

# Appendix G: Peer Review (Submitted)

Status: Complete

Project ID/Title: NE\_TEMP2045: Onsite Wastewater Treatment Systems: Assessing the Impact of Soil Variability and Climate Change

## Rate the technical merit of the project:

1. Sound Scientific approach:

Approve/continue project with revision

2. Achievable goals/objectives:

Unacceptable

3. Appropriate scope of activity to accomplish objectives:

Good

4. Potential for significant outputs(products) and outcomes and/or impacts:

Excellent

5. Overall technical merit:

Unacceptable

Comments

I find it very difficult to assess the review on the basis of the information provided. It clearly is a very strong project team who understand the field well - the statement for the need is very well synthesised and written - however, the proposal contains very little details on how the actual research will be carried out. The overall objectives are comprehensive and very ambitious but seem to be written in quite a general, aspirational manner without any detail about which researchers will be doing what activities, how this matches their current expertise, facilities and what techniques will be employed. Also, without knowing what scale of finances are available for such a project it is almost impossible to assess whether this proposed research is in any way achievable.

For example, for Objective 1 which is very ambitious and overarching - "Improve our understanding of the interactions among wastewater, soils, biogeochemical cycles and processes and treatment performance (contaminant removal) of existing and novel wastewater treatment technologies in different geographic regions and landscapes over time and in light of climate variability" - it is not clear exactly how contaminant transport through the different soils in different geographic areas will be determined, as it mainly seems to be about assessing existing systems? How will these be instrumented to assess the movement of effluent and contaminant transport and attenuation through the unsaturated zone without creating preferential flowpaths for example? It mentions using different analytic approaches such as isotopic studies, molecular biology etc. but again there is no detail as to who has the expertise to carry out such research and/or the methods / equipment is available.

Similarly for Objective 2, there is no detailed information about how the proposed modelling will be done – what type of models / approaches will be used, which locations will be simulated, what data will be collected to calibrate the models against, which climate models will be used to make predictions of sea level; rise etc. etc..

I have lots of other questions, but overall, although the aim of the project is extremely interesting, I just see how it can be properly evaluated on the level of detail given in the proposal, the actual roles of each partner institution in the research plan and without having any sense of the scale of finances available. This is why I have rated the "Achievable goals/ objectives" as Unacceptable, as I cannot make an assessment on the information provided I'm afraid.

Your Recommendation:

Approve/continue project with revision

Response: Because of the nature of the multi-state projects, collaborating partners each use their locally assigned resources and capacity, plus any potential extramural grants from other agencies and entities, to help accomplish the objectives of their project. Details related to the specific research to be done, the materials, methods, and personnel involved would be provided at that time. It is beyond the encompassing umbrella scope of this multi-state project to detail specific efforts that a particular Land Grant institution may wish to pursue.

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Excellent

5. Overall technical merit:

Excellent

Comments

Programmatic capabilities have been demonstrated during the two previous projects. An important aspect of understanding the various physical and biogeochemical processes of OWTS, their functional efficacy and subsequent interaction with soils and water resources is the ability to access systems under "real world" scenarios coupled with mesocosm studies. Collaboration and partnerships with regulatory, state, county and local jurisdictional stakeholders are key components for success. The team has previously demonstrated the capabilities to effectively forge those partnerships. The proposed methods and scientific approaches are sound and build on previous findings and preliminary research.

Your Recommendation:

Approve/continue project

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Excellent

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Good

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Excellent

5. Overall technical merit:

Excellent

Comments

The approach is sound and continues efforts from previous projects (NE 1045 and NE 1545). Sound objectives are supported by partner involvement and current, related or previous work by partners of this project. Appropriate scope with the listed partners which will be enhanced with further participation (milestone 2020) in the project across the region. Building on previous efforts under projects NE 1045 and NE 1545 will provide this project with significant opportunities to transfer emerging information and findings from this project to practitioners, decision-makers and the public. The deliverables (outcomes) from this project are timely, needed and achievable. The proposed technical approach is innovative, feasible, achievable, and complete. The proposed technical team has the expertise and experience to accomplish the proposed tasks.

Your Recommendation:

Approve/continue project

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Excellent

Comments

The multi-state approach for onsite wastewater treatment is important given the need to assess soil variability and climatic differences that the proposed research discusses. I think the scientific merits of this project are high, especially with the increased uncertainty surrounding OWTS treatment due to climate change, as well as the already demonstrated regional variability. The previous two multi-state projects funded under this group have produced sufficient data, publications, and outreach to suggest that they will be successful with the current proposal.

Your Recommendation:

Approve/continue project

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Excellent

Comments

Very good team with excellent track record on this important and under-researched area. Good mix of fundamental research, mathematical modeling and policy related aspects. Excellent plan for outreach and dissemination - their past performance attests to their commitment to this aspect of the work.

Your Recommendation:

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Comments

This is an excellent project with a multilayered approach that will produce a strong scientific foundation and guidance for regulatory authorities tasked with managing sanitary systems as we continue to see effects of climate change. I am particularly interested in the effect of gradual sea level rise on coastal communities. Understanding the soil treatment areas ability to treat wastewater under various conditions, as sea level rise will not be static, most coastal areas will see a rise in groundwater, then salt water intrusion, understand what happens to STA under these circumstances will allow regional recommendations and development of new leaching structures that can mitigate potential damages to the STA. Modeling these effects and potential timelines will also allow community the tools necessary to initiate smart community planning measures to mitigate human impact of climate change.

This research also lends itself to potentially identifying microbes that may be able treat wastewater under non-ideal conditions. This is going to be necessary in order to provide adequate wastewater treatment and bolster coastal resiliency by reducing nutrients that have shown to damage the root system of marshes and wetlands.

Also, under current world conditions it would be important to examine the ability of STA to remove pathogens such as COVID-19, which has shown an interesting lifespan in wastewater. Also, we are measuring CEC's in wastewater and groundwater and it would be important to identify soil conditions more conducive to remove CEC's such as 1-4 Dioxane & PFOAS.

Education and Outreach of this research is very important. I recommend a regulatory training module in addition to industry training. Online training in addition to in person workshops should be explored, also potential social media campaign outlining the findings would be a logical next step to promote future research and journal articles.

Your Recommendation:

Approve/continue project

Response: Agreed with reviewer, sea level rise (SLR) is critically important to coastal communities, and we have included mention of SLR in several location in the proposal text. In addition, we agree with reviewer that CEC are quite important and we included them as part of the scope in several areas of the proposal.

Agreed: A statement related to enhancing existing and developing new training modules specific for regulatory agencies was included in the Education and Outreach section.