WRRI Research Priorities for FY 2016

Projects not eligible for support include research on health effects involving human subjects, and research involving oceanography or focused on ocean waters (estuarine-related research is acceptable). WRRI is unable to support monitoring-only based projects.

Proposed work must be conducted in the state of North Carolina. Successful proposals must make a strong case for relevance and importance of the proposed project to North Carolina. WRRI is interested in the economics and economic value of water as it applies across the different focus areas. WRRI also encourages PIs to consider approaches to information and technology transfer and dissemination of research results for all projects. While not a required component of the pre-proposal stage, successful applicants will be asked to address this in a full proposal (for faculty submissions) and/or in project deliverables (for faculty and student projects that receive funding).

For its FY 16-17 funding cycle, WRRI is interested in proposals that address the following focus areas.

FOCUS AREA 1: STORMWATER MANAGEMENT

Low impact development How do the lifecycle costs and benefits of low impact development (LID) compare to conventional development in new, retrofit, and redevelopment applications, particularly regarding LID for stormwater treatment in urban settings? What are the short-term and long-term implementation and maintenance cost and benefits of LID for developers, municipalities, communities, and individuals compared to that of conventional stormwater control measures (SCMs)? What is the short-term and long-term effectiveness of low impact development, specifically as related to stormwater treatment, costs and benefits, and water quality improvement? How can low impact development be encouraged and incentivized in North Carolina? For the questions above, how do costs and benefits for LID and conventional development compare across the different regions of the State?

Impervious cover impacts & mitigation How can we quantifiably mitigate the effects of impervious cover on water quality and aquatic life in different urban stream settings and stormwater systems? What realistic management measures (including stream restoration practices, riparian buffers, and floodplain-stream reconnection) exist or can be further evaluated to address effects of impervious cover? How can watershed restoration activities be implemented to achieve macroinvertebrate recovery and recolonization?

Pollutant removal processes and credits How should pollutant removal credits be determined and evaluated for urban stormwater control measures (SCMs) and stream restoration practices, in particular those aimed at managing nutrients, pathogens, and sediment? How can we better understand the processes by which SCMs remove

contaminants from stormwater and reduce impacts to receiving streams? Specifically for the state of North Carolina, and its physiographic regions (mountains, piedmont, and coastal plain), what location-based methods and criteria can be developed for evaluating SCM and stream restoration performance, credit accounting, and removal rates for pollutants (particularly nutrients, pathogens, and sediment)?

FOCUS AREA 2: DRINKING WATER, WASTEWATER & WATER INFRASTRUCTURE

Risk and uncertainty In the face of changing population, land use, climate, and regulations, how can we quantify and manage risks and uncertainties in public water supplies? How should rate setting and financing capital improvements for water and sewer utilities be determined in the face of these risks and the changing physical and regulatory landscapes? How can utilities increase their resilience to these changes?

Customer behavior and utility relations Using social science and economic valuation methodologies, how can water/wastewater utilities better understand customers' level-of-service expectations, motivations for behaviors, willingness to pay for services, and customer perceptions, attitudes, opinions and beliefs related to drinking water, wastewater, and reclaimed water? How can this information be applied to utility management?

Alternative water sources What alternative sources (graywater, harvested rainwater, reclaimed water) exist for differing consumptive uses (e.g. home irrigation)? What are the health risks of these alternatives sources? What are the impacts of alternative water use on overall water supply and demand?

Innovative processes What/how can innovative processes and technologies be applied to NC utilities for water and wastewater treatment, plant operation, energy production, distribution systems, waste discharge management, potable and reclaimed water supply, and the repair, management and planning of infrastructure?

FOCUS AREA 3: SURFACE WATER & GROUNDWATER HYDROLOGY

What are the human impacts to groundwater and surface water availability and quality in North Carolina? What fundamental hydrogeological interactions of surface water and groundwater resources do we need to further understand in order to support the sustainable use of water resources?

FOCUS AREA 4: WATERSHED MANAGEMENT

In NC watersheds where Total Maximum Daily Loads (TMDLs) and nutrient management plans have been implemented, what changes in water quality have been observed? What are the sources, transport and fate of nutrients and sediments in surface waters in these

watersheds? What physical, hydrological, biological and/or community dynamics need to be understood to enhance watershed management approaches?