates:

- Considered full-time if:
- Grad:** 6 credits or more = 1%
  - Undergrad:** 6 credits or more = 1%
  - Part-Time:** Less than 6 credits = 9%

*Benefit estimates are for budgeting purposes. Actual benefit percent varies with each employee. Employees at less than 1.0 FTE will be higher than stated.*

Contact OSP for additional information.

The payroll paperwork/EPAF deadline is the 20th of every month (or the preceding workday if the date falls on a Sat./Sun.)

**MSU Tax/Employer Identification Number (TIN/EIN): 81-6010045**

**DUN's Number: 625447982**

**ASAP: 3034514**

**Congressional District: AL or 1**

**For Grants.gov: MT-001**

**MSU Land Grant Status: 1893**

**IPF Code: 1381104**

**NAICS Code: 611310 SIC Code: 8221**

**Agency ID/Business Unit#: 51040**

**Cage Code: 1-KQE9**

**MT Land Grant (Morrill Act): 1862**

## TRAVEL Information:

*Call OSP at X2381 for any questions*

## Lodging Allowances & Meal Per Diems:

	<u>In-State</u>	<u>Out-of-State</u> (10-9-15)	<u>Foreign</u>
<b>Lodging:</b>	\$77.00	\$89.00	Current Federal Rates -
<b>Meals:</b> Breakfast (12:01 am - 10:00 am)	\$5.00	\$11.00	See webpage below
Lunch (10:01 am - 3:00 pm)	\$6.00	\$12.00	Variable Rates
Dinner (3:01 pm - 12:00 am)	\$12.00	\$23.00	Variable Rates
<b>Total meals/day:</b>	<u>\$23.00</u>	<u>\$46.00</u>	Variable Rates

## Mileage Rates:

Car: \$.54, \$.51 after 1,000 mi./month, & 0.26/mi. w/o use justification; Personal Aircraft: \$1.15/mi. (as of 1/1/16)

**Lodging Exceptions:** Lodging without receipt = \$12.00 per day

Actual costs allowed for lodging in high-cost cities and foreign travel rates are available on the web at:

[http://aoprals.state.gov/content.asp?content\\_id=184&menu\\_id=78](http://aoprals.state.gov/content.asp?content_id=184&menu_id=78)

## Dates of Assurances of Compliance:

- Rehabilitation Act - 09/02/77
- Title VI, Civil Rights - 01/06/65
- Title IX, Sex Discrimination - 07/21/76
- FIPS State Code - 30**

## MSU Federal-Wide Assurance Numbers:

- Human Subjects: 00000165 (expires 2/13/20) IRB#00000799
- Animal Welfare: A3627-01 AAALAC #713 (effective 07/15/97)
- MSU Associated Research Level - Intensive**
- FICE Code: 002532**
- SAM Registration 3/6/02, expires 4/26/17

## Date of IDC (F&A) Rate Agreement - 9/17/15

Cognizant Agency: DHHS, Jeanette Lu, 90 7th Street, Suite 4-600, San Francisco, CA 94103

Phone: (415) 437-7820 E-mail: dcafs@psc.hhs.gov

**F&A (IDC) Calculation Examples**  
**Current rates are available on page 1**

<b>Example 1 (without subcontract)</b>		NSF Proposal - allows full federal research rate, 44% Modified Total Direct	
MSU Budget Detail			
Salaries	\$36,000	Subtotal	\$68,220
Benefits	\$11,520	IDCs	<u>\$24,737</u> (IDCs are calculated as total directs less
Travel	\$6,000	Total	<u>\$92,957</u> equipment < 5000, 68220 - 12000 = 56220 *
Supplies	\$2,700		.44 = 24737)
Equipment	<u>\$12,000</u>		
Subtotal	\$68,220		

<b>Example 2 (with subcontracts)</b>		NSF Proposal - allows full federal research rate, 44% Modified Total Direct Proposal includes 2 subcontracts of \$35,000 each	
MSU Budget Detail			
Salaries	\$36,000	Subtotal	\$138,220
Benefits	\$11,520	IDCs	<u>\$49,377</u> (IDCs are calculated as total directs less
Subcontracts	\$70,000	Total	<u>\$187,597</u> equipment < 6000, and 1st \$25k on
Supplies	\$2,700		subcontracts)
Travel	\$12,000		(IDCs 138220-6000-20000 = 112220 * .44 = 49377)
Equipment	<u>\$6,000</u>		
Subtotal	\$138,220		

<b>Example 3</b>		State of Montana (BOR Policy) allows 25% - unless Federal pass through then full federal negotiated rate applies	
MSU Budget Detail <i>25% of total direct costs</i>			
Salaries	\$35,000		
Benefits	\$11,200		
Travel	\$4,500		
Supplies	\$2,750		
Subtotal	<u>\$53,450</u>		
IDCs	\$13,362 (53450* .25 = 13362)		
Total	<u>\$66,812</u>		

<b>Cost Share/Match Calculation Example</b>		MSU Cost Sharing Policy is available at:	
Mt Board of Research & Commercialization requires 25% match of total funds requested			
MSU Budget Detail			
Requested from sponsor	\$187,500.00	<a href="http://www.montana.edu/wwwvr/osp/Costsharingpolicy.html">http://www.montana.edu/wwwvr/osp/Costsharingpolicy.html</a>	
25% match required	<u>\$62,500.00</u>		
Total	<u>\$250,000.00</u>	(250000 * .75 = 187500) (250000*.25 = 62500)	

For specific budget questions contact your OSP Fiscal Manager at 994-2381.  
 Fiscal Manager department assignments are available at:  
<http://www.montana.edu/wwwvr/osp/grants/OSPFiscalManagers.pdf>

Rates as of 9/26/16	Monthly salary (@ 1.0 FTE), 2% salary increases will be effective January 1, 2017	Current fringe benefit rate (will change if FTE changes or if MSU benefit rates increase)
Marcel Huijser	\$ 7,994.57	33.10%
Matt Blank	\$ 6,239.88	61.50%
Rob Ament	\$ 8,041.67	42.50%
Jeralyn Brodowy	\$ 7,061.16	34.60%
Communications staff	\$ 4,446.83	43.50%
	<b>Hourly rate</b>	<b>current benefit rate</b>
James Begley	\$ 37.50	8.70%

## EXHIBIT C COST PROPOSAL

### Budget

The proposed budget is shown below. This includes the two Contracted Services Agreements and an IDC rate of 44%.

		WTI Team							Other Direct Expenses			Totals
		Marcel Huijser	Matt Blank	Rob Arment	James Begley	Jeralyn Brodowy (admin)	Communications staff	Total Hours/Total Costs	Travel for site visits and meetings	Contracted services agreement Corinna Riggins	Contracted services agreement (Ed R. Jenne illustration)	Total Costs
Task #	Task Title	\$61.43	\$58.18	\$65.37	\$38.05	\$54.88	\$36.85					
0	Kick-off meeting (phone)	8						8				
		\$491.44			\$0.00	\$0.00	\$0.00	\$491.44				\$491.44
1	Literature review	40	40					80				
		\$2,457.20	\$2,327.20		\$0.00		\$0.00	\$4,784.40		\$ 1,000.00		\$5,784.40
2	Data gathering, analyses, procedures	80	40		80			200				
		\$4,914.40	\$2,327.20		\$3,044.00		\$0.00	\$10,285.60		\$ 4,000.00		\$14,285.60
3	Field review, formulation mitigation measures	80	80					160				
		\$4,914.40	\$4,654.40		\$0.00		\$0.00	\$9,568.80	\$ 3,000.00	\$ 2,000.00	\$ 10,000.00	\$24,568.80
4	Review potential funding sources			40				40				
		\$0.00		\$2,614.80	\$0.00		\$0.00	\$2,614.80				\$2,614.80
5	Public meeting	40		80				120				
		\$2,457.20		\$5,229.60	\$0.00		\$0.00	\$7,686.80	\$ 1,500.00	\$ 3,000.00		\$12,186.80
6	Final report	106	20			20	20	166.046				
		\$6,514.41	\$1,163.60		\$0.00	\$1,097.60	\$737.00	\$9,512.61				\$9,512.61
<b>TOTAL HOURS</b>		354	180	120	80	20	20	774.046				
<b>TOTAL DIRECT COSTS (includes ben.)</b>		\$21,749.05	\$10,472.40	\$7,844.40	\$3,044.00	\$1,097.60	\$737.00	\$44,944.45	\$ 4,500.00	\$ 10,000.00	\$ 10,000.00	\$69,444.45
0.44	Indirect Costs at 44%	\$9,569.58	\$4,607.86	\$3,451.54	\$1,339.36	\$482.94	\$324.28	\$19,775.56	\$1,980.00	\$4,400.00	\$4,400.00	\$30,555.56
<b>Total Project Costs</b>		\$31,318.63	\$15,080.26	\$11,295.94	\$4,383.36	\$1,580.54	\$1,061.28	\$64,720.00	\$ 6,480.00	\$ 14,400.00	\$ 14,400.00	\$100,000.00



## EXHIBIT D

August 13<sup>th</sup>, 2016

Amy Ramage, PE  
Engineering Dept. Manager,  
Teton County Engineering  
320 S. King Street, Jackson,  
Wyoming 83001

Dear Ms. Ramage,

The Western Transportation Institute (WTI) and our partners are committed to assisting with the development of a wildlife mitigation masterplan for highways and roads in Teton County. We look forward to the opportunity to address issues related to human safety, biological conservation, and economics for Teton County.

The WTI and subcontractor team offers top experts, and most importantly, project experience with rural transportation issues that directly applies to current transportation needs. WTI researchers and partners for this project not only have general experience in road ecology, traffic safety and planning, but we also have specific experience in working on infrastructure in Teton County.

The academic credentials of our team illustrate that we are not only aware of the current state of knowledge; we are actually at the forefront of generating the knowledge that is required to implement effective and economically sustainable mitigation measures. Our research is applied, our recommendations are based on data, and we are motivated by making a difference in the real world.

We have attached a proposal in response to your request. We look forward to working with you, and establishing a productive, long-term relationship. If you have questions or would like to discuss next steps, please contact Marcel Huijser, Road Ecologist, at [mhuijser@montana.edu](mailto:mhuijser@montana.edu) or 406-543-2377

Sincerely,

A handwritten signature in blue ink, appearing to read 'MH' followed by a flourish.

Marcel Huijser, PhD

P.O. Box 174250  
Bozeman, MT 59717-4250  
[www.wti.montana.edu](http://www.wti.montana.edu)

Tel (406) 994-6114  
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E-mail [wti@coe.montana.edu](mailto:wti@coe.montana.edu)

**Mountains & Minds**

# **TETON COUNTY WILDLIFE CROSSINGS MASTER PLAN**

## **Proposal**

Prepared for:

Teton County Engineering  
320 S. King Street  
Jackson, Wyoming 83001

Prepared by:

Western Transportation Institute (WTI)  
College of Engineering, Montana State University  
P.O. Box 174250  
Bozeman, MT 59717 – 4250

August 13<sup>th</sup>, 2016

## Introduction

Teton County, is located in the Greater Yellowstone Ecosystem, a uniquely intact ecosystem that is home to abundant and diverse wildlife species. At the same time, Teton County's human population is growing rapidly, at times coming into conflict with wildlife. One consequence of development is rising traffic volume and an associated increase in the ecological impacts of roads. Roads can have a variety of impacts on wildlife species, including direct mortality (e.g. when animals get hit by cars), acting as partial or complete barriers to animal movements (both terrestrial and aquatic species), and reducing the habitat that is effectively available to wildlife. Vehicle collisions with large mammals also pose a significant human safety problem.

Protecting wildlife populations is a central community value, as reflected in the Teton County Comprehensive Plan. Specifically, Plan policies 1.1.c and 1.4.d identify maintaining wildlife habitat connectivity and safe wildlife highway crossings as priorities. At present, however, there is no comprehensive plan for how to achieve this goal in Teton County. This proposal is in response to a request for proposals from Teton County for a Wildlife Crossings Master Plan that would set priorities, identify suitable mitigation measures, and provide cost estimates for effective and safe wildlife crossings in the County.

At the Western Transportation Institute (WTI), we have extensive experience in providing solutions for the transportation systems of today and tomorrow. WTI is a leader in applied research on the concerns of today's transportation networks. With a focus on rural problems and an interest in sustainable road systems, we work with federal agencies, state DOTs, Counties, private-sector companies and nonprofits to deliver real-world solutions. WTI works across the country and internationally to raise the bar in transportation research and applied solutions.

Our team of road ecologists at WTI are world leaders in their field. We conduct original applied research into the effectiveness of mitigation measures aimed at reducing wildlife-vehicle collisions and providing safe crossing opportunities for wildlife. We have also developed a cost-benefit model for evaluating the economics of wildlife mitigation measures. We care about applying effective mitigation measures we know will work. WTI road ecologists not only integrate existing knowledge for clients; WTI road ecologists are actually at the forefront in their field and generate the knowledge that is required to implement effective and economically sustainable mitigation measures.

Our team is composed of four WTI road ecologists (Marcel Huijser, Rob Ament, Matt Blank, James Begley) that collectively bring expertise in mitigation measures for large mammals and aquatic species, cost-benefit analyses, spatial analyses, and policy. Our team also includes road ecologist Corinna Riginos, a resident of Teton County and expert on large mammal road ecology in western Wyoming, and Ed Jenne, an illustrator with extensive experience in conceptual and technical illustrations including drawings of wildlife mitigation measures and fish passages. Together, we possess the knowledge and experience to provide a high quality Master Plan for wildlife crossings in Teton County that applies cutting-edge concepts in road ecology and mitigation technologies to the specific conditions and considerations at play in Teton County.

## Objective

Provide Teton County with information and tools that identify high priority road sections that qualify for the potential implementation of mitigation measures for wildlife and aquatic species. The measures are aimed at reducing wildlife-vehicle collisions with large mammals, providing safe crossing opportunities for large mammals, and making stream crossings passable for fish species.

## Approach

We reorganized the tasks described in the Request for Proposals to illustrate our step-wise approach. The final product of our work will be a technical document that reflects the expertise of the team members based on existing data, a field review of selected sites along the road sections described in the Request for Proposals, and cost-benefit analyses for the suggested measures. We will coordinate with the Advisory Group from Teton County before the work is initiated and at several points during the course of the project. In addition, we will seek input from other stakeholders including Wyoming Department of Transportation, Wyoming Game and Fish, U.S. Fish and Wildlife National Elk Refuge, Grand Teton National Park, and key NGOs working on these issues in Teton County such as the Jackson Hole Wildlife Foundation, the Greater Yellowstone Coalition, and the Jackson Hole Conservation Alliance. Finally, there will be one public meeting where we will illustrate the impacts of roads and traffic on large mammals and fish species in Teton County, discuss potential solutions with the public, and seek their feedback. We will create conceptual and technical drawings to illustrate a range of potential solutions for selected road sections to help stakeholders and members of the public visualize potential solutions.

## Tasks

### **Task 1. Conduct a literature review and synthesize and summarize the impacts to wildlife and habitat connectivity caused by roads in Teton County.**

We propose to update existing literature reviews with the most recent publications that focus on the impacts of roads and traffic on large mammals and aquatic species (especially fish). In addition, our review will highlight the impact of vehicle-collisions with large mammals on human safety. However, most of the review will consist of a summary of the measures aimed at avoiding, reducing, or mitigating these impacts on humans, large mammals and aquatic species. The impacts of roads and traffic on terrestrial wildlife and aquatic species are numerous and varied. Therefore we will focus our efforts on (1) wildlife-vehicle collisions with large mammals, (2) the barrier effect of transportation infrastructure for large mammals and native fish species, and (3) measures aimed at reducing these impacts. Collectively, our team has produced a number of similar literature reviews in the past (e.g. Report to U.S. Congress by Huijser et al. 2008a) and is also familiar with the most recent publications in the field. Members of our team

have consistently worked at the cutting edge of solutions-oriented research in the field of road ecology (e.g. Huijser et al. 2016).

While many mitigation measures have been suggested to reduce collisions with large mammals, wildlife fencing in combination with safe crossing opportunities (e.g. wildlife under- and overpasses) are considered the most effective and robust. However, a recent analysis of multiple sites showed that short fenced road sections (<3 mi road length) are less effective in reducing collisions with large ungulates than longer sections (>3 mi road length) (Huijser et al. 2016). Fence-end treatments and other measures that encourage wildlife to cross the road straight at fence ends are essential, especially for relatively short mitigated road sections. This new knowledge is especially relevant in multi-functional landscapes such as Teton County with varied land use and where landscape aesthetics are a concern. Animal detection systems can be similarly effective, but they are less predictable in their effectiveness and can suffer from a range of technological and management problems. We will take these considerations into account when making recommendations for Teton County. Finally, we will summarize the concept of cost-benefit analyses for a selection of mitigation measures aimed at reducing wildlife-vehicle collisions and providing safe crossing opportunities. These concepts for cost-benefit analyses will be based on the framework presented in Huijser et al. (2009).

For the purposes of the Teton County Wildlife Crossings Master Plan, we will keep the literature review succinct with a focus on the species and habitat present in Teton County. Our team is very familiar with the relevant data sources and publications from Teton County, particularly as members of our team have conducted several studies in on this topic in Teton County in recent years (e.g. Huijser et al. 2011; Riginos et al. 2013; Huijser & Begley 2015).

## **Task 2. Develop and describe the methodology used to identify and set priorities for large mammal crossing sites and stream crossings.**

Based on the information provided in the Request for Proposals and the literature review (Task 1), our team will select parameters related to human safety (e.g. wildlife-vehicle collision data, especially for large wild ungulates), biological conservation (e.g. important wildlife habitat and wildlife corridors for key species identified by the Advisory Group, seasonal movements, riparian areas, land use and ownership), and economics (cost-benefit data for the implementation of a range of mitigation measures (similar to Huijser et al. 2011)). These parameters will then be applied to the road sections in Teton County that are considered of greatest interest. We will make the final selection of the parameters in consultation with the Advisory Group for the project. In addition, we will suggest a weighting process for the individual parameters with input from the Advisory Group. Once the Advisory Group has approved the parameters, the weighting of the parameters, and the cut-off levels, the five road sections that have highest priority for mitigation for large mammals will be identified and selected for further review. Note that our team already has access to many of the data (Huijser et al. 2011). However, after consultation with the Advisory Group the data may be supplemented with more information, especially for road sections that were not included in the analyses conducted by Huijser et al. (2011).

Teton County and the Advisory Group will provide a list of major stream crossings for the highways and county roads in Teton County (based on the Request for Proposals). We will review the stream crossing sites in the context of existing data. Based on the Request for Proposals no ranking procedure will be developed; all major stream crossings will be reviewed (see Task 3b).

**3a. Describe terrestrial wildlife road crossing mitigation measures appropriate for specific locations within Teton County.**

*a. Develop a cost-benefit analysis to help evaluate the savings in reduced costs to society.*

Members of our team have developed a cost benefit model for implementing wildlife mitigation measures along roads that is already in wide use (Huijser et al. 2009). We propose to apply this model to the road sections and mitigation measures of interest in Teton County (see Task 2) based on existing data (e.g. Huijser et al. 2011; data from Wyoming Department of Transportation, Teton County etc.).

*b. Provide site-specific mitigation solutions for the five highest priority ungulate crossing sites. These must include high-level design recommendations, including some general visualizations in PDF or JPG format suitable for public presentation purposes. Provide schematic level cost opinions for each site-specific solution.*

The five highest priority ungulate crossing sites will be identified through the procedure outlined in Task 2. Specialists from our team (with expertise on collision mitigation, safe crossing opportunities for large mammals, and fish passage in cases where there is also a stream or river crossing), will visit the five highest priority ungulate crossing sites and evaluate what combination of mitigation measures may be most appropriate. We will also invite the Advisory Group and other key stakeholders (as identified earlier). We may choose to develop more than one “mitigation measure package” for each site for discussion with the Advisory Group, other stakeholders, and the general public. The suggested mitigation measures will be “high-level”, detailing the most important features but leaving room for design modifications should Teton County decide to initiate a construction project at a later time. Each mitigation package will be accompanied by a list of pros and cons, indicative costs based on similar projects elsewhere, and sketches made by an illustrator. The sketches will show the type and approximate dimensions of the crossing structure, other design characteristics, wildlife fences or retaining walls (which have reduced impact on landscape aesthetics compared to wildlife fences) designed to keep large mammals off the road, and how the mitigation measures would be situated in the surrounding landscape for each of the five sites (Figures 1-3).

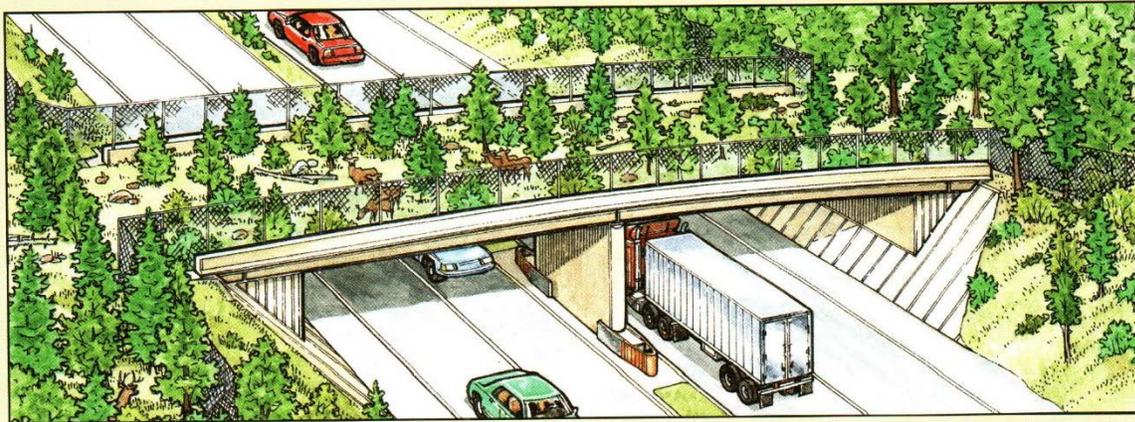
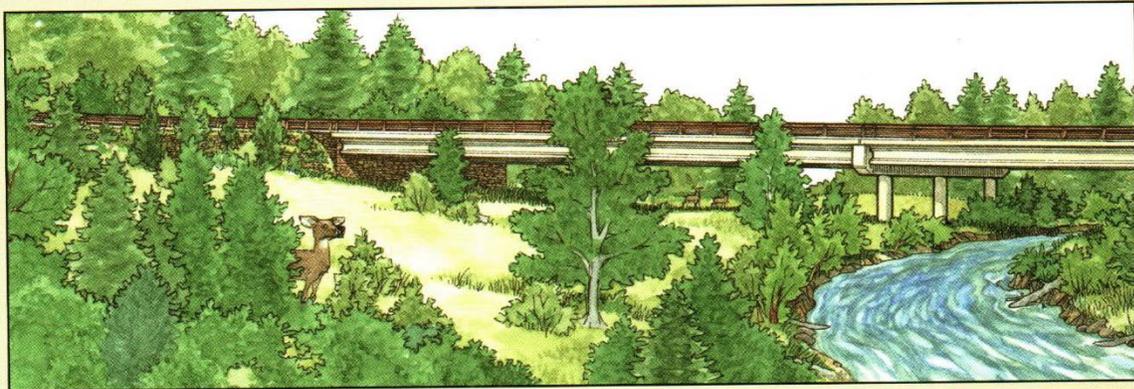


Figure 1. Sample illustration of wildlife underpass combined with a stream crossing and a wildlife overpass (© E.R. Jenne Illustration).

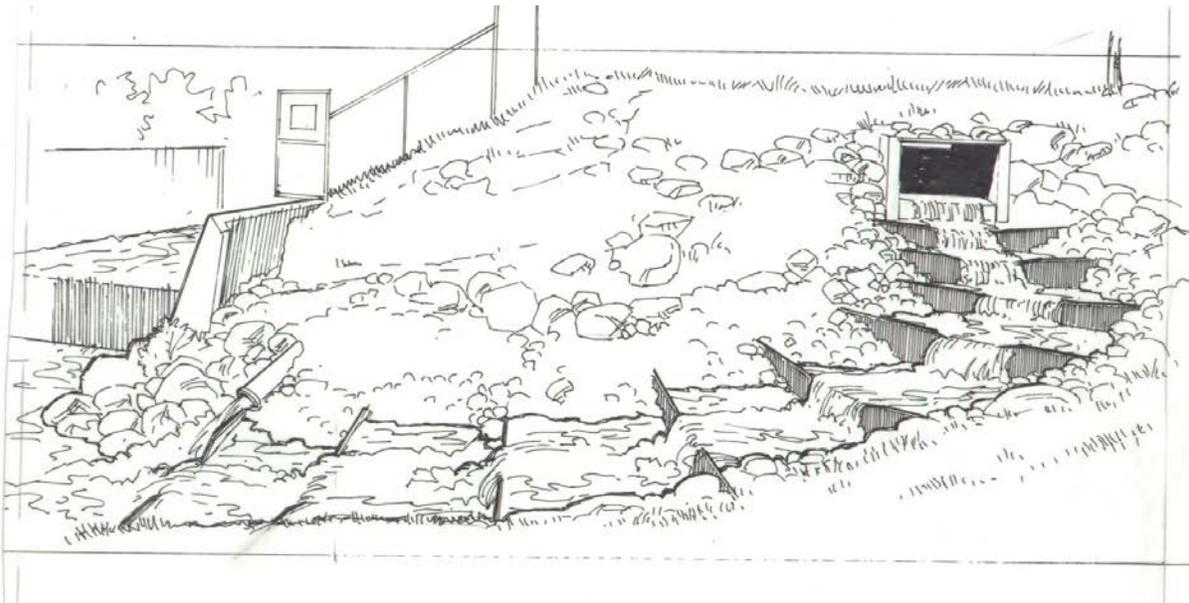


Figure 2. Sample illustration of fish ladder (© E.R. Jenne Illustration).

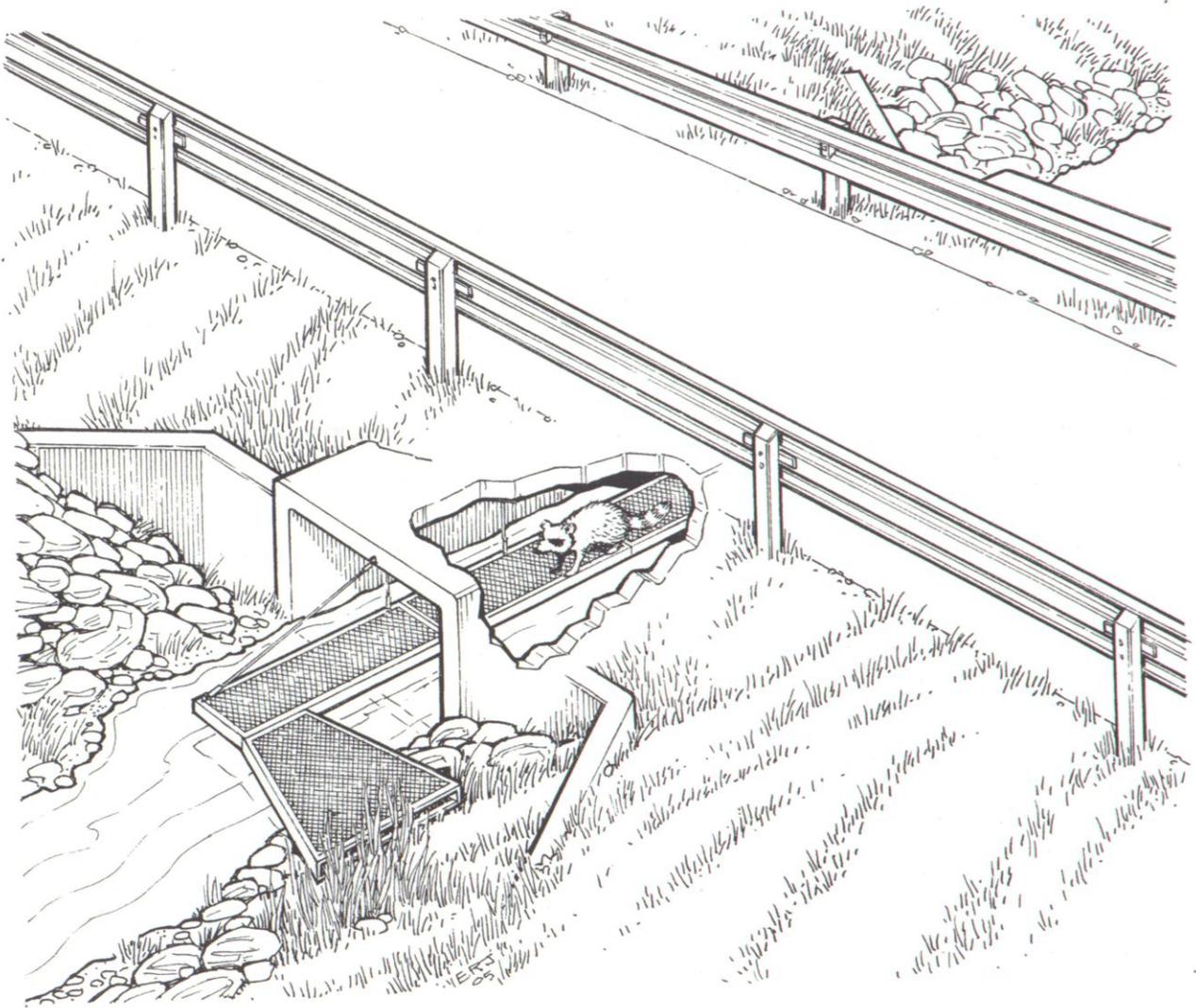


Figure 1. Sample illustration of a stream crossing (culvert) with a shelf that allows small and medium sized mammals to cross through the culvert originally designed for hydrology only (© E.R. Jenne Illustration).

- c. *Provide a strategy for monitoring of crossings and wildlife vehicle collisions to assess effectiveness of any proposed structures/measures.*

Our team has extensive experience with the design and analyses of the effectiveness of wildlife mitigation measures, both in terms of reducing collisions with large mammals and providing safe crossing opportunities for large mammals. One of the strongest study designs is a Before-After-Control-Impact (BACI) analysis (Rytwinski et al. 2015). This is most likely the study design we will recommend for evaluating the effectiveness of the mitigation measures in Teton County. While a BACI approach is now commonly applied to collision reduction studies (based on crash and carcass removal data), it is still less common when evaluating wildlife crossings across highways. It is particularly complex to document wildlife crossings along unmitigated highway

sections where animals can cross almost anywhere. However, thermal cameras are now an affordable and suitable technology to record wildlife highway crossings before the mitigation measures are implemented (Riginos et al. Submitted). Thermal cameras can detect large mammals that cross the road at-grade up to about 100 m distance from a camera. In addition, we will likely recommend a well-established technology (wildlife cameras) to record wildlife passages at wildlife under- and overpasses. Our team not only has extensive experience with design and analyses of BACI data, but we also have hands-on experience with installing and maintaining such research equipment. This will result in solid advice that is grounded in experience.

### **3b. Describe stream crossing measures appropriate for specific locations within Teton County.**

Our team will provide high-level general design recommendations for modification of existing stream crossings for replacing existing stream crossings with new structures. The recommendations are aimed at increasing connectivity for aquatic species, especially native fish species. Specialists from our team (with expertise on fish passage and safe crossing opportunities for large mammals), will visit the highest priority stream crossings and evaluate what combination of mitigation measures may be most appropriate. Our team will also invite the Advisory Group and key stakeholders (as identified earlier) to participate in these site visits. Similar to our activities for ungulate crossing sites, we may choose to develop more than one “general mitigation measure package” for discussion with the Advisory Group, key stakeholders, and the general public. The suggested mitigation measures for stream crossings will be general (not site-specific) and “high-level” outlining the most important features of proposed stream crossings. However, the design recommendations will leave room for potential future design modifications. Each mitigation package will be accompanied by list of pros and cons, indicative costs based on similar projects elsewhere, and a sketches made by an illustrator. The sketches will show the types and approximate dimensions of suggested stream crossings and other design characteristics. Typically, the best mitigation strategy to ensure long-term aquatic connectivity is to build crossings that span the entire stream and riparian area, and thus allow for natural stream and riparian function through the crossing itself. However, in some cases, to protect native species from non-native species, it may be desirable to create a barrier at a crossing or to not remove an existing barrier. For example, one common strategy to protect Yellowstone cutthroat trout from non-native rainbow trout in the Yellowstone region, is to purposely create or leave a passage barrier in the stream or river. This then purposely isolates native cutthroat (upstream) and protects them from competition from non-native species (downstream). Considerations like this can be added to the stream crossing evaluation process and development of mitigation strategies. Lastly, our team will integrate mitigation strategies for terrestrial and semi-aquatic wildlife at stream crossings (e.g. riparian and terrestrial habitat). This integration is very important as one structure can address the barrier effect of a road and associated traffic for both aquatic and terrestrial species. Our team includes members that have specific experience with the design of stream crossings for aquatic organisms including fish (e.g. Burford et al. 2009; Blank et al. 2011; 2014).

**4. Describe potential sources of funding for wildlife crossing measures from federal, state, county, private groups and other sources.**

When motorist safety as well as wildlife conservation are a concern (e.g. through wildlife-vehicle collisions and maintaining or improving habitat connectivity across roads) highway mitigation measures can potentially be funded by a variety of sources. Funding for mitigation projects can include a mix of federal, state, and local agencies as well as non-profit organizations and individuals, or partnerships among these. Our team has extensive knowledge regarding potential funding sources for highway wildlife mitigation measures (Federal highway programs, States' Highway Safety Improvement Programs, Federal Lands Access Program for National Parks, Wildlife Refuges, Forests and local ballot initiatives). A synopsis of these programs was co-authored by a member of our team (Callahan et al. 2012). In addition to transportation programs, there may be opportunities to leverage traditional transportation funding with funding from non-transportation agency funds or interested non-transportation partners. For example, programs that are oriented toward wildlife conservation are an obvious candidate (e.g. protection of threatened and endangered species, improved habitat and ecological connectivity). Members of our team have produced a number of reports that included various means of funding for wildlife mitigation (Nichols et al. 2014; Huijser et al. 2008a; Huijser et al. 2008b). For Teton County, we will suggest a suitable mix of federal, state, local, private individuals and/or non-profit organizations that can be tapped individually or together in order to maximize the eligibility for programs and sources of funding that can be used to implement wildlife highway mitigation measures.

**5. Hold one public meeting, midway through the development of the Master Plan process to hear public comment. Provide visual aids and present information at the public meeting on the proposed Master Plan**

Our team will seek public input and feedback from the public during the development of the Master Plan. We propose developing clear problem statements, clear goals (what is it that we want to achieve), and different scenarios for mitigation measures that will be evaluated in terms of how effectively they meet the stated goals. The purpose of the public meetings will be to listen to the public with regard to their perceived problems, their goals, and what they see as the pros and cons of different mitigation strategies. However, the design alternatives that we will present to the public will have been previously discussed with the Advisory Board and the stakeholders (as defined above) and deemed "acceptable" for presentation to and discussion with the general public. We will make materials available to the general public before the meeting (downloadable from a website). These materials will include sketches of what the different mitigation packages would look like for each site, situated in the landscape of Teton County. We will thoroughly document the opinions expressed by the public during the meeting and discuss them with the Advisory Group after the meeting.

**6. Provide a final written Wildlife Crossings Master Plan document in a format ready for formal adoption by the Teton County Board of County Commissioners and attend the Board hearing to present the final master plan.**

Our team will prepare a Wildlife Crossings Master Plan for the indicated roads and highways in Teton County. The report will include the results of all previous tasks (Tasks 1 through 5). The report will not only identify opportunities to integrate measures with future highway reconstruction efforts but it would also describe potential procedures for wildlife mitigation measures to be implemented as a stand-alone effort. Regardless, high level designs for road and highway sections that may require measures for human safety, biological conservation and economics will be included in the report so that the design and construction process can be initiated relatively quickly. The high level designs will include sketches of the different mitigation packages and maps showing their locations. When appropriate, additional Geographical Information System (GIS) products will be made available in digital format. In addition to producing this report, our team will be prepared to present the final Master Plan to the Teton County Board of County Commissioners.

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## Expectations

<b>Task</b>	<b>Teton County Advisory Group</b>	<b>Key stakeholders</b>
1a. Literature review	Provide resources and contacts	Provide resources and contacts
2a. Identify and set priorities for large mammal crossing sites and stream crossings	Provide feedback on and approve suggested procedures aimed at identifying the five highest priority ungulate crossing sites.	
	Provide a list of major stream crossings for the highways and county roads in Teton County	
3a. Describe terrestrial wildlife road crossing mitigation measures appropriate for specific locations within Teton County.	Participate in field review of 5 highest priority ungulate crossing sites	Participate in field review of 5 highest priority ungulate crossing sites
3b. Describe stream crossing measures appropriate for specific locations within Teton County.	Participate in field review of stream crossings identified by Teton County	Participate in field review of stream crossings identified by Teton County
5. Public Meeting	Arrange for location (room) and equipment (projector) for public meeting. Invite the public and potentially local media. Participate in public meeting.	Participate in public meeting.

## Schedule

The proposed schedule is shown below.

	2016-2017															
Event	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Task 0: Kick-off meeting																
Task 1: Literature review																
Task 2: Gathering existing data and data analyses, describing procedures																
Task 3: Field review (with Advisory Group and stakeholders)																
Task 3: Formulation mitigation packages, consult w. Advisory Group and stakeholders, drawings mitigation packages																
Task 4: Review of potential funding sources																
Task 5: Public meeting																
Task 6: Final report													Draft			Final

## Contracting and Staff

Teton County would contract with WTI-MSU. Most of the proposed staff are WTI employees, but Corinna Riginos would have a contracted services agreement with WTI for the purpose of this project. Ed Jenne would have an additional contracted services agreement with WTI for the drawings. The qualifications of the proposed key personnel are highlighted on the following pages. WTI conducts contract research for various entities; we are responsive to our funders and stay on budget and schedule. Should problems arise we communicate with our funders to identify the best possible solutions.

## Marcel Huijser, PhD

Research Ecologist, Western Transportation Institute

### Qualifications Overview

Marcel Huijser is a research ecologist with 23 years of experience. Specializing in road ecology since 1995, he has conducted research in Europe, North America, South America and Asia. His focus is on the ecological impacts of transportation infrastructure as well as mitigation measures aimed at reducing these impacts. Most of his research relates to reducing large mammal-vehicle collisions, providing safe crossing opportunities for wildlife, and cost-benefit analyses regarding the implementation of mitigation measures. Huijser has taught a road ecology course for MSc and PhD students and has also provided several multiple day courses to various agencies and toll road companies.

Marcel Huijser has led several dozens of road ecology projects, **including a report to U.S. Congress** on reducing wildlife-vehicle collisions (2008), and several handbooks containing practical suggestions on implementing effective mitigation measures aimed at reducing wildlife-vehicle collisions (2008) and providing safe crossing opportunities for wildlife (2011). While mitigation measures may be required based on human safety and biological conservation parameters alone, Huijser also developed a cost-benefit model (2009) that serves as a decision support tool based on economics. While Huijser is an applied research ecologist he also values publishing in peer-reviewed journals.

### Selected Relevant Project Experience

1. Evaluation of wildlife crossing structures and fencing along Hwy 93, Montana. Funded by Montana Department of Transportation, Federal Highway Administration, and US DOT (\$900,000; 2002-2016).
2. Survey for all states and provinces in the US and Canada to document the current practices with the collection, analyses and use of animal-vehicle collision and animal carcass data. Funded by the Transportation Research Board, National Academies (\$30,000; 2005-2007).
3. Wildlife-vehicle collision reduction study: report to congress. Funded by Federal Highway Administration (\$185,000; 2006-2009).
4. Cost-benefit analyses of mitigation measures aimed at reducing collisions with large ungulates in the United States and Canada: a decision support tool. Funded by the Wilburforce Foundation (\$3,000; 2008-2009).

### Years of Experience: 24

#### Project Role

- Principal Investigator

#### Subject Area Expertise

- Road ecology
- Ecological impacts of transportation infrastructure
- Mitigation measures aimed at reducing large mammal-vehicle collisions and providing safe crossing opportunities for wildlife
- Cost-benefit analyses for wildlife mitigation measures

#### Education

- PhD, road ecology, Wageningen University, The Netherlands
- MSc, ecology, Wageningen University, The Netherlands

#### Key Skills

- Ecology
- Data analyses
- Writing and presentation
- Project management

#### Contact:

- mhuijser@montana.edu
- 406-543-2377

## Corinna Riginos, Ph.D.

Research Associate, Northern Rockies Conservation Cooperative

### Qualifications Overview

Corinna Riginos is a research ecologist with 15 years of experience. She has worked on a variety of issues surrounding ungulates and their relationships with their habitat, both in North America and in Africa. One focus of her work is in understanding the ecological impacts of transportation infrastructure on ungulates and testing mitigation measures aimed at reducing these impacts. She has recently completed two studies for the Wyoming Department of Transportation (WYDOT) on deer-vehicle collisions and is currently leading three more related projects in Wyoming. She led the analysis and presentation of results from a WYDOT-funded study on mule deer road crossing and collision patterns in Teton County and is well-versed in the issues of road ecology in Teton County. As a resident of Jackson, WY, she also has strong existing relationships with key partners in the region, including biologists at Wyoming Game and Fish Department Grand Teton National Park and the Bridger-Teton National Forest, transportation engineers at WYDOT, and the leaders of key local NGOs. Corinna is experienced in communicating with the public and stakeholders and has also published her research widely in peer-reviewed journals.

### Selected Relevant Project Experience

1. Led analysis and reporting on a study evaluating mule deer (*Odocoileus hemionus*) movement and habitat use patterns in relation to roadways in Teton County. Funded by WYDOT and Federal Highway Administration (FHWA), report completed in 2013.
2. Led study of the effectiveness of wildlife warning reflectors on wildlife vehicle collisions in central Wyoming. Funded by WYDOT and FHWA, report completed in 2015.
3. Leading study: Planning-support for mitigation of wildlife-vehicle collisions and highway impacts on migration routes in Wyoming. Funded by WYDOT and FHWA, \$27,000, 2014-2016.
4. Leading study: Priority areas for reducing Golden eagle-vehicle mortalities. Funded by National Fish and Wildlife Foundation, \$102,000, 2016-2017.
5. Leading study: Traffic thresholds in deer road crossing behavior. Funded by WYDOT and FHWA, \$38,000, 2016

### Years of Experience: 15

#### Project Role

- Research ecologist

#### Subject Area Expertise

- Ungulate-habitat relationships
- Road ecology
- Mitigation measures aimed at reducing large mammal-vehicle collisions and providing safe crossing opportunities for wildlife

#### Education

- PhD, Ecology, University of California, Davis
- BSc, Environmental Science, Brown University

#### Key Skills

- Ecology
- Data analyses
- Knowledge of wildlife-vehicle and animal movement patterns in Teton County
- Relationships with stakeholders and partners in Teton County

#### Contact:

- criginos@gmail.com
- 307-413-2280

## Rob Ament, MSc

Research Scientist, Western Transportation Institute

### Experience Overview

Rob Ament, M.Sc., Biological Sciences, is the Road Ecology Program Manager for the Western Transportation Institute – Montana State University (WTI). Rob has more than 30 years of experience in ecology, natural resource management, environmental policy and organizational development. At WTI, Rob leads efforts to research, monitor and develop solutions to minimize the impacts of roads on the natural environment, wildlife, aquatics, vegetation and climate. He oversees 7 staff in three offices in western North America that are working on approximately 15 active projects. He has recently facilitated workshops and reports for the development of roads and wildlife mitigation strategies for the Western Governors Association, ARC-Solutions ([www.arc-solutions.org](http://www.arc-solutions.org)) and the California Department of Transportation.

### Selected recent publications in past year:

Lister, N.M., Brocki, M. and R. Ament. 2015. Integrated adaptive design for wildlife movement under climate change. *Frontiers in Ecology and the Environment* **13**: 493–502. <http://dx.doi.org/10.1890/150080>

Kociolek, A.V., Ament, R.J., Callahan, A.R., Clevenger, A.P. 2015. Wildlife crossings: The new norm for transportation planning. *Institute of Transportation Engineers Journal*, 85(4): 45-47.

### Relevant project experience as the principal investigator:

Wildlife and the transportation network in the American West: The use of wildlife data in 16 western states. 2015. A report prepared pursuant to Cooperative Agreement DTFH61-13-H-00005 between the Western Governors' Association and the Federal Highway Administration, Washington, D.C.

[http://www.westgov.org/images/images/WGA\\_FHWA\\_FinalReport.pdf](http://www.westgov.org/images/images/WGA_FHWA_FinalReport.pdf)

Highway mitigation for wildlife in northwest Montana, Estimating the impacts of exurban growth and traffic demand on grizzly bears and other key wildlife species. 2015. Prepared for the National Fish and Wildlife Foundation. The Sonoran Institute, Northern Rockies Office, Bozeman, MT. 84 pp.

<http://largelandscapes.org/media/publications/Highway-Mitigation-Wildlife-NW-Montana.pdf>

Where people and wildlife intersect, Prioritizing mitigation of road impacts on wildlife connectivity. A report to the Great Northern Landscape Conservation Cooperative. The Center for Large Landscape Conservation, Bozeman, MT. 50 pp. <http://largelandscapes.org/media/publications/Where-People--Wildlife-Intersect-Prioritizing-Mitigation.pdf>

### Years of Experience: 30

#### Project Role

- Research Scientist

#### Subject Area Knowledge

- Natural resource research, policy and management
- Science-based program development and implementation
- Organizational development, fundraising, and strategic planning

#### Education

- Master of Science in Biology, Montana State University
- Bachelor of Science in Horticulture, Iowa State University

#### Contact Information:

- [rament@montana.edu](mailto:rament@montana.edu)
- 406-994-6423

## **Matt Blank, Ph.D., P.E.**

**Research Scientist, Western Transportation Institute**

### **Qualifications Overview**

Dr. Blank has over 20 years of experience conducting both academic studies and consulting activities on water resource issues. He is currently a research scientist and assistant research professor at the Western Transportation Institute and the Civil Engineering Department at Montana State University, and serves as a technical director for Environmental Resources Management, a private consulting firm. He is co-principal investigator of a fish passage and swimming research facility that was formed through a partnership with the United States Fish and Wildlife Service, and has been investigating regional fish passage issues for several years. The focus of the fish passage research is on developing engineering design criteria specifically for fish passage and connectivity. He teaches applied fluid mechanics and engineering hydraulics at MSU.

Through both research and consulting activities, Dr. Blank has been involved with the assessment and/or design of over 150 hydraulic structures in rivers and streams across the country and in Canada. This work spans the range of structures from small culverts on gravel roads, to irrigation diversions, to large hydropower dams on major rivers such as Albeni Falls Dam on the Pend Oreille River in Idaho, and Conowingo Dam on the Susquehanna River in Maryland.

### **Selected Relevant Project Experience**

1. Maintaining Migratory Pathways of Imperiled Large River and Small Stream Prairie Fishes in the Face of Climate Change and Energy Development – Bozeman, MT. Funded by the Plains and Prairie Pothole, LLC of the United States Fish and Wildlife Service (\$150,000; 2012 – 2015).
2. Development of Swimming Performance Criteria for Rainbow Trout and Westslope Cutthroat Trout for Passage Assessment and Design – Bozeman, MT. Funded by TEI, Inc., United States Forest Service, University Transportation Center Program of FHWA, USFWS (\$270,000; 2010 – 2014).
3. Culvert and Fish Passage Monitoring Program – North Slope, AK. Funded by BP (Alaska), Inc. (\$200,000; 2013 to present).
4. Hydraulic Structure Design for Flood Conveyance and Fish Passage (20+ crossings) – North Slope, AK. Funded by BP (Alaska) Inc. (~\$500,000 in design costs only; 2007 to present).

### **Years of Experience: 21**

#### **Project Role**

- Aquatic connectivity review, mitigation strategy development, conceptual design and cost estimation

#### **Subject Area Expertise**

- Fish and aquatic species passage
- Hydrology and hydraulics (H&H)
- River hydraulics and stream restoration
- Flood modeling and flood studies.
- Hydraulic structure design (culverts, bridges, irrigation diversions, fishways)
- Engineering design and cost estimation.

#### **Education**

- PhD, Civil Engineering, Montana State University (MSU)
- MSc, Civil Engineering, MSU
- BSc, Geological Engineering, University of Wisconsin-Madison

#### **Key Skills**

- Hydrology, hydraulics and fisheries data analysis and integration
- Project management

#### **Contact:**

- mblank@montana.edu
- 406-994-7120

**James S. Begley, M.S.**  
**Spatial Data Analyst, Western Transportation Institute**

**Key Qualifications**

James Begley has nearly 20 years of experience with wildlife research and management issues pertaining to a wide variety of wildlife species. He has extensive experience with GIS analyses, modeling, and mapping for projects ranging from small urban forests to national forest planning clusters. For example, James was heavily involved with wildlife sustainability assessments required for forest plan revisions of national forests in Northeast Washington and Northeast Oregon.

**Selected Relevant Project Experience**

Assisted with WTI's efforts with pre-construction wildlife research and monitoring for proposed wildlife crossing structures associated with the Snoqualmie Pass East project. Duties included surveying for carnivores using non-invasive techniques, remote camera surveys, small mammal live-trapping, snow tracking, and database/project management.

Conducted GIS analyses for road ecology projects in Jasper National Park (Canada), Boundary County (Idaho), Cabinet-Purcell range (Montana), Jackson area (Wyoming), and central California.

Developed dispersal habitat connectivity models for American marten, Canada lynx, grizzly bear, and wolverine to help managers determine impacts of a proposed expansion for the Stevens Pass Resort, Washington.

Conducted GIS modeling for terrestrial species sustainability assessments for forest plan revisions of national forests in Northeast Washington and Northeast Oregon.

Developed land stewardship plans as a natural resources consultant for a conservation easement within the Suncadia master plan resort and the City of Roslyn's designated urban forest. Duties and responsibilities included the development of stand by stand, site specific prescriptions to achieve goals of wildlife habitat enhancement/restoration, hazardous fuels reduction, human safety, recreation, and visual aesthetics.

Participated in the following wildlife research studies for the United States Forest Service: (1) National Fire/Fire Surrogate Study; (2) I-90 Wildlife Habitat Linkage Assessment; (3) Pendleton Dry Forest Management Study; (4) Barred Owl Ecology Study; (5) Yakima Elk Habitat Study; and (6) Post Fire/Salvage Harvest Effects on Cavity Nesting Birds. Duties included field data collection, data entry, database management, and analyses.

**Years of Experience: 20**

**Project Role**

- Geographical Information Systems expert, spatial analyst

**Subject Area Expertise**

- Spatial data analyses
- Natural Resource Management

**Education**

- M.Sc., Resource Management, Central Washington University.
- B.Sc., Natural Resource Management (Wildlife), Washington State University.

**Key Skills**

- Spatial data analyses
- Natural Resource Management

**Contact:**

- begleyj@hotmail.com
- 509-933-1340

## Edward R. Jenne

Illustrator, E.R. Jenne Illustration

### Key Qualifications

Edward Jenne has been self-employed as an illustrator for more than 30 years. Ed has a wide range of experience in providing illustration support for a wide range of private and public entities. He is capable of working in numerous different types of illustration media. Ed Jenne has provided illustration for numerous clients to include U.S. Forest Service; U.S. Fish & Wildlife Service; BLM; Montana Fish, Wildlife & Parks; Discovery Map Company; Montana Natural History Center; Adventure Cycling Association; MSU Forestry Extension; WGM Engineering; University of Montana; SBA-SBIR; Mountain Press and Phoenix Publishing.

### Selected Relevant Project Experience

Technical illustrations of wildlife friendly fencing for the publication: *A Landowner's Guide to Wildlife Friendly Fences*, Montana Department of Fish, Wildlife and Parks, 2008

Illustrations of wildlife corridor solutions for publication: *Conserving Biodiversity Through Sustainable Forestry*, National Commission on Science for Sustainable Forestry, 2007

Illustrations of wildlife corridor incorporation in Jocko highway project, WGM Engineering

Illustrations of parameters of sensitive wildlife sites for: *Oregon's Forest Protection Laws*, Robert Logan, MSU Forestry Extension

**Years of Experience: 35**

### Project Role

- Illustrator, conceptual and technical drawings of wildlife mitigation measures and fish passages

### Subject Area Expertise

- Conceptual illustrations
- Technical and engineering illustrations

### Education

- Bachelor of Arts, Biology, University of Montana

### Key Skills

- Illustration in various media
- Ability to research, produce and coordinate detailed illustrations for large or complex projects
- Ability to interpret and utilize various sources of reference material in preparing layouts

### Contact:

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- 406-543-5535



**Board of County Commissioners - Staff Report**

**Fiscal Impact:**

The fiscal impact of this contract is \$100,000 plus staff time.

\$100,000 was allocated in the FY2016 capital budget for this item. Account 37-4-037-008-003 Safe Wildlife Crossings.

Note that the way that a University-sponsored group bills out their personnel is somewhat different than standard consultants. Rather than charging an hourly rate which includes overhead, they invoice based on percentage of their time worked on the project each month. The monthly salary rates and their indirect cost worksheets are included within the contract. Montana State University will bill actual costs for all expenses, including salaries, benefits, and other direct costs, plus 44% indirect costs on all expenses. MSU salaries will increase by 2% on January 1, 2017, however this will not impact the overall not-to-exceed amount of \$100,000.

**Staff Impact:**

Engineering staff will manage this project. This project is expected to require significant staff time.

**Legal Review:**

Gingery

**Staff Input / Recommendation:**

The staff-assembled advisory committee recommends awarding the contract to Western Transportation Institute.

**Attachments:**

Proposed Contract with Western Transportation Institute

**Suggested Motion:**

I move to approve a contract with Western Transportation Institute for professional services for preparation of the Teton County Wildlife Crossings Master Plan in the amount not to exceed \$100,000.00.