CMM 319 grant application purpose

CMM requests this grant to advance hydrology stabilization techniques by educating and demonstrating effective water storage techniques, quantification of benefits and engage funding options.

1. The grant will establish (four?) water storage Best Management Practices (BMPs) and hold 6 demonstration events to reach out to Minnesota agricultural producers regarding effective water management options.
2. Management of water storage to reduce the rate and volume of nonpoint source runoff causing near channel erosion site selection will include:
    a. Assessment of the hydrology causing or contributing to ravine, bank and/or gully erosion
        i. Contributing area delineation for local erosion issue
        ii. Identification of local issue relationship with regional issues
            1. Identification of nearest gaging station
            2. Mapping gaging stations contributing area
            3. Identification/evaluation of the prevalence of like symptoms regionally
            4. Identification of de-sequencing opportunities within watershed
            5. Comparison of differences in scale between the catchment and watershed area
        iii. Assessment of regional system hydrology changes using statistical analysis of gaged streams in like conditions (seeking links between near channel erosion and hydrology shifts)
        iv. Preliminary causal linkage identifying potential contributing factors regarding an accelerated flashy regional hydrograph (e.g., assessments of temporal and spatial changes in landuse, adoption of tiling, channel straightening, new ditching practices, changes access to the flood plain, metrological conditions, impervious surfaces,…)
        v. Identification of options for a local catchment's BMP implementation by project team and local watershed managers (not necessarily able to completely address the near channel erosion on its own)
        vi. Engagement of the producer to inf0rm and allow the final selection of BMP (totally controlled by producer's choice)
3. The four BMPs will be selected from a list of potential BMPS similar to the list below (again selection is entirely dependent on the individual producer's preferences).
    a. Two stage ditch (regional scale)
    b. Perennial vegetation (e.g., alternative crops, buffers, CRP; field scale)
    c. Control drainage (field scale)
    d. Offline storage (wetland or detention pond at the regional scale)
    e. Rock inlets (field scale)
    f. Cover crops (field or farm scale)
    g. Terraces/waterways (if/as they contribute to de- sequencing of receiving water flows)

h. Grade stabilization structures
i. Armoring for ravines

4. Estimated quantification of nonpoint source runoff BMP induced changes regarding runoff volume, rate, duration based on best available science by benchmarking multiple methods and existing models (including curve number development assumptions for initial abstraction and cover types, stream energy equations and other runoff equations) to develop a metric for ungaged sites that is easily transferable:
    i. Evaluation of simpler hydrologic nonpoint source runoff assessment tools
    ii. Assess hydrology energy equations like stream power, work and how these equations are applied to the sites physical setting (e.g., Lane's stream balance where volume and rate move a given quantity of sediment volume or increased particle sizes)
    iii. Evaluation of downstream scale factors regarding catchment contributing to the BMP versus the contributing area of the water resource
    iv. Consideration of regional scale impacts on stream power
    v. **Results:** Propose a simple, easily transferable quantification metric for use in valuation of water storage sites (for use by both public and private funding sources)
5. Explain/demonstrate how the developed metric could be used in the following funding sources:
    a. Public sector sources
        i. Water quality implementation grants
        ii. Flood management programs
        iii. Farm conservation programs
    b. Private sector markets
        i. Water quality trading
        ii. Corporate investments in sustainability and social responsibility
        iii. Municipal and County Payment for Ecosystem Services (PES)
            1. Ditch authority few assessments
            2. Municipal stormwater utility services
            3. Drinking water supply utilities
6. Project Monitoring
7. Grant Reporting
8. Outreach events -- Field days (6 events) and educational materials