Pasture Management Science Panel Recommendations

WQGIT Conference Call

May 10, 2010

Panel Background

- The Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) and the Water Quality Goal Implementation Team (WQGIT) sponsored a series of two Pasture Management Workshops to provide a scientific forum for the evaluation of pasture and livestock management practices, implementation and tracking issues, and current assistance programs throughout the Bay watershed.

- The first workshop held on October 27-28, 2009 convened an initial science panel to develop draft practice definitions and model effectiveness values for preliminary model placeholders in the Chesapeake Bay Program Phase 5.3 modeling suite.

Panel Background

- Panel Steering Committee
  - Dave Hansen, WQGIT Co-Chair
  - William Keeling, WTWG Chair
  - Mark Dubin, AgWG Coordinator
  - Liz Van Dolah, CRC-STAC
  - Victoria Kilbert, CRC-CBPO
- Panel Representation
  - USDA ARS
  - USDA NRCS (DE, MD, PA, VA)
  - UD
  - VT
  - UMD
  - PSU
  - WVU
  - MDA
  - VADCR
  - USC

Panel Background

- A second workshop was held on March 10-11, 2010 which convened a larger science panel to more adequately represent the Bay jurisdictions and organizations. The panel reviewed the draft recommendations of the first workshop and considered them in the preparation of final recommendations for development of a watershed-wide science-based report on pasture management systems.
- The initial recommendation report is being provided to the Chesapeake Bay Program partnership for review and consideration of adoption using the BMP evaluation protocol.
- Due to the timelines set by the WQGIT for detailed and specific recommendations to revise to the Phase 5.3 modeling suite, a fully documented final recommendation report will be published after the partnership review to address the documentation standards of the BMP protocol.

Recommendation Review Process

- The initial recommendation report was provided to the Watershed Technical Workgroup (WTWG) on April 21, 2010 as part of the CBP partnership's review and consideration of the recommendations using the BMP evaluation protocol.
- The WTWG provisionally approved the panel recommendations pending review by the Agriculture Workgroup (AgWG).
- The AgWG reviewed the panel recommendations on April 27, 2010 and approved them for consideration by the WQGIT.
- The AgWG and the WTWG wish to nominate the panel recommendations to the WQGIT for approval and adoption into the Chesapeake Bay Program Watershed Model Phase 5.3 (revised).

Pasture Management BMPs Recommended

- **Alternative Watering Facilities**
- **Stream Access Control with Fencing**
- **Prescribed Grazing (PG)**
- **Precision Intensive Rotational Grazing (PIRG)**

Alternative Watering Facilities

- By providing an alternative source of clean water it has been shown that livestock will spend less time watering in streams and thereby impact the stream and the stream bank less than without the alternative source of water. Alternative watering facilities typically involves the use of permanent or portable livestock water troughs placed away from the stream corridor.
- The source of water supplied to the facilities can be from any source including pipelines, spring developments, water wells, and ponds. In-stream watering facilities such as stream crossings or access points are not considered in this definition.

Alternative Watering Facilities

- The modeled benefits of alternative watering facilities can be applied to pasture acres in association with or without improved pasture management systems such as prescribed grazing or PIRG. They can also be applied in conjunction with or without stream access control.
- With proper placement of the watering system, a better distribution of grazing and manure deposition occurs over the entire pasture as compared to the livestock using the stream exclusively for water. Research has indicated that these measures will reduce the time livestock spend in streams.

Alternative Watering Facilities

- An efficiency applied to each pasture land use acre reported of TN 5%, TP 8%, and TSS 10%.
- This practice assumes a nutrient and sediment reduction value with alternative watering systems located remotely from the stream corridor. In-stream watering facilities such as stabilized stream crossings or access points in conjunction with stream access control with fencing is assumed to be a benefit to the stream corridor protection.
- The modeled benefits of this practice are applied against the pasture land use loadings versus the degraded stream corridor land use, as this is how this practice has historically been tracked and reported.

Stream Access Control with Fencing

- Direct animal contact with surface waters and the resultant stream bank erosion are primary causes of pollution from livestock and adjacent pastures. Stream access control with fencing involves excluding a strip of land with fencing along the stream corridor to provide protection from livestock.
- The fenced areas may be planted with trees or grass, or left to natural plant succession, and can be of various widths.

Stream Access Control with Fencing

- To provide the modeled benefits of a functional riparian buffer, the width must be a minimum of 35 feet from top-of-bank to fence line. If an entity is installing a riparian buffer practice in conjunction with stream protection fencing, and can track and report these installations, additional upland benefits of those riparian buffers can be applied in the model.
- The implementation of stream fencing provides stream access control for livestock but does not necessarily exclude animals from entering the stream by incorporating limited and stabilized in-stream crossing or watering facilities.

Stream Access Control with Fencing

- The modeled benefits of stream access control can be applied to degraded stream corridors in association with or without alternative watering facilities. They can also be applied in conjunction with or without pasture management systems such as prescribed grazing or PIRG.
- Stream bank fencing and riparian buffer implementation reduces the nutrient, sediment, and fecal bacteria losses from the adjacent upland pasture, in addition to improving stream bank stability, reducing sedimentation, and direct deposition of fecal matter.

Stream Access Control with Fencing

- If the stream corridor excluded is less than 35 feet in width from top-of-bank to fence line, the efficiency applied is a land use change converting acres of degraded stream corridor with stream access control to hay without nutrients if grass; or forest if trees are planted and tracked and reported as such.
- If the stream corridor excluded is 35 feet or greater in width from top-of-bank to fence line, the land use change converts acres as noted above, plus includes the nutrient and sediment reduction values as a function grass or forested riparian buffer if tracked and reported separately. This practice also includes a ratio of upslope treatment area that is additive to any other pasture management efficiencies within that treatment area. These ratios are described in the number of pasture land use acres to riparian buffer acres receiving modeled nutrient or sediment reduction benefits; 4:1 for TN and 2:1 for TP and TSS.

Stream Access Control with Fencing

- The default value for the width of converted degraded stream corridors that do not have documented land use or width considerations will use the most conservative values; i.e. acreage conversion to grass without nutrients land use based on a 10 feet exclusion width from top of bank to fence line.
- In-stream watering facilities such as stabilized stream crossings or access points in association with stream access control systems will be assumed to be an integral part of the fencing system and will not be provided a separate nutrient and sediment effectiveness value.

Prescribed Grazing (PG)

- This practice utilizes a range of pasture management and grazing techniques to improve the quality and quantity of the forages grown on pastures and reduce the impact of animal travel lanes, animal concentration areas or other degraded areas.
- PG can be applied to pastures intersected by streams or upland pastures outside of the degraded stream corridor (35 feet width from top of bank).

Prescribed Grazing (PG)

- The modeled benefits of prescribed grazing practices can be applied to pasture acres in association with or without alternative watering facilities. They can also be applied in conjunction with or without stream access control. Pastures under the PG systems are defined as having a vegetative cover of 60% or greater.
- Other benefits of this pasture management system include improved infiltration/runoff characteristics, healthier grass stands, reduced need for fertilizers or other inputs, and reduced erosion.

Prescribed Grazing (PG)

- An efficiency of TN 9%, TP 24%, and TSS 30% applied to each acre of improved pasture tracked and reported within appropriate Hydrogeomorphic Regions (HRMR) that demonstrate a predominance of subsurface versus surface storm water flow.
- The designated Hydrogeomorphic Regions (HRMR) for Phase 5.x of the model is as follows: Coastal Plain Dissected Uplands (CPD), Coastal Plain Lowlands (CPL), Coastal Plain Uplands (CPU), Piedmont Carbonate (PCA), Valley and Ridge Carbonate (VRC) and Appalachian Plateau Carbonate (APC).

Prescribed Grazing (PG)

- An efficiency of TN 11%, TP 24%, and TSS 30% applied to each acre of improved pasture tracked and reported within appropriate Hydrogeomorphic Regions (HRMR) that demonstrate a predominance of surface versus subsurface storm water flow.
- The designated Hydrogeomorphic Regions (HRMR) for Phase 5.x of the model is as follows: Mesozoic Lowlands (ML), Piedmont Crystalline (PCR), Valley and Ridge Siliciclastic (VRS), Appalachian Plateau Siliciclastic (APS) and Blue Ridge (BR).
- The modeled benefits of PG are applied against the pasture land use loadings of pastures intersected by streams or upland pastures outside of the degraded stream corridor (35 feet width from top of bank).

Precision Intensive Rotational Grazing (PIRG)

- This practice utilizes more intensive forms pasture management and grazing techniques to improve the quality and quantity of the forages grown on pastures and reduce the impact of animal travel lanes, animal concentration areas or other degraded areas of the upland pastures.
- PIRG can be applied to pastures intersected by streams or upland pastures outside of the degraded stream corridor (35 feet width from top of bank).

Precision Intensive Rotational Grazing (PIRG)

- The modeled benefits of the PIRG practice can be applied to pasture acres in association with or without alternative watering facilities. They can also be applied in conjunction with or without stream access control. This practice requires intensive management of livestock rotation, also known as Managed Intensive Grazing systems (MIG), that have very short rotation schedules. Pastures are defined as having a vegetative cover of 60% or greater.
- Other benefits of this pasture management system include improved infiltration/runoff characteristics, healthier grass stands, reduced need for fertilizers or other inputs, and reduced erosion.

Precision Intensive Rotational Grazing (PIRG)

- An efficiency of TN 9%, TP 24%, and TSS 30% applied to each acre of improved pasture tracked and reported within appropriate Hydrogeomorphic Regions (HRMR) that demonstrate a predominance of subsurface versus surface storm water flow.
- The designated Hydrogeomorphic Regions (HRMR) for Phase 5.x of the model is as follows: Coastal Plain Dissected Uplands (CPD), Coastal Plain Lowlands (CPL), Coastal Plain Uplands (CPU), Piedmont Carbonate (PCA), Valley and Ridge Carbonate (VRC) and Appalachian Plateau Carbonate (APC).

Precision Intensive Rotational Grazing (PIRG)

- An efficiency of TN 11%, TP 24%, and TSS 30% applied to each acre of improved pasture tracked and reported within appropriate Hydrogeomorphic Regions (HRMR) that demonstrate a predominance of surface versus subsurface storm water flow.
- The designated Hydrogeomorphic Regions (HRMR) for Phase 5.x of the model is as follows: Mesozoic Lowlands (ML), Piedmont Crystalline (PCR), Valley and Ridge Siliciclastic (VRS), Appalachian Plateau Siliciclastic (APS) and Blue Ridge (BR).
- The modeled benefits of PIRG are applied against the pasture land use loadings of pastures intersected by streams or upland pastures outside of the degraded stream corridor (35 feet width from top of bank).

Precision Intensive Rotational Grazing (PIRG)

- The modeled nutrient and sediment effectiveness values of PG and PIRG are currently equal due to the current unavailability of scientific data within the region documenting nutrient and/or sediment differences between PIRG versus PG grazing systems. The PIRG practice is placeholder for future research and documentation for modeling the possible water quality benefits of more intensive pasture management systems.

A Comparison of Pasture Management BMPs

- Alternative Watering Facilities (former Off-Stream Watering without Fencing BMP)
  Phase 4.3: TN 30%, TP 30%, TSS 38%
  Phase 5.2: TN 15%, TP 22%, TSS 30%
  Phase 5.3: TN 5%, TP 8%, TSS 10%
  Phase 5.3R: TN 5%, TP 8%, TSS 10% (stand-alone practice effectiveness values)
- Steam Access Control with Fencing (former Off-Stream Watering with Fencing BMP)
  Phase 4.3: TN 60%, TP 60%, TSS 75%
  Phase 5.2: TN 25%, TP 30%, TSS 40%
  Phase 5.3: Land Use Change/Upslope Ratio Reductions
  Phase 5.3R: Land Use Change/Upslope Ratio Reductions (stand-alone practice effectiveness values)
- Prescribed Grazing (former Upland Pasture Management BMP from BMP Project)
  Phase 4.3: TN 0%, TP 0%, TSS 0%
  Phase 5.2: TN 20%, TP 20%, TSS 40%
  Phase 5.3: TN 10%, TP 20%, TSS 30%
  Phase 5.3R TN 9%/11% , TP 24%, TSS 30% (stand-alone practice effectiveness values)

A Comparison of Pasture Management BMPs

- Precision Intensive Rotational Grazing (PIRG) (former Upland Pasture Management BMP from BMP Project)

  Phase 4.3: TN 0%, TP 0%, TSS 0%

  Phase 5.2: TN 20%, TP 20%, TSS 40%

  Phase 5.3: TN 10%, TP 20%, TSS 30%

  Phase 5.3R TN 9%/11% , TP 24%, TSS 30% (stand-alone practice effectiveness values)

- Off-Stream Watering with Fencing and Rotational Grazing

  Phase 4.3: TN 20%, TP 20%, TSS 40%

  Phase 5.2: TN 20%, TP 20%, TSS 40%

  Phase 5.3: TN 15%, TP 28%, TSS 40%*

  Phase 5.3R: Stand-alone practices that can be individually stacked

  AWF: TN 5%, TP 8%, TSS 10%

  SACF: Land Use Change/Upslope Ratio Reductions

  PG/PIRG: TN 9%/11% , TP 24%, TSS 30%

* Off-Stream Watering effectiveness included

Recommendation Process: Next Steps

- Pending review and approval by the WQGIT of the pasture management panel's recommendations, the panel steering committee members will assist the CBPO modeling team with incorporating the new recommendations into the CBP Watershed Model Phase 5.3 (revised) for recalibration.
- The steering committee and panel will develop a fully documented final recommendation report to address the documentation standards of the BMP protocol.
- The panel's final recommendation report will be presented to the AgWG, the WTWG and STAC to ensure that the report meets the expectations of the partnership and the documentation standards of the BMP protocol process.
- The AgWG and the WTWG will notify the WQGIT of their review of the final panel recommendation report for their consideration and adoption.