

University of Alaska Fairbanks

New Occupational Endorsement Request: Format 3A

**OCCUPATIONAL ENDORSEMENT IN RURAL SURFACE WATER QUALITY
TESTING**

9 credits minimum

Submitted by
UAF Bristol Bay Campus
College of Rural and Community Development
November 2015

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I. COVER MEMORANDUM

A. NAMES OF PERSONS PREPARING REQUEST

This request was prepared by Dr. Debi McLean, Director at University of Alaska Fairbanks Bristol Bay Campus (UAF BBC); Bob Metcalf, Director at University of Alaska Fairbanks Northwest Campus (UAF NWC); Dr. Todd Radenbaugh, Associate Professor of Environmental Science at UAF BBC; Dan Bogan Alaska Natural Heritage Program Research Scientist at University of Alaska Anchorage (UAA); Carol Gales Program Development Manager at UAF NWC; and Tara Borland, Lab Coordinator at UAF CRCD.

Key contact information:

Dr. Todd Radenbaugh
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B. BRIEF STATEMENT OF PROPOSED ENDORSEMENT

Overview:

There is a continuing need for standardized and defensible water quality testing across rural Alaska to lower community health risks and assure that environmental standards are maintained. In recent years employment opportunities related to water quality monitoring have frequently been filled by consultants or out-of-state technicians. Comprehensive programs such as EPA Indian General Assistance Program (IGAP) provide for defensible water quality testing but there is a continuous need for trained individuals to fill rural IGAP positions. The Rural Surface Water Quality Testing Occupational Endorsement (OE) has been designed to meet the training needs of rural water quality technicians and village IGAP employees.

In designing the Rural Surface Water Quality Testing OE, UAF's Bristol Bay and Northwest Campuses have made significant partnerships with regional entities and communities such as Bristol Bay Native Association, UAA's Alaska Natural Heritage Program, Southwest Alaska Municipal Conference, Northwest Arctic Borough, Kuskokwim Watershed Council, Nushagak-Mulchatna Watershed Council, Alaska Forum on the Environment. These partnerships will assure that educational opportunities are available throughout the state to those interested in water

quality training. The proposed OE in Rural Surface Water Quality Testing will provide students with a broad-based educational foundation to conduct basic quality analysis and acquire defensible data. This OE will not specifically train a student for one career path but will teach the students a universal skill set that can be used for a broad range of careers including EPA IGAP assistants and coordinators. These skills could also serve as a foundation for other technical work available in their communities. Training local students in these skills will not only give employers an opportunity to hire locally for technician work that is traditionally completed by non-local technicians, but will also support local economic development. In addition, graduates will be placed on a direct track towards further science and engineering programs such as the Environmental Studies Certificate, an Associate's degree, or other degree programs.

The mission of the OE in Surface Water Quality is to provide Alaskan students, including Alaska Native and rural students, with quality academic instruction and training responsive to community and industry needs. This program will help empower graduates and their communities to monitor water quality in local streams while protecting and enriching local environmental conditions.

Industry Objectives:

Every municipality and village in Alaska must defensibly report water quality parameters in compliance with State (DEC) and Federal (EPA) regulations. In rural Alaska there are often not enough qualified individuals to complete water quality compliance testing. The lack of trained individuals demonstrates a need for a more standardized training program. This fact was further illustrated by formal and informal discussions with partners assisting in guiding the development of the OE. As a result of partner input, this OE will provide a structured educational sequence designed with community input to meet the demand for trained water quality technicians.

Abbreviated Student Learning Outcomes Assessment and Implementation Plan:

The Student Learning Outcomes Assessment Plan has been designed to meet the objectives of the Rural Surface Water Quality Testing OE. The Environmental Studies Program Coordinator will be responsible for implementation of the plan. Section VIII D provides a detailed Rural Surface Water Quality Testing Student Outcomes Assessment and Implementation Plan that is summarized briefly below:

- Students will satisfactorily complete all coursework by earning at least a 70% in each required and elective course.
- Students will document employment or enrollment in another degree or training program.

C. PROVISION FOR REVIEW SIGNATURES OF PREPARATION:

Brian Rasler 9/8/15
CRCD Science Chairman Date

[Signature] 4-Sept-2015
Environmental Studies Program Head Date

Reborah McLean 9-4-15
Director, UAF Bristol Bay Campus Date

[Signature] 9/8/15
Director, UAF Northwest Campus Date

College of Rural and Community Development Academic Council Date

Dean, College of Rural and Community Development Date

SIGNATURES FOR APPROVAL:

Curricular Affairs Committee Chair Date

President, UAF Faculty Senate Date

Chancellor, UAF Date

II. IDENTIFICATION OF THE OCCUPATIONAL ENDORSEMENT

a. DESCRIPTION OF THE OCCUPATIONAL ENDORSEMENT

i. Occupational Endorsement Title: Rural Surface Water Quality Testing

ii. Admission Requirements and Prerequisites:

Students accepted into the Rural Surface Water Quality Testing program should have a high school diploma or GED. Due to the science focus of this occupational endorsement, it is noted that students seeking admission to this program will benefit from having completed a high school, lab-based science course as well as math through the algebra level. Students also should be familiar with computer applications, such as word processing, spreadsheets, database, and operating systems.

iii. Course Descriptions

ENVI F101 – Introduction to Environmental Science (3 cr)

An introduction to the interconnected topics that make up environmental science. By exploring Earth's systems, environmental questions are investigated such as how to sustainably use natural resources and the influence of population growth on ecosystems. The course takes a holistic approach to reinforce scientific principles. Key topics covered include ecosystem functions, energy, biodiversity, resource management, landscape alteration and climate change.

Recommended: F100-level biology, chemistry or geology class. (3+0)

ENVI F110 – Introduction to Water Quality I: Measurement (1 cr)

Introduces students to standard water quality methods used and applies them to rural Alaska. Students will become familiar with EPA water quality standards and programs that help preserve water quality in rural communities. Key topics covered include: stream ecology, wastewater management, storm water runoff and data analysis. (0.5+0+1.5)

ENVI F111 – Introduction to Water Quality II: Monitoring and Assessment (1 cr)

Reviews proper use and calibration of water quality testing equipment and operation methods learned in ENVI F110. Emphasis will be placed on further skill development in collecting data that meet quality objectives, electronic storage of data, data analysis, and reporting. Students will be introduced to equipment and methods used in lake monitoring. Students will start work on developing their own Environmental Protection Agency approved Quality Assurance Project Plan (QAPP) for surface water quality monitoring. Prerequisites: ENVI F110 or permission of instructor. (0.5+0+1.5)

ENVI F112 – Introduction to Water Quality III: Data Quality Assurance (1 cr)

Reviews proper use and calibration of water quality testing equipment and operation methods learned in ENVI F110 and ENVI F111. Emphasis in this class will be placed on conducting data quality assurance measures that meet data quality objectives, writing and following a data Quality Assurance Project Plan (QAPP), data analysis, and reporting. Students will continue to

develop their own U.S. EPA approved QAPP for surface water quality monitoring.
Prerequisites: ENVI F110 and ENVI F11 or permission of instructor. (0.5+0+1.5)

ENVI 160 – Internship in Environmental Studies (1-2 cr)

Under the guidance of a UAF Bristol Bay Campus-approved agency or business (public or private that monitors, tests, analyzes or studies the environment), students gain supervised pre-professional experience in environmental studies. The intern will explore the interdisciplinary aspects of field or laboratory research, build practical expertise and make contacts. Internships make one to ten weeks of full-time commitment to the agency or business and when completed make public presentations on the experience. Prerequisites: ENVI F101 or permission of instructor. (1-2+0)

ABUS F183 – Advanced Job Readiness Skills (1-3 cr)

Practical information necessary to help students choose meaningful employment as well as build their own employment portfolio. Materials used will allow students to learn more about themselves, engage in personal assessment and learn how this information relates to different careers. Students will complete target resumes, cover letters, follow-up letters, applications, job search strategies, mock job interviews and a professional portfolio. This class is designed for students embarking into the job market. (1-3+0)

CIOS F150 – Computer Business Applications (1-3 cr)

Designed to develop computer literacy in the use and understanding of computer systems, office productivity applications and the Internet. Topics include operating system fundamentals, file management, word processing and spreadsheet fundamentals and safe, secure and effective use of Internet technologies. (1-3+0)

iv. Requirements for the Endorsement

1. Complete the following Water Quality requirements (9 to 13 credits)

	#	Course Title	Credits
ENVI	F101	Introduction to Environmental Studies	3
ENVI	F110	Introduction to Water Quality I: Measurement and Calibration	1
ENVI	F111	Introduction to Water Quality II: Monitoring and Assessment	1
ENVI	F112	Introduction to Water Quality III: Data Quality Assurance	1
ENVI	F160	Internship in Environmental Studies	1-2
ABUS	F183	Advanced Job Readiness Skills	1-3
CIOS	F150	Computer Business Applications	1-3
		Total	9-14

Sample Course of Study for the Occupational Endorsement in Basic Water Quality

Fall

ENVI 110 1 credit
 ABUS 183 1-2 credits
 ENVI 101 3 credits

Spring

ENVI 111 1 credits
 ENVI 112 1 credit
 CIOS 150 1-3 credits
 ENVI 160 1-2 credits

TOTAL = 9 to 14 credits for completion of an Occupational Endorsement in Water Quality

3-Year Cycle of Course Offerings

COURSE	Fall 2014	Spring 2014	Summer 2014	Fall 2015	Spring 2015	Summer 2015	Fall 2016	Spring 2016	Summer 2016
ENVI 101		x			x			x	
ENVI 111		x			x			x	
ENVI 112			x			x			x
ENVI 160	x		x	x		x	x		x
ABUS 183	x	x		x	x		x	x	
CIOS 150	x	x		x	x		x	x	

2. Proposed Catalog Description

Provides education and training necessary to conduct water quality monitoring and assessment by developing and following a Quality Assurance Project Plan (QAPP). It focuses on water quality monitoring issues related to rural Alaskan communities and provides the basic academic preparation for entry-level water quality technician careers. Students will gain a foundation of knowledge that prepares them to continue into a science and engineering-related certificate, associate, or baccalaureate program. Admission is open to students with a high school diploma or GED.

b. OCCUPATIONAL ENDORSEMENT GOALS

1. Objectives and Means of their Evaluation:

The goal of this OE is to provide the preparation needed for graduates to enter directly into the workforce as an environmental technician or into a science and engineering-related certificate or degree program.

a) Objectives

- To increase the number of Alaskans with vocational and educational background in basic water quality analysis.
- To allow students to develop and follow the procedures of a comprehensive Quality Assurance Action Plan
- To provide students with basic knowledge necessary to understand and work on specific community-based water issues.
- To prepare students with the job readiness skills necessary for successful employment.

b) Evaluation

- Academic Performance – Accumulated GPA in required courses
- Number of students applying for employment in water quality fields
- Student satisfaction of OE based on exit survey

2. Relationship of Endorsement Objectives to Industry Needs

Communities need to be empowered to monitor and understand the environmental parameters that affect quality of life in rural Alaska. There is a need for all communities to monitor surface water quality. Water quality monitoring is a significant public health necessity tied to understanding local environmental conditions. There is a need for more training in rural Alaska in developing and implementing QAPPs related to water quality monitoring and assessment.

The objectives of this OE were designed to meet the demands for a structured educational pathway to train rural Alaskans in surface water quality testing. The OE was developed in response to recommendations by the Council of Advisors and other collaborative entities. Graduates of this occupational endorsement will have developed both a broad-based educational background focusing on surface water quality measurement and hands-on vocational skills. Course requirements will emphasize site-specific water issues that will prepare students for entry-level employment in a variety of community based occupations.

The employability needs precipitating the development of this program came from the analysis of a 2012 survey conducted by UAF BBC indicating the need throughout the state of Alaska and especially in rural areas for more graduates of environmental educational and vocational training programs. In addition, UAF BBC faculty held numerous meetings and conversations in the fall of 2012-13 with industry leaders regarding training and educational programs currently available in Alaska. The overwhelming consensus was that there is not only a need for more qualified entry-level employees but also for training and educational programs.

Partners consisting of community and industry leaders from rural Alaska were contacted in September 2013 to facilitate the development of an OE designed to address statewide community water quality training needs. The committee recognized Dan Bogan's (UAA, Alaska Natural Heritage Program) extensive efforts in training EPA IGAP personnel for water quality. Input from the committee regarding the knowledge and skills needed for entry level employment in water quality monitoring and assessment guided the development of the proposed OE.

3. Occupational/Other Competencies to Be Achieved:

Employment opportunities for water quality technicians are available throughout Alaska as the EPA IGAP program often requires tribes, villages, and watershed councils to conduct baseline water testing. The skills and knowledge students will gain through the OE represent an area of technical expertise that is desired and needed to monitor surface water quality throughout the state. This OE will provide the training necessary for employment as an entry level water quality technician. In addition, graduates will be positioned on a track towards other tribal management, science and engineering programs such as the Environmental Studies Certificate as well as associate and bachelor degrees.

4. Relationship of Courses to the Endorsement Objectives:

Courses directly serve program objectives by:

- a) Providing culturally appropriate opportunities for development of applied skills, knowledge, and techniques
- b) Providing opportunities to increase student knowledge, skills, and techniques used to monitor surface water quality across Alaska.
- c) Making extensive use of federal, statewide, and community resources.
- d) Providing coursework that will train surface water quality technicians.

B. DESCRIPTION OF STUDENT LEARNING OUTCOMES ASSESSMENT PLAN

The Student Learning Outcomes Assessment Plan has been designed to meet the objectives of the OE. Assessment will be completed using an Individual Learning Outcomes Assessment Rubric, and an employer survey. The rubric will be filled out by the program coordinator and the survey will be completed by employers of interns and student-hires. See section VIII-D for a detailed student outcomes assessment and implementation plan. Students will document recent employment or enrollment in another degree or training program.

III. PERSONNEL DIRECTLY INVOLVED WITH THE PROGRAM

A. FACULTY INVOLVED

1. Faculty

Dr. Todd Radenbaugh, Associate Professor, Environmental Studies, UAF BBC, Dillingham
– instructor of ENVI 101 and ENVI 110

Dan Bogan, Research Scientist, Alaska Natural Heritage Program, UAA

2. Adjunct Faculty

Adjunct faculty will be hired on demand by participating UAF CRCD academic units

B. ADMINISTRATIVE, COORDINATING, AND CLASSIFIED PERSONNEL

1. Pete Pinney, Associate Vice Chancellor and Executive Dean, UAF CRCD
2. Dr. Debi McLean, Director, UAF BBC, Dillingham
3. Bob Metcalf, Director, UAF NWC, Nome
4. Dr. Todd Radenbaugh, Environmental Studies Associate Professor and Program Coordinator, UAF BBC, Dillingham
5. Dan Bogan, Aquatic Ecologist, UAA Environment and Natural Resources Institute, Anchorage
6. Tara Borland, Science Lab Coordinator, UAF CRCD, Fairbanks
7. Carol Gales, Program Development Manager, UAF NWC, Nome
8. Staff support from UAF BBC and UAF NWC are available to this OE as needed for tutoring, student advising, facilitation, and other needs

IV. ENROLLMENT INFORMATION

A. PROJECTED ENROLLMENT

CRCD has a student enrollment population from across the state. In fall 2013, about 60 percent were Alaska Native or American Indian (UA in Review 2013). This OE is designed to attract a diverse student population with broad interests. Few students will be from out of state; most likely, the large majority of students will be Alaskan. Due to the growing need and popularity of the subject there is an expected increase in students from other regions of the state. Based on the increasing demand for qualified entry-level employees in the Water Quality fields, enrollment for this OE is expected to grow. This OE directly addresses the University's commitment to serve Alaska Native and underserved communities.

B. HOW DETERMINED/WHO SURVEYED/HOW SURVEYED

Projected enrollment has been estimated using:

- CRCD student enrollment statistics
- community and state wide interest in Water Quality pilot courses taught in 2009 and 2010
- conversations with the Council of Advisors and other industry leaders
- U.S. Department of Labor statistics.

In addition, UAF BBC held sessions and panel discussions from 2012 to 2014 at the Alaska Tribal Conference on Environmental Management (2012) and the Alaska Forum on the Environment (2012-14). Both meetings attract rural environmental workers especially those involved with the EPA's IGAP. Surveys of environmental workers and potential students agreed

that there is a need for more training and educational programs designed for entry-level employees.

C. MAXIMUM ENROLLMENTS

With current resources, the maximum enrollment for this program will be 15 per year. This number is dependent upon faculty and space availability as well as travel funding. This is due, in part, to the travel costs associated with the face-to-face water quality classes: ENVI F110, ENVI F111, and ENVI F112. Currently, one instructor is designated to teach these courses to 15 students per year. If demand or funding increases, adjunct faculty will be hired to meet the growth of the program.

V. NEED FOR OCCUPATIONAL ENDORSEMENT

A. EMPLOYMENT MARKET NEEDS

1. Procedures

Information collected by UAF BBC through a state-wide survey sent to 60 potential employers indicated the growing need for Water Quality education and training. A total of 26 surveys were returned resulting in a return rate of 43%. One hundred percent of survey respondents either *agreed* or *strongly agreed* that there was a current shortage throughout the state in qualified entry-level workers in the water quality fields. Seventy-two percent of respondents *strongly agreed* that in the next 5 years the need would be even greater. It was determined that an OE in surface water quality would help an applicant gain employment. Further, 83% of respondents stated they would be more likely to hire a graduate of an OE. Over 87% of respondents indicated a need for more standardized surface water quality training. A majority of respondents also indicated that the suggested coursework would improve an applicant's chance of gaining employment with their business/organization. Thus, students and local employers have shown interest in the OE and partners are preparing to take advantage of it when it is available.

2. Job Opportunities

State statistics from the Alaska Department of Labor substantiate workforce and skill development in rural Alaska. Figures provided by the Department of Labor website (<http://almis.labor.state.ak.us>) project, by 2018, a 12.3% increase in jobs in Professional, Scientific, and Technical Services, and an 11% increase in Environmental jobs. The number of available green jobs in Alaska is also expected to increase greatly. This OE will prepare students to directly enter this high demand workforce.

3. How Have Positions Been Filled to Date?

Positions related to monitoring surface water quality have been filled either through village programs funded by EPA IGAP or by technicians employed by organizations from outside of local communities.

VI. OTHER

A. COUNCIL OF ADVISORS

This proposal is the result of an ongoing initiative by the University of Alaska, Alaskan residents, local nonprofits, and tribes/villages wanting to increase educational opportunities available, especially to the rural Alaska workforce. The guiding force behind this OE is the Council of Advisors. The Council of Advisors will continue to plan, guide, monitor, and assess the Occupational Endorsement.

Occupational Endorsement in Rural Surface Water Quality Testing

Council of Advisors

Dan Bogan	Alaska Natural Heritage Program, University of Alaska Anchorage
Carol Gales	Program Development Manager, UAF Northwest Campus
Susan Flensburg	Environmental Program Manager, Bristol Bay Native Association
John Oscar	Director, Kuskokwim Watershed Council
Kevin Zweifel	Norton Sound Health Corporation

B. FACULTY

The majority of the faculty is currently employed in the University of Alaska System. Dr. Todd Radenbaugh has been hired specifically to coordinate the Environmental Studies program as well as teach two required courses (ENVI 101, ENVI110). Dan Bogan works with the Alaska Natural Heritage Program, UAA and helped develop three of the required courses (ENVI 110, 111, and 112). Other faculty will come from well-established CRCD programs. If the program requires more instructors, adjuncts can be hired on demand.

VII. RELATION OF ENDORSEMENT TO OTHER UNIVERSITY PROGRAMS

A related university program is the OE in Rural Utilities Business Management that specifically addresses operation of rural water and wastewater utilities. This proposed OE Rural Surface Water Quality Testing is different from the existing program as it deals with all surface water not related to municipal or village water supplies or waste streams. This proposed OE is designed to train technicians to conduct general environmental monitoring for programs such as EPA IGAP and watershed councils. Thus, this OE does not duplicate or approximate other programs statewide. At present there is no water quality training program designed specifically to serve the needs of the rural environmental workforce.

VIII. IMPLEMENTATION/TERMINATION

A. DATE OF IMPLEMENTATION

The program is expected to be in the UAF catalog and available in the fall semester of 2015. All required courses have been piloted or/are either already existing as catalog UAF courses.

B. PLANS FOR RECRUITING STUDENTS

Promotion of this new program will be accomplished throughout the state in cooperation with local and tribal governments, local for-profit and nonprofit native corporations, rural university campuses and centers, and the urban Fairbanks campus. Upon approval, the UAF CRCD is prepared to market the program with brochures, on community campus websites, and other conventional methods of student recruitment.

Rural tribal councils, local nonprofits, and local for-profit corporations will be encouraged to organize and support students in this recruitment endeavor. Organizations such as Bristol Bay Native Association, Southwest Alaska Municipal Conference, Kuskokwim Watershed Council, and the Telida Village Tribal Council will continue to have a need for water quality technicians. As part of normal workload, UAF CRCD faculty and staff regularly attend conferences and job fairs, participate in high school programs, and conduct community outreach activities in an attempt to promote university programs and recruit students. This OE program will be added to these recruiting efforts.

Preliminary marketing and research of the idea for the new program shows a strong interest from community partners. For example, Bristol Bay and Seward Peninsula communities are supportive of an educational program that works to develop local surface water technicians and could help to successfully transition more community members into higher education. It should be noted partners are already preparing to take advantage of this OE's coursework.

C. PLANS FOR PHASING OUT PROGRAM IF UNSUCCESSFUL

This program does not involve substantial program or new equipment investment. If student numbers are low or unsustainable, the phasing out process would only involve the assurance of endorsement completion by existing students. If it becomes necessary to close the program, any student that started this OE will be provided the opportunity to complete it.

D. ASSESSMENT OF THE PROGRAM

The program will be assessed through ongoing and periodic student and faculty evaluations, and according to the Student Outcomes Assessment Plan. This assessment will consist of monitoring student recruitment, retention, and progress while in the program, and the results of the program as seen by students, alumni, employers and community members. See the full Student Outcomes Assessment Plan that follows for greater details.

**Occupational Endorsement in Rural Surface Water Quality Testing Student Outcomes
Assessment Plan**

Expanded Statement of Institutional Purpose	Intended Objectives/Outcomes	Assessment Criteria and Procedures	Implementation (what, when, who)
<p>MISSION STATEMENT: This OE will provide students, including Alaska Native and rural students, with quality academic instruction and training responsive to community, government, and industry needs. It will help empower graduates and their communities to collect baseline data and to monitor surface water quality while protecting and enriching local culture.</p> <p>GOAL STATEMENT: Graduates of the OE will possess the necessary interdisciplinary skills needed for entry-level employment in surface water monitoring.</p>	<ol style="list-style-type: none"> 1. Graduates of this OE will be prepared academically for entry-level employment in the field of surface water quality analysis. 2. Graduates of this OE will be prepared vocationally for employment in the field of surface water quality analysis. 3. Graduates of this OE will be prepared to take additional undergraduate level coursework or advance into a science or engineering- related Certificate, Associate or Baccalaureate program. 	<ol style="list-style-type: none"> 1a. Individual student Learning Outcomes Assessment Rubric 2a. Individual student Learning Outcomes Assessment Rubric 2b. Community partner perception of interns and student hires 3. Student enrollment in additional UAF courses or programs 	<ol style="list-style-type: none"> 1a. Completed by Program Coordinator annually. 2a. Completed by Program Coordinator annually. 2b. Survey delivered to community partners annually. 3. Survey of OE graduates enrolled in additional UAF coursework completed by Program Coordinator annually.

**Occupational Endorsement in Rural Surface Water Quality Testing Individual Learning Outcomes
Assessment Rubric**

Outcomes	Expectations	Rating
<p align="center">Academic Performance</p> <ul style="list-style-type: none"> Accumulated student GPA in required courses 	A Grade Point Average of 'C' (2.0) or above in Occupational Endorsement in Water Quality courses (Rating scale: C=1, B=2, A=3)	
<p align="center">QAPP Development/Compliance</p> <ul style="list-style-type: none"> Learn the basic scientific reporting methods and techniques necessary to implement surface water Quality Assurance Project Plan (QAPP). 	Satisfactorily develop and or and report on an existing QAPP. This may include literature searches, data collection, data analysis, and project reporting.	
<p align="center">Civic Engagement</p> <ul style="list-style-type: none"> Active engagement in coursework and community outreach in water quality issues 	Actively debates water-related topics during class or community events. Presents oral or poster presentations at academic conferences or meetings. Participates in water quality internships or professional certifications.	
<p align="center">Cooperative Learning</p> <ul style="list-style-type: none"> Reflective and open to feedback from others Motivated to work with others on projects Eager to learn from others 	Completes projects with other students while demonstrating cooperative behavior in coursework.	
<p align="center">Continued Understanding of Surface Water Quality Topics</p> <ul style="list-style-type: none"> Dedicated to being a "lifelong student" Professional and ethical behavior 	Sustains an understanding of surface water quality topics in their community Attends technical conferences such as Alaska Forum on the Environment or joins professional associations such as Alaska Tribal Conference on Environmental Management	
<p align="center">Job Preparedness</p> <ul style="list-style-type: none"> The student acquired the necessary skills for an entry-level surface water quality career. 	Student demonstrates the job readiness skills required to interview and acquire entry level employment. The student has: received a water quality related internship or, has interviewed for a water quality job or, is successfully employed in a water quality position.	
Score (Total =18, score greater than 13 or 70% suggests learning objectives for student were met)		

Rating Scale:
0 = student does not exhibit this characteristic
1 = student rarely exhibits this characteristic
2 = student occasionally exhibits this characteristic
3 = student typically exhibits this characteristic

IX. APPENDICES

Appendix A. COURSE LEARNING MATRIX

	Water Quality : Course Matrix	ENVI 101	ENVI 110	ENVI 111	ENVI 112	ENVI 160	ABUS 183	CIOS 150
Cat. A.	Apply basic environmental concepts to surface water in Alaska							
1	Acquire knowledge of surface water issues in Alaska	X	X	X	X			
2	Understand role of water cycle in ecosystems	X						
3	Acquire knowledge of ecological issues	X	X	X	X			
4	Acquire basic knowledge of hydrology.	X	X	X	X			
5	Learn about environmental assessments.	X	X	X	X			
Cat. B.	Understand general science concepts.							
1	Understand how science uses math.	X	X	X	X			X
2	Describe possible solutions to current water quality issues	X		X	X	X		
3	Understand the scientific method	X	X			X		
Cat. C.	Understanding and following a Quality Assurance Project Plan							
1	Learning the elements of a QAPP		X	X	X			
2	Compliance with regulations	X	X	X	X	X		
3	Reporting defensible data	X	X	X	X			X
4	Recognize basic science concepts related to water		X	X	X			
Cat. D.	Understand the basics of water quality in Alaska							
1	Identify types of water quality monitoring tools		X	X	X	X		
2	Discuss what to do when water quality parameters are not met	X		X	X	X		
3	Perform basic analysis of water quality data		X	X	X	X		

Cat. E	Demonstrate knowledge of the safe and calibrated use of water quality instruments							
1	Recognize and identify various basic instruments		X	X	X			
2	Know how to calibrate standard instruments and follow an SOP		X	X	X	X		
3	Describe and demonstrate maintenance procedures for specific water quality instruments		X	X	X			
Cat. H	Demonstrate Algebra and computer skills required for water quality analysis							
1	Enter data accurately into a spreadsheet or database			X	X			X
2	Understand numbers as data that can be used to tell a story	X			X	X		X
Cat. K.	Apply effective interpersonal and communication skills							
1	Practice audience appropriate professional communication.	X					X	
2	Prepare a resume and cover letter.						X	
3	Be able to write reports, correspondences, etc.	X				X	X	
4	Prepare effective oral presentations.					X	X	
5	Demonstrate computer literacy.	X				X	X	X
6	Effectively communicate in job interview setting						X	

Appendix B.

LETTERS OF SUPPORT

1. UAF BBC Director - Dr. Debi McLean
2. UAF NWC Director - Bob Metcalf
3. UAF CRCDC Science Department - Dr. Brian Rasley
4. UAA Alaska Natural Heritage Program - Dan Bogan
5. UAF CRCDC Tribal Management Program - Kevin Illingworth
6. Bristol Bay Native Association, Environmental Program - Susan Flensburg
7. Yukon River Inter-Tribal Watershed Council – Edda Mutter

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www.uaf.edu/bbc

September 3, 2015

To Whom it May Concern:

The UAF Bristol Bay Campus enthusiastically supports the Occupational Endorsement (OE) in Rural Surface Water Quality. This program could be a benefit across Alaska by providing educational opportunities and training currently not easily accessible to rural communities.

The Rural Surface Water Quality OE is designed as a pathway for rural community members to gain local employment through proper training and education. Other local community members such as the Southwest Alaska Municipal Conference and Bristol Bay Native Association have also shown support for this program.

There is a need in Alaskan rural communities for training and education opportunities that are relevant to the available jobs. Having properly trained water quality technicians is crucial as the US Environmental Protection Agency and Alaska Department of Environmental Conservation have created stricter testing and reporting guidelines for communities to remain in compliance with current data standards. This OE will create an approved pathway to training local community members the water quality testing techniques and to successfully acquire the available water quality technician positions.

On behalf of the Bristol Bay Campus I would like to extend our full support of the Rural Surface Water Quality OE.

Sincerely,



Deborah McLean, Ed.D.
Director, Bristol Bay Campus
University of Alaska Fairbanks



November 7, 2014

To Whom It May Concern:

Northwest Campus strongly supports adoption of the proposed occupational endorsement in Rural Surface Water Quality Testing.

In concert with several regional partners, UAF Northwest Campus has been working with the UAF Bristol Bay Campus to develop the Rural Surface Water Quality Testing occupational endorsement. Northwest Campus worked hand-in-hand with partners at Norton Sound Health Corporation's Office of Environmental Health; with area tribal water quality monitoring staff; and with the University of Alaska Anchorage's Alaska Natural Heritage Program to offer a series of surface water quality courses in 2013-14. These three courses include two new courses that are now proposed as part of this occupational endorsement. Further discussion with these partners contributed to assembling the menu of seven courses that make up the proposed occupational endorsement.

The occupational endorsement in Rural Surface Water Quality Testing will improve education at UAF by providing students an opportunity to receive relevant training needed to work as rural water quality technicians and EPA IGAP assistants and coordinators. These positions are critical for community safety and because all municipalities and villages in Alaska must report water quality compliance to state and federal officials.

The proposed occupational endorsement will benefit Northwest Campus by allowing us to provide an educational opportunity that is of recognized relevance and benefit to our students and communities.

We encourage you to approve the occupational endorsement in Rural Surface Water Quality Testing.

Sincerely,

A handwritten signature in black ink that reads "Bob Metcalf".

Bob Metcalf, Director

UNIVERSITY OF ALASKA FAIRBANKS
College of Rural and Community Development
400 Brooks Building PO Box 756500 Fairbanks, Alaska 99775-6500
(907) 474-5029 (907) 474-5640 (fax)
Rural Science Department

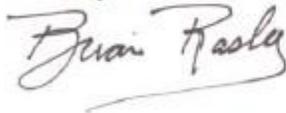
To: UAF Curriculum Review Committee and UAF Faculty Senate

From: Brian Rasley, PhD., CRCD Rural Science Department Chair

Re: Occupational Endorsement Program for Rural Surface Water Quality Testing

I am writing the letter to express my support for the proposed Occupational Endorsement (OE) program for Rural Surface Water Quality Testing. Surface water quality has historically been a critical issue in rural Alaskan communities and there is currently little baseline data to evaluate potential changes in surface water quality due to resource development and climate change. Implementation of a program that can produce a pool of locally trained people with the correct qualifications to carry out water quality analyses in rural Alaska is long overdue. An OE program for surface water quality testing has many benefits to local communities, which include providing an employable skillset to local residents and introducing local residents to science related disciplines. The proposed program has been structured to meet a demonstrated statewide need in rural Alaska and has a course of study that is the result of extensive collaboration among the various government and industry stakeholders. The proposed OE program will provide a standardized training environment and fill a critical need for most rural Alaskan communities. Due to the widespread need for qualified water quality testing personnel in rural Alaska I believe that the proposed program is sustainable, and fulfills a historical need. I fully support the implementation of the proposed OE.

Sincerely,



Brian Rasley, PhD.
CRCD Rural Science Department Chair



Alaska Natural Heritage Program
UNIVERSITY of ALASKA ANCHORAGE

3211 Providence Drive
Beatrice McDonald Hall
Anchorage, AK 99508
T 907.786.6350

<http://aknhp.uaa.alaska.edu>

7 January 2015

Pete Peter Pinney
Associate Dean of CRCD Academic Affairs
University of Alaska Fairbanks College of Rural and Community Development

Dear UAF Curriculum Review Committee members,

This letter is to show my full support for the UAF CRCD Occupational Endorsement (OE) in *Rural Surface Water Quality Testing*. I have been involved with water quality training programs in Alaska for over 15 years. During that time, I was involved in the development and delivery of the Tribal Water Quality Training Program (TWQTP) sponsored by the Native American Fish & Wildlife Society beginning in 2002. My involvement in that program brought me to rural areas in Alaska including the Bristol Bay Region to conduct a training in 2003. I have been returning to the region to conduct similar and recertification trainings ever since. Attendees of the trainings, for the most part, have been Tribal Environmental Coordinators, whose positions are funded through the EPA's Indian General Assistance Program (IGAP). To help streamline the training for this program, which has been done piecemeal since the cessation of the TWQTP in 2006, I strongly encourage the approval of the proposed Occupational Endorsement for Rural Surface Water Quality Testing.

Through the years, I have been able to see important skill sets that are good predictors of whether or not someone will be a successful water quality monitor. Many students lack basic training in computer skills which makes it difficult for them to manage and analyze data. Students who have been introduced to computers and word processing and spreadsheet programs are much more likely to be successful in developing a Quality Assurance Project Plan (which is required by the EPA for IGAP-funded water quality monitoring projects) and accurately collect and manage their data. I helped develop and have taught three of the required classes for the OE; ENVI 110 - Introduction to Water Quality I: Measurement and the proposed ENVI F111 - Introduction to Water Quality 2: Monitoring and Assessment and ENVI F112 - Introduction to Water Quality III: Data Quality Assurance. I have found that students with basic computing skills who have been introduced to the study of environmental science are much more likely to experience success more quickly and stick to their water quality monitoring program over time. The proposed Occupational Endorsement in Rural Water Quality Testing would give participating students the skills they need to be successful in performing surface water quality assessments for their Tribe or Village. I enthusiastically support its approval and passage.

Sincerely,

A handwritten signature in black ink that reads 'D. Bogan'.

Daniel Bogan
Research Professional, Aquatic Biologist



Tribal Management Program
College of Rural and Community Development
Interior-Aleutians Campus
Harper Building-PO Box 756720, Fairbanks, AK 99775-6720
Phone: (907) 474-5439 – Fax (907) 474-5208

November 14, 2014

To Whom it May Concern:

As faculty and academic program head of the University of Alaska Tribal Management Program and Chair of the Department of Indigenous, Community, and Tribal Programs, I am pleased to write this letter of support for the Occupational Endorsement in Rural Surface Water Quality Testing.

Development of surface water quality testing curriculum for rural Alaska has been identified numerous times as a priority of many communities in rural Alaska. This OE will teach the students a universal skill set that can be used for a broad range of careers including EPA IGAP assistants and coordinators, and other positions within tribal governments. These skills could also serve as a foundation for other technical work. Training local students in these skills will not only give employers an opportunity to hire locally for technician work that is traditionally completed by non-local technicians, but will also support local economic development.

These courses will have a positive impact on the Tribal Management Program and on the success of Tribal Management students and tribal communities in Alaska. Tribes across the State of Alaska are in dire need for education and training opportunities related to natural resources, environmental science and water quality testing. In 2001 the Tribal Management Program responded to this need by developing an area of emphasis in Environmental and Natural Resource Management within the Tribal Management Program, and offered several water quality courses through partners such as the Yukon River Inter-tribal Watershed. With limited resources, however, the TM program has focused its efforts on the Natural Resource Management side, and is very pleased to see the expansion of coursework within the Environmental Studies program to help meet this need. Several TM graduates have taken ENVI coursework, and we expect that number to increase as more ENVI courses become available.

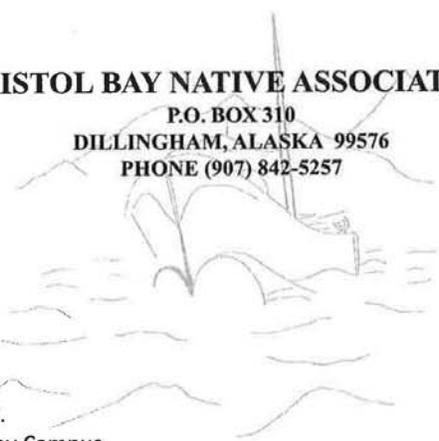
The Tribal Management program strongly supports the Environmental Studies program in the development of these much needed courses and Occupational Endorsement. On behalf of the University of Alaska Tribal Management Program, I would like to extend our complete support of Occupational Endorsement in Rural Surface Water Quality Testing.

Sincerely,

Kevin M. Illingworth, J.D.
Associate Professor and Academic Program Head
Tribal Management Program
Chair, Department of Indigenous, Community and Tribal Programs
University of Alaska Fairbanks

BRISTOL BAY NATIVE ASSOCIATION

**P.O. BOX 310
DILLINGHAM, ALASKA 99576
PHONE (907) 842-5257**



Tribal Councils
Served by BBNA:

- Aleknagik
- Chignik Bay
- Chignik Lagoon
- Chignik Lake
- Clarks Point
- Curyung
- Egegik
- Ekuk
- Ekwok
- Igiugig
- Iliamna
- Ivanof Bay
- Kanatak
- King Salmon
- Kokhanok
- Koliganek
- Levelock
- Manokotak
- Naknek
- New Stuyahok
- Newhalen
- Nondalton
- Pedro Bay
- Perryville
- Pilot Point
- Port Heiden
- Portage Creek
- South Naknek
- Togiak
- Twin Hills
- Ugashik

November 24, 2014

Deborah McLean, Ed.D.
Director, UAF Bristol Bay Campus
P.O. Box 1070
Dillingham, AK 99576
907-842-5109

RE: Occupational Endorsement in Rural Surface Water Quality Testing

Dear Dr. McLean,

Bristol Bay Native Association (BBNA) serves thirty-one villages with a wide range of federally and state funded programs including support to Tribal Councils to develop village-based and watershed environmental protection programs.

The Occupational Endorsement in Rural Surface Water Quality Testing will teach students a universal skill set that can be used for a broad range of careers including EPA funded positions through the Indian General Assistance Program (IGAP). These skills could also serve as a foundation for other technical work available in communities and outside the region through ANCSA corporations and their subsidiaries.

BBNA participated on the committee that helped to develop the proposed Occupational Endorsement because of the demonstrated need to provide tribal environmental program staff with the necessary classes and training to perform surface water quality assessments and produce defensible data. As in other regions, there is occasional turnover and students that complete the Occupational Endorsement will have a better chance of filling the IGAP funded coordinator and technical assistant positions.

BBNA would like to thank our local campus for initiating the effort and enthusiastically supports its approval and passage.

Sincerely,

Susan Flensburg, Environmental Program Manager
Bristol Bay Native Association



725 Christensen Drive, Suite 3 ♦ Anchorage, Alaska 99501 ♦ P: (907) 258-3337 ♦ Fax: (907) 258-3339

February 13, 2015

To Whom It May Concern:

Subject: Letter of Support for the proposed Occupational Endorsement (OE) program for Rural Surface Water Quality Testing

Dear Sir/Madam:

I am writing on behalf of the Yukon River Inter-Tribal Watershed Council (YRITWC) to express enthusiastic support for the award application submitted University of Alaska Fairbanks Bristol Bay Campus College of Rural and Community Development. This project offers an exciting opportunity to increase the capacity of rural surface water quality testing throughout the state and to spur progress in the critical field of community adaptation to water quality issues.

The Council is an Indigenous grassroots organization, consisting of 70 First Nations and Tribes, dedicated to the protection and preservation of the Yukon River watershed. The Council accomplishes this by providing Yukon First Nations and Alaska Tribes in the Yukon Watershed with technical assistance, such as facilitating the development and exchange of information, coordinating efforts between First Nations and Tribes, undertaking research, and providing training, education and awareness programs to promote the health of the watershed and its Indigenous peoples. The Council's Indigenous Observation Network was established to conduct large-scale water quality, as such, we believe that a standardized training environment will enhance rural communities' capacity and will contribute in providing high quality surface water data necessary to address surface water concerns.

We are dedicated to understanding the Yukon River Watershed by means of monitoring, measuring and researching, and to use this knowledge to enhance and preserve life along the Yukon River. We believe that University of Alaska Fairbanks, Bristol Bay Campus College of Rural and Community Development has the same goal and therefore, fully support the implementation of the proposed occupational endorsement program.

Sincerely,

Edda Mutter, PhD.
Science Director
Yukon River Inter-Tribal Watershed Council