

**DIVISION OF PUBLIC HEALTH  
DPH CONTRACT 27448  
AMENDMENT #3**

The Department of Health Services, on behalf of the Division of Public Health and Iron County Health Department agree to amend their original agreement for the program(s) titled Preventive Health and Health Services (PPHS) (Profile 159220) and Environmental Public Health Tracking (Profile 155078) as follows:

REVISION: SECTION 5. SERVICES

Additional projects to be completed as detailed in attached Exhibit(s).

REVISION: SECTION 34.A.2

Insert: "The due date of the final fiscal report for Profile 159220 and 155078 shall be sixty (60) days after the Grant Agreement Period ending date. Expenses incurred during the Grant Agreement period on Profile 159220 and 155078, but reported later than sixty (60) days after the period ending date, will not be recognized, allowed or reimbursed under the terms of this Grant Agreement."

Adjustment will be made to the Community Aids Reporting System (CARS) based on the information in the table below.

Agency #	Agency Type	Profile #	Current Contract Level	Contract Change Amount	New Contract Level	Funding Period
26	630	159220	\$0	\$4976	\$4976	10/1/14-8/31/16
26	630	155078	\$0	\$10500	\$10500	11/1/15-7/31/16

All other terms and conditions of the original agreement remain unchanged.

\_\_\_\_\_  
GRANTEE's Authorized Representative  
Name:  
Title:

\_\_\_\_\_  
Date

\_\_\_\_\_  
GRANTOR's Authorized Representative  
Chuck J. Warzecha  
Administrator / Deputy Administrator, Division of Public Health  
Department of Health Services

\_\_\_\_\_  
Date

**“Taking Action with Data: Use of the Environmental County Health Profiles to Improve Environmental Health in a Community”**

**Additional Information for Iron County**

Environmental Public Health Tracking (EPHT) Program staff members Paul Creswell and Megan Christenson had a kick-off conference call with Elizabeth Ruder (Environmental Health Specialist, Iron County) and Zona Wick (Health Officer, Iron County) on Wednesday, December 2, 2015.

Additional information regarding the application from Iron County was sought by Paul and Megan. Specifically, details on the surveys (preliminary and post-project) that the county was planning to administer and the time-frame for the surveys were asked. Paul inquired about a back-up plan if Iron County did not receive an Area Health Education Centers (AHEC) intern.

Elizabeth commented that Iron County would conduct their preliminary survey with community members to assess what the community already knows about their well water. Iron County intends to target individuals for the survey with whom they will actually work (i.e., distribute the well-water test kits). Their goal is 150 tests/kits. In addition to the preliminary survey, Iron County plans to administer a post-project survey to the participants in order to evaluate the efficacy of the outreach efforts of the project. Elizabeth also said that, in the event Iron County did not receive an AHEC intern, they would recruit for that position from the local colleges.

## **Request for Application**

### **Taking Action with Data: Use of the Environmental County Health Profiles to Improve Environmental Health in a Community**

**RFA # G-0476-DPH-16**

#### **Part I – Applicant information**

Iron County Health Department

Project lead: Elizabeth Ruder, Iron County Environmental Health Specialist

502 Copper Street, Suite # 2

Hurley, WI 54534

715-561-2191

rudere@ironcountywi.org

#### **Part II – Proposal**

##### **A) Environmental Issue Selected**

The Iron County Health Department selects private well water quality as the environmental issue, specifically groundwater contamination measured by nitrates and bacteria levels in private well water samples.

##### **B) Statement of Need**

**1. Jurisdiction of Project:** This initiative will be implemented in Iron County. Private well water data will be collected within the Upper Chippewa watershed. Outreach and education efforts will take place throughout Iron County.

**2. Burden of Environmental Issue:** In Iron County, the intimate connection to freshwater resources extends beyond the 7.5 miles of Lake Superior coastline. Home to 228 inland lakes and more than 220 miles of wilderness shoreline, Iron County draws tourists and recreational enthusiasts from all over the world. Water covers 32% of county land and has shaped the cultural and economic structure. Although residents depend on these pristine waters, there is little information available to assess freshwater contamination in Iron County.

The Gogebic Range in Iron County is rich in iron ore nested within metamorphic rock, which has been mined since the 1880's. Due to the depth to bedrock, type of bedrock, soil characteristics, depth of the water table, and characteristics of superficial deposits, groundwater in this area is highly susceptible to contamination. The reliance on groundwater in Iron County has increased 110% since 1979. Increased draw from groundwater supply is the result of more than 1,800 private wells since 1988 to meet the basic needs of rural residents and accommodate a growing tourism industry. Many more wells predate these records, and are often damaged or improperly abandoned.

Groundwater contamination in Iron County private wells is poorly understood due to low sampling effort and laboratory analyses. Results from private well water quality tests are also not required to be made publicly available, so broader assessments are not currently possible. The Wisconsin Environmental Public Health Tracking Program provides very limited current information on nitrates in public water systems and cannot offer baseline information to assess nitrate contamination in private wells due to low voluntary reporting by private well operators.

In many areas without access to public water systems, private wells often share a relatively small property area with private onsite wastewater treatment systems (POWTS)

or “septics”, and freshwater lakes, rivers, and streams. It is estimated that Iron County is home to more than 3,800 POWTS. Many of which have been poorly maintained for extended periods, resulting in severe deterioration which now requires replacement or rehabilitation in order to prevent leaking and leaching of sewage contents into nearby surface water and groundwater supplies. Without intervention, the combined damaged wells and POWTS continue to act as conduits for the transportation of surface water contaminants such as raw sewage.

The maintenance required to prevent contamination and insure safe drinking water is poorly understood by property owners in Iron County. Additionally, many residents are unaware of abandoned private systems within their property line or how to identify an abandoned POWTS or a private well. Furthermore, with an estimated >10% unemployment rate and approximately 16% of residents living under the national poverty line, economically disadvantaged rural residents of Iron County cannot afford the cost of monitoring bacteria and nitrate levels in their private wells.

In 2014, the Wisconsin Coastal Management Program analyzed 57 well water samples within the Lake Superior watershed. These data provided baseline information that was used to effectively identify contamination and target outreach efforts to mitigate groundwater contamination within the Lake Superior watershed, which spans the northern half of Iron County. The Upper Chippewa watershed is located in the southern portion of the County (Figure 1) and covers 46% of Iron County. The watershed is home to hundreds of lakes in Iron County, including the Turtle Flambeau Flowage, which accounts for more than 19,000 acres of surface water and acts as a year-round hub for tourism in the area. Additionally, this area is dominated by rural and long-standing rustic cabin accommodations, which depend on private drinking water and wastewater systems. Therefore, it is crucial to implement a project that will protect and monitor groundwater supplies and implement outreach and education strategies to achieve long-term solutions.

**3. Resources Currently Available:** Resources that are currently available include Iron County Health Department staff that are experienced in freshwater science and motivated to complete this study and initiate a comprehensive well water and (POWTS) program in Iron County. The Iron County Health Officer, Environmental Health Specialist, Land and Water Conservation staff, and Planning & Zoning staff time will be leveraged by each department. These participants will assist in all aspects of this program, including planning, well water collection strategies and outreach and education efforts. The Iron County Board of Supervisors and Board of Health members are supportive of this initiative and will act as points of contact for rural areas in the county.

### **C) Target Audience**

**1. Identify Population Specified:** The population specified includes all Iron County residents. Specifically, community members residing in rural settings which require the use of a private well for drinking water and a POWTS for sewage thereby increasing the risk of drinking water contamination. Additionally, education and outreach efforts include all Iron County residents that utilize county rivers and lakes for recreation purposes.

### **D) Project Description**

**1. General Overview of Project:** The Environmental Health staff at the Iron County Health Department aims to work with citizens, local officials, non-governmental organizations, and students on a variety of environmental health actions that protect water resources within Iron County. The Environmental Health Division is driven to identify environmental health risks and implement programs and interventions that protect and promote safe environments for all to enjoy. The focus of Environmental Health staff is to

protect drinking and groundwater through monitoring, outreach, and improved management practices.

The proposed project aims to do just that. The program will engage Iron County landowners in education and discussions about land use practices and potential groundwater impacts within the Upper Chippewa River basin. The project will begin with a preliminary survey of rural Iron County residents to identify outreach needs and assess community understanding of private well and POWTS management practices. Next, we will deploy targeted mailing to approximately 500 landowners, followed by a press article on groundwater education, and then a press release on the Private Well Testing Program, including dates for test bottle distribution and collection. Eligible participants will receive the Homeowner's Package from the Water and Environmental Analysis Laboratory (WEAL) at the University of Wisconsin-Stevens Point, which costs \$49 and tests for nitrate, coliform bacteria, pH, alkalinity, hardness, conductivity, corrosivity, and chloride. Collected samples will be transported in batches to WEAL.

A follow-up education program will be presented to participants and Iron County Community members with test results. Because so little is known about groundwater quality in Iron County, it is very important to ensure participation in this program in order to gather baseline information about groundwater in this watershed. This baseline data will be used for continued monitoring, long-term natural resource management, and to provide foundational information for policy reform. To achieve high participation and gather the desired number of test results for the project, the cost of the tests will be covered by the grant so there will be no expense to the landowner. Additional education offered through the project will include techniques for proper well abandonment and introductions to cost-share programs.

The Environmental Public Health Tracking funding opportunity would allow Iron County to continue to collect water samples for baseline data in the Upper Chippewa watershed; educate residents about well test results and the quality of drinking water in the county; offer a complete assessment of current water quality across Iron County; indicate possible sources of ground and surface water contamination; and provide a basis for the initiation of future programs such as the POWTS program in Iron County.

## **2. Project goals and objectives**

### **Goals:**

1. *Increase public understanding* of the roles of private well and POWTS operators in protecting groundwater supplies.
2. *Monitor drinking water and groundwater quality* through the collection of 150 private well water samples and laboratory analyses.
3. *Identify wells and POWTS that are unsafe*, provide support and guidance to POWTS operators, and develop guidelines and local ordinance to improve the management of POWTS in Iron County.

*Present project* using formats that are easily understood and accessed in order to reach a broad audience. Presentations should educate county residents through seminars, online access, as well as outreach efforts at community events in 2016.

### **Objective 1: Collect preliminary data. November 2015- January 2016**

Perform a survey of private well owners to collect information regarding public understanding of private well testing for nitrates and bacteria using a series of simple questions asked over the phone, online, or in person. These preliminary findings will serve to establish outreach and education needs in the community that will be compared to parallel surveys following the completion of the report.

**Objective 2: Collect and analyze private well water samples that may be contaminated by a POWTS. February- June 2016**

Notify public through newspaper, USPS, and online social media of subsidized nitrate and bacteria water testing to rural Iron County residents in the Upper Chippewa watershed operating a private well and a private onsite water treatment system or a privy. Provide education and project requirements to participating residents. Collect and transport private well water samples to WEAL.

**Objective 3: Educate community members and incorporate conclusions into long-term policy and ordinance reform in Iron County. June-July 2016**

Provide drinking water and groundwater education and present project conclusions and GIS mapping access to Iron County residents. Provide education to the community to clarify the importance investing in regular well testing and POWTS maintenance. Demonstrate best practices for private wells and POWTS to promote long-term protection for groundwater and surface water resources. Provide guidance and financial assistance opportunities for operators. Use project conclusions to develop policy and ordinance regarding POWTS maintenance and management. Perform parallel post-project surveys with private well owners to measure efficacy of outreach and groundwater safety education efforts.

**3. Project Timeline:** The timeline for this project is the 10 month award period from November 2, 2015 through July 31, 2016. The project will begin in November with the creation of a combined database of Iron County private well and POWTS operator information and applying for an AHEC student intern in November. In December, Elizabeth will meet with WEAL staff and Health Department staff will prepare individual USPS mailing notifications and social media and newspaper press releases to be posted in January. A mid-project report will be created in March to address any project issues and evaluate progress. Mailing notifications will be sent to eligible participants in March and April and informational seminars will be offered to outline project goals answer questions from community members. Private water samples will be collected and analyzed in May. After identifying contaminated wells, on-site meetings with property owners with at-risk systems will take place in May and June to educate and provide guidance in POWTS and private well management. During these conferences, residents with failing POWTS will be introduced to cost-sharing resources, to offset a portion of the cost of rehabilitation or replacement of an existing POWTS. Outreach efforts will take place in May and June, releasing the results of the project on the Iron County Health Department website and on the Water Quality Viewer. The conclusions of the project will be presented to Iron County residents on two occasions in seminar format in June and July. A final report of the project will be complete and submitted in July as well as ordinance drafting. An invoice will be submitted before August 31, 2016 to complete the project.

**4. Health Equity Consideration:** Health equity will be assured during this project as the provision of clean drinking water demonstrates a core function in public health and is paramount in all aspects of health for Iron County residents. Eligibility for participation in this project is not precluded by financial need, since free water testing kits will be provided to any Iron County resident with a private well and a POWTS. Outreach will not only be done in local newspapers and radio, but in mailings to homes, information on health department and partner websites, school newsletters, and posters in the community.

**5. Roles of Collaborating Partners:** Collaborating partners include the Iron County Zoning Department who will assist us with gathering contact information for private well

and POWTS operators for our outreach efforts and surveys. The Planning and Zoning Administrator, Tom Bergman works closely with the Iron County Health Department on issues with water and POWTS and is interested in expanding this partnership to include writing ordinances for the maintenance and inspection of current septic systems in the county. Iron County Land and Water Conservationist, Heather Palmquist, provide assistance gathering data, water sampling, and outreach to the public. The support staff at the Iron County Health Department include Melissa DeCarlo and Sue Herlevi and an undergraduate student intern. They will assist with project management tasks, media press releases, and performing surveys. Kevin Masarik, a Groundwater Outreach Specialist, has offered to assist with data synthesis and presentation in GIS format in the Wisconsin Water Quality Viewer. Additionally, Neil Martinko, the Iron County GIS Specialist will assist with mapping presentations specifically for Iron County. Local officials, including the Board of Supervisors and the Board of Health, will assist in assuring the health of the community and initiating programs that improve health outcomes.

**E) Project Work plan**

<b>Activity</b>	<b>Person Responsible</b>	<b>Timeline</b>	<b>Evaluation Measure</b>
<b>Objective 1: Collect preliminary data</b>			
Hold meeting between all project participants to review project goals, structure, and individual roles, and share ideas.	Elizabeth Ruder Heather Palmquist Zona Wick Tom Bergman Erica Roeder	11/02/2015-11/18/2015	Program meeting to be held on or prior to 11/18/15 All participants sign written work plan
Create combined database including private wells and POWTS in Iron County	Elizabeth Ruder Erica Roeder *Sara Hughes	11/02/2015-11/31/2015	Database is complete with all information available on or prior to 11/31/15
Complete AHEC internship application for Iron County Health Department	Elizabeth Ruder Zona Wick	11/02/2015-11/24/2015	Application is submitted on or prior to AHEC deadline 11/26/2015
Organize and plan with UWSP laboratory and Well Water Viewer Staff	Elizabeth Ruder *Bill DeVita *Kevin Masarik	12/01/2015-12/31/2015	Time period for water sample transport to laboratory is tentatively decided 12/31/15
Prepare mailing notification and media press releases	Elizabeth Ruder Melissa DeCarlo Heather Palmquist	12/01/2015-12/31/2015	All notifications are prepared on or prior to 12/31/15 to be released in 2016
<b>Objective 2: Collect/analyze private well water samples that may be contaminated by a POWTS.</b>			
Release program information in newspaper, social media, and through outreach events	Elizabeth Ruder Melissa DeCarlo Sue Herlevi Heather Palmquist	01/01/2016-05/15/2016	Community has been informed via social media, outreach, newspaper advertisements, 5/15/2016
Create database of participant information	Elizabeth Ruder Student Intern	01/01/2016-5/01/2016	150 participants are available in the database for water sample collection 05/2016
Send program information to potential participants (USPS)	Melissa DeCarlo Student Intern	3/1/2016	All information packets are delivered by 03/05/2016

Provide informational seminars and social media releases	Elizabeth Ruder Student Intern	3/2/2016- 04/31/2016	Seminars take place in Mercer and Springstead and online via Iron County social media
Collect samples and transport to UWSP Water and Environmental Analysis Laboratory	Elizabeth Ruder Tom Bergman Heather Palmquist Student Intern	05/01/2016-5/31/2016	All participant submissions are at UWSP laboratory facilities on or prior to 5/20/2016
<b>Objective 3: Educate community members and evaluate, and incorporate conclusions into long-term policy and ordinance reform in Iron County</b>			
Analyze and synthesize data to present findings	Elizabeth Ruder Kevin Masarik Student Intern Heather Palmquist	05/15/2016-06/16/2016	Clear graphical interpretations and informative literature are widely available to participants and the public on 6/16/16
Present data and perform public education and private outreach to property owners with high-risk results	Elizabeth Ruder Student Intern Tom Bergman Heather Palmquist	06/01/2016-07/15/2015	Presentations in Mercer and Springstead take place before 07/20/15, consultation occurs prior to 07/28/2016.
Perform post-project survey	Student Intern Elizabeth Ruder	06/01/2015-07/24/2015	Post-project Surveys are completed and compiled on or prior to 07/28/2016.
Incorporate project findings into ordinance ordinance restructuring	Tom Bergman Heather Palmquist Elizabeth Ruder Health Officer	06/01/2016-08/31/2016	Local ordinance is drafted on or prior to 08/31/16 incorporating wellhead and POWTS management plans

## F) Project Evaluation

**1. How will this project be evaluated?** The project will be evaluated by the successful collection of 150 water samples, a completed database that will be added to the 2013-14 Wisconsin Coastal Management Program data, completion of documented outreach and education to residents in the county, and completion of the 8 grant requirements to be written and submitted with a final invoice by August 31, 2016. Project progress will be reported to the Iron County Board of Health at quarterly meeting and a final report submitted.

**2. How will success be demonstrated?** Project success will be demonstrated by the completion of the work plan, successful collection of water samples, increased community awareness regarding safe groundwater supplies, providing property owners with resources to improve private systems and their health, and foundational data to develop policy and Iron County ordinances on POWTS maintenance schedules and inspections.

## Part III – Budget

A)

**Taking Action with Data: Use of the Environmental County Health Profiles to Improve Environmental Health in a Community**

October 1, 2015 - July 31, 2016

Local Public Health Agency

or Tribal Health Agency Name: **Iron County Health Department**

Fiscal Agent Representative:

Zona Wick

Representative Phone:

715-561-2191

Representative E-mail:

[wickz@ironcountywi.org](mailto:wickz@ironcountywi.org)

Budget Items		Totals	
<b>PERSONNEL</b>			
<b>Salaries</b> (List Name(s), Position, FTE Equivalent)	Elizabeth Ruder, Environmental Health Specialist, 0.25 FTE	\$0	
<b>Fringe Benefits</b> (List Name)			\$0
<b>Total Personnel</b>			\$0
<b>CONSULTANT/CONTRACTED STAFF</b>			
List Name, Position, FTE Equivalent	WI AHEC Intern, Environmental Health Assistant, 0.5 FTE	\$1,200	\$1,200
	Heather Palmquist, 0.10 FTE		
<b>SUPPLIES</b>			
Itemize	Project Publication Newspaper Advertisement (\$50 x 6)	\$300	\$745
	Postage/mailing notices (\$0.49 x 500)	\$245	
	Sampling supplies: flaming equipment (\$20 x 10 units)	\$200	
Itemize	Mileage (\$0.57/mi Iron County rate x 1,500 miles)	\$855	\$855
<b>EQUIPMENT</b>			
Itemize	Homeowner Package (150 tests x \$49/test)	\$7,350	\$7,620
	GPS device	\$270	
<b>OTHER</b>			
Itemize	POWTS Inspection Certifications (2 x \$40)	\$80	\$80
<b>TOTALS (Total Funding Request Cannot Exceed \$10,500)</b>		\$10,500	\$10,500
<b>IN-KIND SUPPORT (none is required)</b>			
Itemize	Health Officer time- County levy	\$0	\$0
	Iron County Planning & Zoning staff time	\$0	
	Land & Water Conservation staff time	\$0	
	GIS Staff	\$0	



Elizabeth A. Ruder

715-561-2191 • rudere@ironcountywi.org • 502 Copper St. #2, Hurley, Wisconsin 54534

**ENVIRONMENTAL PUBLIC HEALTH SPECIALIST**  
Iron County Health Department  
Environmental Health Division

Hurley, Wisconsin  
July 2015- present

**EDUCATION**

Ball State University

Muncie, Indiana

- Master of Science, Department of Biology GPA: 4.0 2013-present
- MS Thesis: Development of loop-mediated isothermal amplification for the molecular detection of environmental contamination by *Toxoplasma gondii* in freshwater systems by measuring oocyst accumulation in environmental samples.

University of Wisconsin-Stevens Point

Stevens Point, Wisconsin

- Bachelor of Science, Biology/Psychology, Cum Laude GPA: 3.57 2007-08, 2011
- Dean's Academic Achievement Award

University of Wisconsin-Milwaukee

Milwaukee, Wisconsin

- Major: Biological Sciences, GPA: 3.67 2008-11
- Dean's Honor List

**RESEARCH EXPERIENCE/EMPLOYMENT**

Ball State University, Department of Biology

Muncie, Indiana

*Graduate Teaching Assistant/Departmental Assistant* Dr. William Rogers Aug 2013-present

- Instructed laboratory sections, prepared/graded monthly exams and quizzes, created interactive presentations and weekly lectures in principles of general biology and laboratory technique.
- Graded and provided detailed feedback for student submissions.
- Performed laboratory experiment preparation, chemical inventory, equipment calibration, ordering, and departmental assistance.

Indiana State Department of Health, Zoonotic Disease Division

Indianapolis, Indiana

*Vector-borne Disease Surveillance Intern*, Bryan Price Apr-Nov 2014

- Performed arboviral vector surveillance and species identification via microscopy to survey prevalence in disease vectors across five high-risk counties in Indiana.

Ivy Tech Community College

Muncie, Indiana

*Instructor, Associate Accelerated Program*, Joshua Arthur Aug-Dec 2014

- Prepared weekly lectures for biology students within the accelerated degree program enrolled in a fast-paced 8-week introductory course. Provided group and one-on-one tutoring in lieu of classroom lectures and exam preparation sessions.

National Institute of Environmental Health Sciences Imaging Core

Milwaukee, Wisconsin

*Specific Pathogen-free Laboratory Researcher*, Dr. Henry Tomasiewicz Nov 2012-Jul 2013

- Performed neurobehavioral toxicology studies in aquatic models using molecular techniques.
- Developed molecular and cellular assays to diagnose and manage microsporidian disease in laboratory animals within the specific pathogen-free aquatic animal models facility.

Children's Hospital of Wisconsin, Allergy and Immunology

Milwaukee, Wisconsin

*Laboratory Manager/Researcher*, Dr. Stephen Gauld Feb 2012-Oct 2012

- Investigated cellular mechanisms of autoantibody production, specifically Systemic Lupus Erythematosus, and the role of regulatory T cells and follicular helper T cells in regulation of B cell anergy.

University of Wisconsin-Stevens Point, Department of Biology

Stevens Point, Wisconsin

*Research Assistant*, Dr. Diane Caporale Jul-Dec 2011

- Investigated tick-borne pathogen transmission cycles, disease ecology of *Borrelia burgdorferi* transmission, and surveyed pathogen prevalence in *Ixodes scapularis* vectors via molecular screening.

University of Wisconsin-Milwaukee, Department of Biology  
*National Science Foundation Research Fellow*, Dr. Peter Dunn  
• Performed molecular assays to investigate selection at immune loci and innate immune genes (toll-like receptors) in endangered bird populations, performed large-scale molecular screening for protozoan parasite, sequence analysis, and created geographical phylogenies.

Milwaukee, Wisconsin

Jan 2010-Sep 2011

Smithsonian Tropical Research Institute  
University of Wisconsin-Milwaukee (joint appointment)  
*Research Assistant*, Dr. Stefan Schnitzer  
• Tropical forest community dynamics perform tree/liana census in Barro Colorado Island and Gigante Peninsula forests, database creation, data entry, plant nursery and greenhouse management.  
• Analyzed field data pertaining to tropical community dynamics, tree/liana competition in primary and secondary forests, analysis of successional stages in tree/liana dynamics.

Republic of Panamá

Milwaukee, Wisconsin

Jun 2010-Sep 2011

University of Wisconsin-Milwaukee, Panther Academic Support Services  
*Supplemental Instructor*, Dr. A.J. Petto  
• Conducted lecture sessions for undergraduate students, prepared exam guides and study material, review sessions, private one-on-one tutoring.

Milwaukee, Wisconsin

Jan-May 2011

## **PRESENTATION/PUBLICATION**

**Elizabeth A. Ruder** & Randy J. Bernot. "Development of loop-mediated isothermal amplification: molecular detection of *Toxoplasma gondii* in freshwater ecosystems" Ball State University Research Symposium, Muncie, Indiana; March 31, 2015, Poster presentation.

**Elizabeth A. Ruder** & Randy J. Bernot. "Surveillance of *Toxoplasma gondii* oocysts using loop-mediated isothermal amplification" Ball State University Research Symposium, Muncie, Indiana; March 26, 2014, Poster presentation.

Stephen B. Gauld, Jessica L. De Santis, Joseph M. Kulinski, Jennifer A. McGraw, Steven M. Leonardo, **Elizabeth A. Ruder**, Weston Maier, and Vera L. Tarakanova. 2013. "Modulation of B-cell tolerance by Murine Gammaherpesvirus 68 infection: requirement for Orf73 viral gene expression and follicular helper T cells." *Immunology*.

Jennifer L. Bollmer, **Elizabeth A. Ruder**, Jeff A. Johnson, John A. Eimes, and Peter O. Dunn. 2011. "Drift and selection influence geographic variation at immune loci of prairie- chickens." *Molecular Ecology*.

Jennifer L. Bollmer, **Elizabeth A. Ruder**, and Peter O. Dunn "Drift and selection influence geographic variation at immune loci of prairie-chickens." American Genetics Association Symposium, Guanajuato, Mexico; July 23-26, 2011, Poster presentation.

**Elizabeth A. Ruder** and Stefan A. Schnitzer. "Comparing structure and function of primary and secondary tropical forests." Manuscript preparation.

**Elizabeth A. Ruder**, Dathan E. Lythgoe and Stefan A. Schnitzer. "Comparing structure and function of primary and secondary tropical forests" Poster presentation.  
• National Conference for Undergraduate Research, Ithaca College, NY; March 31-April 2, 2011.  
• Posters in the Rotunda, Madison, WI. April 6, 2011  
• Undergraduate Research Symposium, University of Wisconsin-Milwaukee, Milwaukee, WI; April 15, 2011.  
• Department of Biological Sciences Symposium, University of Wisconsin-Milwaukee, Milwaukee, WI; April 28, 2011.

**Elizabeth A. Ruder** "A reflection on undergraduate research in the University of Wisconsin System" Posters in the Rotunda 2011, Capitol Building, Madison, WI; April 6, 2011. Invited Speaker.

**Elizabeth A. Ruder** and Stefan A. Schnitzer. "Chagas Disease in the Neotropics; revealing secrets of assassins." National Conference for Undergraduate Research, Ithaca College, NY; April 2, 2011. Oral presentation.

**Elizabeth A. Ruder**, Jennifer L. Bollmer, and Peter O. Dunn. "Geographic variation of avian malaria in

endangered prairie-chickens” University of Wisconsin-Milwaukee, Biological Sciences Symposium, Milwaukee, WI; April 27, 2010. Poster Presentation.

## **GRANTS/AWARDS**

2015	September	Radon Outreach Minigrant, Wisconsin Department of Health Services
	April	Graduate Student Achievement Award, Ball State University
2014	April	Graduate Student Achievement Award, Ball State University
2013	October	ASPiRE, Graduate Research Award, Ball State University
2011	June	Summer Institute in Statistics and Modeling Infectious Diseases Scholarship University of Washington
		Summer Institute in Statistical Genetics Scholarship University of Washington
	April	Ruth Walker Grant-in-Aid Student Award, University of Wisconsin-Milwaukee
	January	Center for Latin American and Caribbean Studies Research/Travel Award University of Wisconsin-Milwaukee
		Wisconsin Study Abroad Grant, University of Wisconsin-Milwaukee
		Finalist, Fulbright Foundation
2010	September	Research Experience for Undergraduates Grant, National Science Foundation Office of Undergraduate Research Award, University of Wisconsin-Milwaukee
	April	Hutto-Erdmann Conservation Scholarship, University of Wisconsin-Milwaukee
	March	Office of Undergraduate Research Award, University of Wisconsin-Milwaukee

## **INSTRUMENTATION AND TECHNIQUE**

**Molecular:** PCR, gel electrophoresis, DNA/RNA extraction and purification, processing tissue from environmental/complex matrices, cDNA synthesis, sequencing, Affymetrix gene chip, sequence editing/analysis, genotyping, quantification, qPCR/real time, primer design and optimization.

**Microbiology:** fluorescence microscopy, tissue culture, bacterial and algal culture, flow cytometry, hybridoma, antibody conjugation and titration, cellular sorting (laser/magnetic), ELISA, western blot/SDS-PAGE, whole cell lysate and cellular stimulation, intracellular calcium flux, adhesion, cryosection, histology, protozoan and helminth identification.

**Chemistry:** water sampling and quality analyses in municipal and environmental sources (multi electrode: Hydrolab Sonde), chemical synthesis, reagent preparation, gradient separation, immunohistochemistry, confocal and fluorescence microscopy.

**Ecological:** Habitat Quality Assessment (HQA), Qualitative Habitat Evaluation Index (QHEI), forestry survey/census, automated data logging, dip net, Secchi disk, Van Dorn, Ekman dredge, sediment sampling (core), zooplankton tow net, gillnet, seine net, mist netting, live animal trapping.

**Animal:** aseptic technique, survival and non-survival surgery, dissection, necropsy, serum and whole blood collection and preparation, intravenous and retro-orbital inoculation/adoptive transfer, local and general anesthesia, mammal and fish euthanasia, intraperitoneal injection, fish and invertebrate aquaculture, passive restraint, Great Lakes regional species identification (insect, mussel, mammal, bird, fish, amphibian).

**Technical:** Experience operating outboard motor boats (currently licensed by the Panama Canal Authority), 4WD manual field vehicles in challenging conditions, aquatic sampling by skin diving, proficiency in rock and tree climbing, extended periods in backcountry conditions.

## **PROFESSIONAL DEVELOPMENT**

### **Certification:**

2015	September	Pool and Spa Operator
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2014 November Food Safety, University of Minnesota, School of Public Health  
 Health Policy Advocacy, University of Minnesota, School of Public Health  
 September Zoonoses Public Health Emergency Training, University of Minnesota,  
 School of Public Health  
 2013 Biosafety, Infectious Agents, Ball State University  
 Chemical Safety and Hazardous Waste, Ball State University  
 2012 Radioactive Waste, Medical College of Wisconsin  
 American Association for Laboratory Animal Science Technician  
 2011 Responsible Conduct of Research Training, National Science Foundation

**Language:**

Instruction in French, Latin, and Spanish.  
 Technical writing, editing, and manuscript preparation and presentation experience.

**Software:**

**Technical:** AB StepOne, Stratagene qPCR, FACS Diva, DnaSP, EstimateS, Flowjo, Geneious, Haploview, Odyssey, Prizm, TreeView  
**Statistical analysis:** R, JMP, Minitab, SPSS.  
**Graphic/Design:** Final Cut, iMovie, iWeb  
**General:** Microsoft Office Suite, iWork Suite  
**Adobe:** After Effects, Illustrator, InDesign, Photoshop

**TEACHING/COURSE LIST**

**BIO 100, Ball State University** **Muncie, Indiana**  
*Biology for the Modern World* Aug 2014-May 2015  
 Considers biological issues related to the environment, genetics and biotechnology, human reproduction and development, and population biology. Historical, contemporary, and future implications of these issues are discussed.

**ZOOL 432/532, Ball State University** **Muncie, Indiana**  
*Invertebrate Zoology* Jan 2015-May 2015  
 Comparative morphology, physiology, ecology, life histories, and phylogeny of invertebrate animal phyla.

**BIO 101, Ivy Tech Community College** **Muncie, Indiana**  
*General Biology* Fall 2014  
 An examination of organizational complexity, development, health, and the place of humans in the natural world.

**BIO 111, Ball State University** **Muncie, Indiana**  
*Principles of Biology* Aug 2013-May 2014  
 Laboratory instruction: Emphasis at cellular level: chemical and physical organization of life, prokaryotic and eukaryotic cell structure and function, bioenergetics, cell division, genetics, gene expression, protein synthesis, and evolution.

**BIO 201, University of Wisconsin-Milwaukee** **Milwaukee, Wisconsin**  
*Human Structure and Function* Spring 2011  
 Brief introduction to human anatomy and physiology for non-science undergraduate majors.

**AFFILIATIONS/MEMBERSHIP**

Aquatic Biology and Fisheries Center, Ball State University  
 National Environmental Health Association  
 Wisconsin Environmental Health Association  
 American Water Resources Association

American Public Health Laboratory Association  
Freshwater Mollusk Conservation Society  
Indiana Water Monitoring Council

**EXTRACURRICULAR/VOLUNTEER**

Mentored undergraduate biology students in research: Jake Davis and Candice Corsmeier  
Midwest Athletes Against Childhood Cancer supporter/athlete, 2007-present, >\$3,000 funds raised;  
National Leukemia and Lymphoma Society pledge raiser and volunteer; Racine Zoo volunteer;  
volunteer rock climbing belay instructor, avid cyclist and horticulturalist.



Iron County  
Land & Water Conservation Department  
607 3<sup>rd</sup> Avenue North  
Hurley, WI 54534

Heather Palmquist  
County Conservationist

Email: [lakes@ironcountywi.org](mailto:lakes@ironcountywi.org)

Phone: (715)561-2234

Fax: (715)561-4801

October 23, 2015

Dear Ms. Jenny Camponeschi,

As the head of the Iron County Land & Water Conservation Department (LWCD) I would like to support the Iron County Health Department's proposal for private well water testing program. Our department has been working to educate the public on healthy practices to protect both surface water and groundwater. One of our goals in our Land & Water Resource Management Plan is to "protect drinking water/ground water through monitoring, education, responsible land use practices and proper well abandonment". While this is a goal of ours, we don't have the funds needed to offer an annual well testing program.

In 2014, Iron County LWCD, Ashland County LWCD and Bad River Tribe partnered on a Coastal Management Grant to provide a free well testing program in the Lake Superior Watershed. The Iron County Health Department provided guidance in obtaining participants for this grant program. The opportunity was well received by Iron County residents, however, many interested parties were unable to participate in the program as their property was outside of the Lake Superior Watershed. Since then, it has been a goal of the LWCD to provide residents in the Mississippi River Watershed the same opportunity that the Lake Superior residents were given - free well testing kits, educational workshop to explain results and the ability to promote our well abandonment program.

By funding this grant application the residents in southern Iron County would be given the opportunity to obtain important information of the health of their groundwater. Given the economic demographics of Iron County, grant support is vital for programs such as this. Most households are unable to afford the expense of these tests, yet the interest and need is there.

I ask that you strongly consider the Iron County Health Department's grant proposal for approval. I am confident that there will be an overwhelming number of interested parties that will sign up for a well testing program within the Mississippi River Watershed. By funding this grant proposal you will be enabling Iron County Health Department and LWCD to achieve the goals set in our work plans.

Thank you for your time and consideration of this grant proposal.

Sincerely,

Heather Palmquist  
County Conservationist

**IRON COUNTY LAND AND ZONING INFORMATION OFFICE  
300 TACONITE STREET SUITE 115  
HURLEY, WI 54534  
715-561-5414  
FAX 715-561-2928**

Wisconsin Department of Health Services  
Division of Public Health  
Bureau of Environmental and Occupational Health  
Taking Actions with Data: Use of the Environmental County Health Profiles to Improve Environmental Health in a Community

To Whom It May Concern:

With great pleasure, the Iron County Planning & Zoning Department wishes to support Elizabeth Ruder and the proposed Iron County Private Well and Groundwater Tracking Project through support from the Wisconsin Environmental Public Health Tracking Program. As the sole Environmental Health staff member for Iron County, Elizabeth has worked closely with our program as an Environmental Health Specialist for the Iron County Health Department and collaborates regularly with Zoning Administration.

Our staff is eager to partner in an effort that prioritizes groundwater and drinking water quality within the County. The management of private wells in conjunction with private onsite water treatment systems (POWTS) is crucial in protecting safe drinking water for Iron County residents. With more than 3,700 POWTS in rural parts of Iron County without public water supply, private wells and POWTS are often confined together in a relatively small area. Additionally, many of these owners lack the economic resources to maintain their aging private systems, which are commonly damaged and degraded. Together, these conditions pose a serious risk to safe ground and surface water. The proposed project provides the framework for making positive and permanent changes in this area where the resources to provide management and maintenance of private wells and POWTS do not exist otherwise.

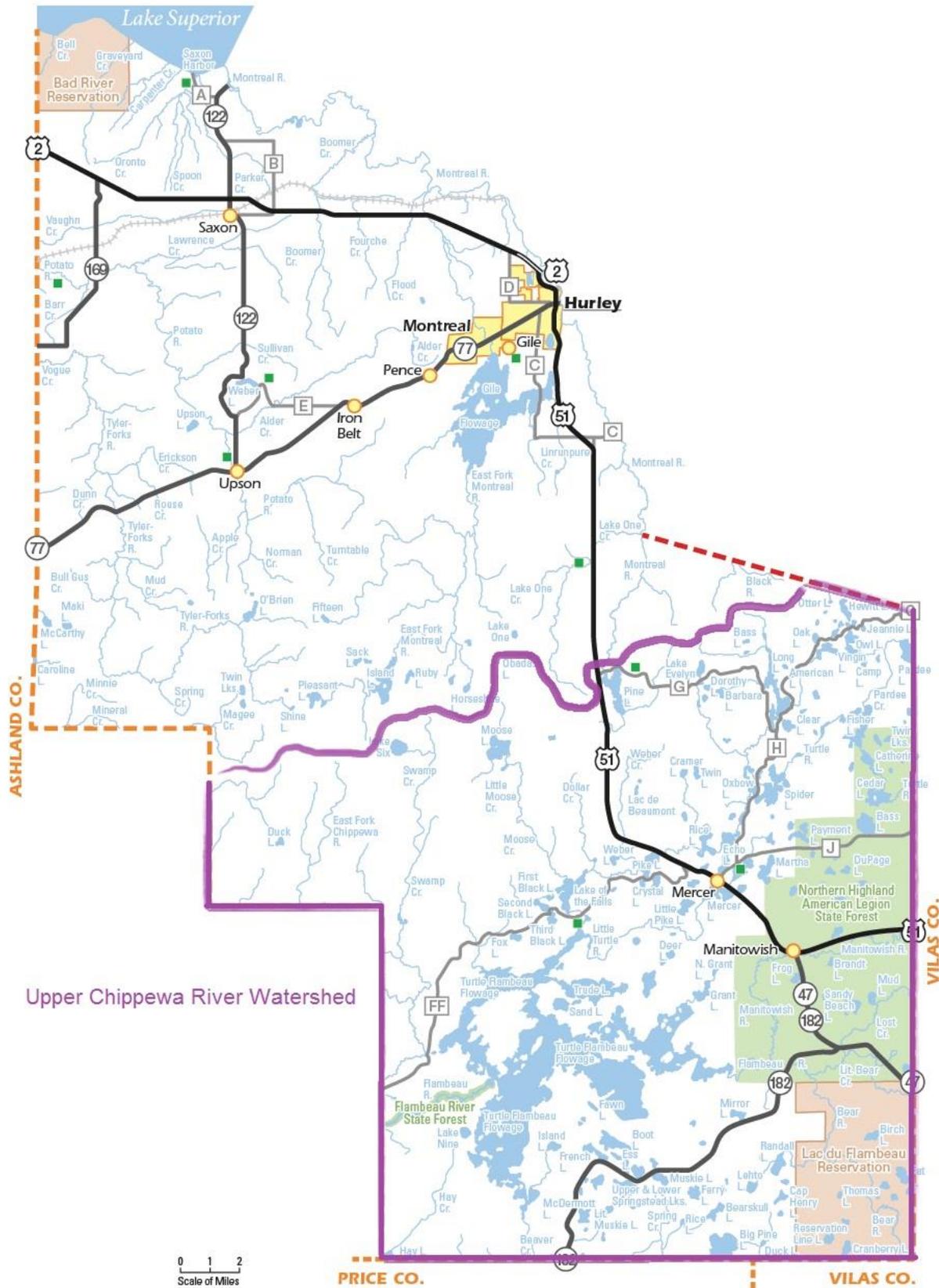
The Iron County Planning & Zoning Department will provide technical assistance and expertise to the proposed project for 2015 County Environmental Health Tracking funding opportunity in Iron County during the award period November 2, 2015-July 31, 2016. The Planning & Zoning staff is eager to foster a continued partnership with the Iron County Health Department staff through the Iron County Private Well and Groundwater Tracking Project which aims to collect private well water quality data, interpret and present meaningful information to the public to educate community members, provide support and assistance to private well owners, and implement policy and local ordinance that promotes long-term improved ground and surface water in Iron County.

Sincerely,



Erika Roeder  
Iron County Assistant Zoning Administrator

MICHIGAN



# WATER QUALITY TESTS FOR DRINKING WATER



Center for Watershed Science and Education  
 College of Natural Resources  
 University of Wisconsin-Stevens Point

Water & Environmental Analysis Laboratory  
 715-346-3209 or Toll Free 877-383-8378  
 Effective January 2015

**Bacteriological testing requires 24 hours.** Therefore, the lab will not accept samples for bacteria analysis on any Friday or July 3, Dec. 23-25, and Dec. 30 – Jan 1.

The following list of water analyses and costs cover the majority of analyses that would be of interest to private well owners.

**HOMEOWNER PACKAGE** (Includes tests 1-8) ..... **\$49.00**

This is a 42% discount savings (total individual cost \$84).

The Homeowner Package consists of the following analyses which can be run separately for price indicated.

1. Total Coliform Bacteria ..... 23.00  
 Test the bacteriological safety of a water supply.  
**Priority analysis (48 hour turnaround)** ..... \$46.00
2. Nitrate plus Nitrite-Nitrogen ..... 16.00  
 These are the most common chemical contaminants in Wisconsin groundwater. They may also serve as an indicator of the potential presence of other contaminants, such as pesticides or trace organic chemicals from septic system effluent.  
**Priority analysis (48 hour turnaround)** ..... \$32.00
3. pH ..... 9.00  
 Measure of relative acidity of the water. Useful in assessing the corrosivity of water to plumbing.
4. Alkalinity ..... 9.00  
 Amount of bicarbonate (*acid neutralizing capacity*), the major anion in water, related to pH and corrosion.
5. Hardness ..... 9.00  
 Measure of the amount of calcium and magnesium. Important if water softening is considered.
6. Chloride ..... 10.00  
 An indicator ion that, if found in elevated concentration, indicates potential contamination from septic systems, fertilizer, landfills, or road salt.
7. Conductivity ..... 8.00  
 Measure of total dissolved minerals in water. Change in conductivity or unusual ratio of conductivity to hardness may signal presence of contaminants.
8. Corrosivity Index .....  
 This is a calculation to determine the tendency of water to be corrosive or scale forming.

Homeowner Package **plus Fluoride** ..... 65.00  
**Fluoride** ..... \$19.00

**METAL PACKAGE** (This test requires an acidified bottle.) ..... **45.00**

This is a 76% discount savings (total individual cost \$187).

**Individual metals are \$17/each**

Arsenic, Calcium, Copper, Iron, Lead, Magnesium, Manganese, Potassium, Sodium, Total Sulfur (SO<sub>4</sub>), and Zinc.

# THE FOLLOWING TESTS REQUIRE A SEPARATE ACIDIFIED BOTTLE

**Please Call the Laboratory**

If organic pollution from a landfill, waste spreading, septic system, or animal waste is suspected the following analyses are recommended.

COD Chemical Oxygen Demand .....	18.00
Ammonium Nitrogen .....	16.00
*Dissolved Iron .....	17.00

Desirable if natural iron is present and concentration is needed to choose a treatment system.

If corrosion is suspected and indicated by the corrosivity index, lead and copper may be leaching from plumbing at concentrations that could be a health concern.

*Lead .....	17.00
*Copper .....	17.00

Arsenic in drinking water has been an increasing concern in Wisconsin.

*Arsenic – Screening.....	17.00
Arsenic – Low level analysis.....	24.00

\* Marked analyses are also run as part of the “Metal Package” listed on front of this sheet.

**Priority analyses can be run on any of the above samples for double the listed price.**

## PESTICIDE ANALYSES

*Call for more detail (715) 346-3753*

Diaminochlorotriazine (DACT) (a breakdown of atrazine and related herbicides) .....	27.00
<b>Priority DACT Analysis</b> .....	75.00
Nitrogen and Phosphorus (N/P) containing pesticides - 40 compounds .....	125.00
Chloroacetanilide Metabolites – 6 compounds .....	95.00
Nitrogen and Phosphorus + Chloroacetanilide Metabolites (NP/CAAM).....	175.00
(Used on corn and soybeans.)	
Organophosphorus Pesticides - 35 compounds.....	125.00
(Used on cranberries.)	

## For sampling instructions and bottles contact:

715-346-3209 or Toll Free 877-383-8378

E-mail [dsisk@uwsp.edu](mailto:dsisk@uwsp.edu)

Web Page [www.uwsp.edu/cnr-ap/weal](http://www.uwsp.edu/cnr-ap/weal)

(prices not listed on web page)

All data generated on private wells is maintained on a computer database for assisting homeowners in obtaining a safe water supply.

DNR State Certification Lab No. 750040280

## Contract Objective Details - Intermediate

**Contract #:** 27448

**Agency:** Iron County Health Department

**Contract Year:** 2015

**Program:** Preventive Health and Health Services  
Block Grant

**Objective #:** 1 of 2

**Objective Value:** \$3,976

### Objective: Primary Details

#### Objective Statement (Template Objective)

Template Objective 3

Injury Prevention: By August 31, 2016, Iron County Health Department will implement 2 evidence based strategies to prevent or reduce injuries.

**Deliverable Due Date:** 09/30/2016

#### Contract Deliverable (Evidence)

A report entered into an electronic data collection tool that briefly describes:

1. Evidenced-Based strategies implemented and outcomes measured.
2. Challenges or barriers to success.
3. Strategies to overcome barriers or challenges.
4. If Prevention funded activities were used to obtain additional funding, donations or in-kind contributions.

#### Programs Providing Funds for this Objective

Preventive Health and Health Services Block Grant: \$3,976

#### Agency Funds for this Objective:

#### Data Source for Measurement

Agency report to be entered into an electronic data collection tool to be provided by the WI Division of Public Health.

#### Baseline for Measurement

The life jacket program would be a new initiative in northern Iron County. The life saver program would be a new initiative. All pre-k, K and 3rd grade students in Iron county receive a bike safety program every May.

#### Input Activities

CDC requires Preventive Health and Health Services Block Grant funds to be used on evidence-based strategies, best practices or promising practices. Describe the strategies/practices to be used and identify the associated web links as available. Potential links to strategies for this objective can be found on the 2014-2016 Preventive Health and Health Services Block Grant Program Boundary Statement.

## Contract Objective Details - Intermediate

**Contract #:** 27448

**Agency:** Iron County Health Department

**Contract Year:** 2015

**Program:** Preventive Health and Health Services  
Block Grant

**Objective #:** 1 of 2

**Objective Value:** \$3,976

### Objective: Risk Profile

**Percent of Objective Accomplished**

0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	90%	95%	100%
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**Corresponding Percentage Recoupment**

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**Corresponding Potential Recoupment Amounts**

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**Definition of Percent Accomplished**

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**Conditions of Eligibility for an Incentive**

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## Contract Objective Details - Intermediate

**Contract #:** 27448

**Agency:** Iron County Health Department

**Contract Year:** 2015

**Program:** Preventive Health and Health Services  
Block Grant

**Objective #:** 2 of 2

**Objective Value:** \$1,000

### Objective: Primary Details

#### Objective Statement (Template Objective)

Template Objective 10

National Public Health Standards - Required: By August 31, 2016, Iron County Health Department will conduct one activity to meet or sustain National Public Health Performance Standards (i.e. pursue accreditation readiness) by updating the Iron County Health Department Policy and Procedure Manual.

**Deliverable Due Date:** 09/30/2016

#### Contract Deliverable (Evidence)

A report entered into an electronic data collection tool that briefly describes:

1. Evidenced-based strategies implemented and outcomes measured.
2. Challenges or barriers to success.
3. Strategies to overcome barriers or challenges.
4. If Prevention funded activities were used to obtain additional funding, donations or in-kind contributions.

#### Programs Providing Funds for this Objective

Preventive Health and Health Services Block Grant: \$1,000

#### Agency Funds for this Objective:

#### Data Source for Measurement

Agency report to be entered into an electronic data collection tool to be provided by the WI Division of Public Health.

#### Baseline for Measurement

The health department will update the agency policy and procedures.

#### Input Activities

CDC requires Preventive Health and Health Services Block Grant funds to be used on evidence-based strategies, best practices or promising practices. Describe the strategies/practices to be used and identify the associated web links as available. Potential links to strategies for this objective can be found on the 2014-2016 Preventive Health and Health Services Block Grant Program Boundary Statement.

Agencies will conduct one of the following activities to prepare for voluntary accreditation:

- Develop, update, and revise agency policies and procedures.

(NOTE: If an agency wants to develop, update, and/or revise agency policies and procedures The Preventive Health and Health Services Grant Coordinator will be involved in the negotiations.)

## Contract Objective Details - Intermediate

**Contract #:** 27448

**Agency:** Iron County Health Department

**Contract Year:** 2015

**Program:** Preventive Health and Health Services  
Block Grant

**Objective #:** 2 of 2

**Objective Value:** \$1,000

### Objective: Risk Profile

**Percent of Objective Accomplished**

0%	10%	20%	30%	40%	50%	60%	70%	80%	85%	90%	95%	100%
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**Corresponding Percentage Recoupment**

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**Corresponding Potential Recoupment Amounts**

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**Definition of Percent Accomplished**

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**Conditions of Eligibility for an Incentive**

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