



# science in ACTION

INNOVATIVE RESEARCH FOR A SUSTAINABLE FUTURE

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## REGIONAL APPLIED RESEARCH EFFORT PROGRAM

The Regional Applied Research Effort (RARE) is an Office of Research and Development (ORD) program administered by the Office of Science Policy (OSP) that responds to the high-priority research needs of EPA Regions. RARE projects address a wide array of environmental science issues critical to ORD's regional partners. The Regional Science Liaisons (RSLs) manage the RARE process by fostering interactions and enhancing communication between the Regions and ORD laboratories and centers. RSLs play a vital role in delivering ORD science, including RARE project results, to support regional environmental decision-making.

### Goals of the RARE Program

- Provide near-term research (1–2 years) to address high-priority, regional, applied science needs
- Foster collaboration between EPA Regions and ORD laboratories and centers
- Build a regional/ORD network for future scientific interaction
- Provide opportunities for ORD scientists to apply their expertise to regional issues and explore new research challenges

### RARE Funding and Process

Annually, ORD allocates resources for each of EPA's 10 regional offices to pursue collaborative research efforts. Each Region conducts its own solicitation and, in collaboration with ORD, selects projects that best address the Region's highest priority needs. The RSLs engage ORD scientists early in the process, ensure the projects are within the scope of ORD's mission, and secure regional and ORD management support for the selected projects. OSP manages the funding process for the chosen projects.

### Sample RARE Projects Regions 2 and 3 Delaware Estuary Benthic Community Project

In this project, researchers will inventory and map the benthic communities in Delaware Bay, providing valuable insight into the condition of the Bay's benthic communities and areas of critical habitat. The Regions are working with ORD's National Health and Environmental Effects Research Laboratory (NHEERL) on this effort. The results from this project will contribute to coastal resource environmental management decisions, including issuing dredging permits, designating areas of essential fish habitat, identifying ecologically significant species and critical habitat for protection, and performing Natural Resource Damage Assessments related to oil spills and hazardous substance release.

### Region 10 Ground Water Contamination on Yakama Reservation Project

In Washington State's Yakima River Basin, residents are using drinking water containing nitrate concentrations that exceed the Federal Safe Drinking Water Maximum Contaminant Level of 10 mg/L. Bacterial contamination has

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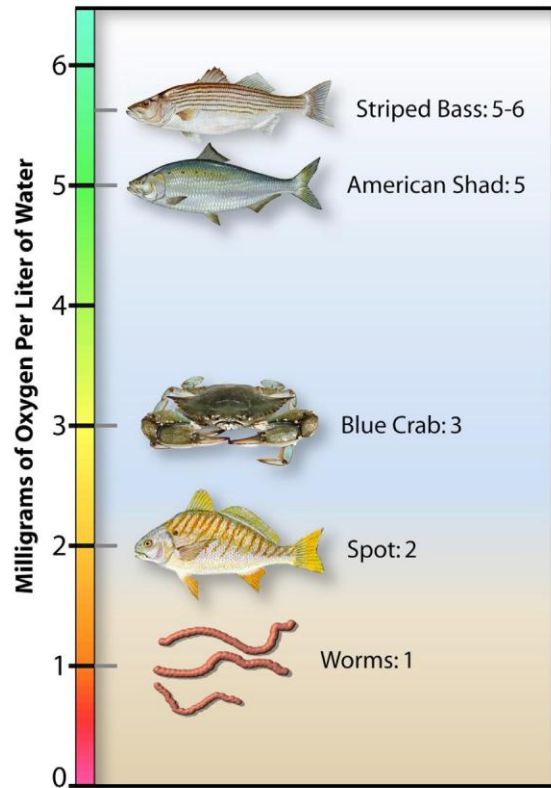
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also been found, along with concentrations of pesticides and heavy metals. In many cases, members of the Yakama Nation (Tribe) or Spanish-speaking families involved in local agriculture are affected. Yakima County's population includes almost a third of the state's migrant/seasonal farm workers, and poverty impacts greater than 20% of the county's population. For this project, the Ground Water and Ecosystems Restoration Division (GWERD) of ORD's National Risk Management Research Laboratory (NRMRL) is collaborating with Region 10 and other Federal agencies, including U.S. Geological Survey, United States Department of Agriculture, and the Indian Health Service. The approach includes ground water sampling for several compounds that may assist in linking contamination to specific sources (e.g., antibiotics or hormones used in dairies that are specific to ruminants, or compounds such as caffeine that are unique to humans). The approach uses isotopic techniques that can help determine whether the source of nitrate is from humans, animals, or fertilizers, and employs microbial source tracking. Although quality assured results will not be available until late 2010, activities related to this RARE project have already resulted in development of a unique GIS method to target sample collection for purposes of determining source contributions in agricultural settings, and have also prompted Washington State to allocate \$300,000 for residential devices that remove nitrates and \$100,000 to establish a state-designated ground water management area (GMA) effort to decrease nitrogen loads. The multi-agency GMA effort will determine measures to protect public health, and may contribute to voluntary changes in plans for nutrient management, fertilizer application rates, or septic system design. The results can also support EPA enforcement actions, if needed.



*Concentrated Animal Feeding Operation (CAFO)*

### Oxygen Needs of Key Species



### Region 3 Dissolved Oxygen Criteria in Chesapeake Bay

The goal of this RARE project was to address the issue of fluctuation of dissolved oxygen (DO) in Chesapeake Bay, where natural conditions indicated that in some sections of the Bay, the standard levels of DO were not met during the warmer months of the year.

Through the RARE program, scientists at NHEERL, in cooperation with Region 3's Chesapeake Bay Program, generated data that were critical to understanding the exposure effects on a range of organisms under conditions of cyclic DO concentrations. ORD scientists developed an experimental system that modeled a tidal cycle by exposing test organisms to DO levels that fluctuate to simulate a typical tidal cycle. These data were then used by the Chesapeake Bay DO Criteria Task Group to recommend and promulgate the DO criteria. These criteria were developed to protect against short-term exposures that could impact aquatic organisms, particularly during larval and juvenile life stages. This RARE project not only contributed significantly to the Chesapeake Bay DO criteria but also to the EPA Virginian Province Saltwater DO criteria document. This effort contributed to efforts to address the problem of low DO in the Bay.

**For more information on RARE, please visit: <http://www.epa.gov/osp/regions/rare.htm>.**