Opportunity Title: Watershed Integrity: Refinement and Case Study Development
Opportunity Reference Code: EPA-ORD-NHEERL-WED-2018-06

Organization U.S. Environmental Protection Agency (EPA)

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How to Apply A complete application consists of:

- An application
- Transcripts – Click here for detailed information about acceptable transcripts
- A current resume/CV, including academic history, employment history, relevant experiences, and publication list
- Two educational or professional references

All documents must be in English or include an official English translation.

If you have questions, send an email to EPArpp@orau.org. Please include the reference code for this opportunity in your email.

Description Under EPA's Safe and Sustainable Water Resources National Program, an Index of Watershed Integrity (IWI) has been defined (Flotemersch et al. 2015) and mapped for the conterminous US (Thornbrugh et al. 2018). This research project may consist of the following four elements: (1) Enhancing the IWI map -- The original IWI map was based on hypothesized relationships between stressors and ecological functions, using first order, linear assumptions and no weighting. An approach to enhancing the IWI map by defining empirical relationships using random forests has been developed for the water quality function (Johnson et al. submitted). The research participant may be involved in enhancing the IWI map by more accurately characterizing the relationships between stressors and the remaining five functions that are incorporated into the index using literature and available data; (2) Testing the IWI map -- The IWI map has been tested by comparing results to stream condition data from case study watersheds and national surveys (Kuhn et al. 2018; Thornbrugh et al. 2018), and in conjunction with #3 below, the research participant will acquire regional data to further test the IWI maps; (3) Regional applications -- The research participant may develop one or more regional case studies demonstrating the utility of the IWI maps for aquatic resource management; and (4) Temporal change -- A map of partial change in IWI over time with respect to specific stressors may also be produced, dependent on the availability of new spatial datasets. The research participant may develop a research program that addresses some combination of these four elements.

The participant may be involved in the following activities:

- Assembling regionally-available spatial data for evaluating IWI;
- Using spatial datasets to update national maps of IWI;
- Assembling local, regional, or national datasets for testing of IWI assumptions;
- Collaborating with researchers examining environmental, health, and/or economic impacts of IWI;

- Collaborating with researchers to develop quality assurance approaches for mapping and testing of IWI;
- Using GIS to develop new spatial indicators;
- Collaborating on related national mapping activities;
- Conducting scientific synthesis, data analysis, manuscript preparation and literature searches.

The research participant will learn about the use of spatial indicators and watershed data, and will learn to develop, test, and apply models that evaluate IWI. The research participant will also further develop an expertise in spatial analysis using large national datasets. The research participant will have access to a team of experts collaborating in and across disciplines on problems of crucial importance to the EPA's mission.

Flotemersch, J.E., S.G. Leibowitz, R.A. Hill, J.L. Stoddard, M.C. Thoms and R.E. Tharme. 2015. A watershed integrity definition and assessment approach to support strategic management of watersheds. River Research and Applications 32:1654-1671.

Johnson, Z.C., S.G. Leibowitz, and R.A. Hill. Revising the index of watershed integrity national maps. Science of the Total Environment (submitted).

Kuhn, A., S.G. Leibowitz, Z.C. Johnson, J. Lin, J.A. Massie, J.W. Hollister, J.L. Ebersole, J.L. Lake, J.R. Serbst, J. James, M.G. Bennett, R.J. Brooks, C.T. Nietch, N.J. Smucker, J.E. Flotemersch, L.C. Alexander, and J.E. Compton. 2018. Performance of national maps of watershed integrity at watershed scales. Water 10:604-639.

Thornbrugh, D.J., S.G. Leibowitz, R.A. Hill, M.H. Weber, Z.C. Johnson, A.R. Olsen, J.E. Flotemersch, J.L. Stoddard, and D.V. Peck. 2018. Mapping watershed integrity for the conterminous United States. Ecological Indicators 85:1133-1148.

This program, administered by ORAU through its contract with the U.S. Department of Energy (DOE) to manage the Oak Ridge Institute for Science and Education (ORISE), was established through an interagency agreement between DOE and EPA. The initial appointment is for one year, but may be renewed upon recommendation of EPA and is contingent on the availability of funds. The participant will receive a monthly stipend commensurate with educational level and experience. Proof of health insurance is required for participation in this program. The appointment is full-time in the Corvallis, Oregon area. Participants do not become employees of EPA, DOE or the program administrator, and there are no employment-related benefits.

The mentor for this project is Scott Leibowitz (leibowitz.scott@epa.gov). The anticipated start date for the appointment is October 1, 2018.

Qualifications The applicant should have a Ph.D. in aquatic ecology, ecohydrology, watershed hydrology, or related field with a strong background in aquatic ecology, spatial analysis, and statistics. The degree must be received

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within five years of the appointment start date. Experience in watershed or statistical modeling and spatial analyses at broad spatial scales and use of aquatic monitoring data and GIS analyses is desired.

Candidates should have a strong background in landscape analysis of aquatic systems. Experience with ArcGIS, R statistical software, random forest modeling, and large national datasets preferred, along with experience with working with watershed data and the National Hydrography Dataset Plus V2.

Eligibility Requirements

- **Citizenship:** LPR or U.S. Citizen
- **Degree:** Doctoral Degree received within the last 60 month(s).
- **Discipline(s):**
  - **Earth and Geosciences** (2 👁)
  - **Engineering** (2 👁)
  - **Environmental and Marine Sciences** (5 👁)
  - **Life Health and Medical Sciences** (2 👁)