

**Chesapeake Bay Program Committee, Subcommittee, and Work Group Activities for
STAC**
(Assembled through emails of 08/31/05)

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Announcements:

The 13th National Non-Point Source Monitoring Workshop will be held at Raleigh, NC on September 18-22. The theme of the 2005 workshop is "From Projects to Programs: Enhancing States' NPS Management Programs through Lessons Learned from NPS Monitoring Projects". The conference will provide a unique opportunity to learn and share experiences from nonpoint source management and monitoring approaches. The agenda will include three days of sessions, poster presentations, a choice of three field trips, plus a workshop and an optional Sunday tour. For more details, please check out: http://ncsu.edu/waterquality/nmp_conf

The Mid-Atlantic Composting and Compost Use Conference and Expo will be held at the USDA-ARS facilities in Beltsville, MD from 1pm September 21st to 12 noon September 23rd. The biennial event will include paper sessions and a trade show during the first two days and a tour of composting and compost use sites on the morning of the final day. The conference is a collaborative event planned by the Mid-Atlantic Composting Association (MACA) and extension and research faculty from mid-Atlantic region universities. Further information is available at the MACA website at: <http://www.midatlanticcompost.org>

The International Erosion Control Association Mid-Atlantic Chapter is holding their 12th Annual Conference in Ocean City, MD from October 31st-November 2nd, 2005. STAC member, Tom Simpson is the keynote speaker. Topics include the following: shoreline and coastal erosion, sustainable design and low impact development techniques, stream restoration to meet water quality goals, NPDES compliance, perspectives on Bay restoration, and policy and procedure for accepting new BMP's. For more info please check out the following website: http://www.macieca.org/conferences_events.htm#annual

Forestry Workgroup Meeting (June 8, 2005)

Linda Carnell (WV District Forestry Service) details the WV tributary strategy planning process; in late 2002 WV Governor Wise committed the state to creating a tributary strategy plan by 2004. Two geographic regions: Potomac Highlands and the Eastern Panhandle formed and met separately. State Department of Planning facilitated the tributary meetings and the forestry service did become involved until the end of the planning process. There are many barriers to overcome because the strategy did not meet cap loads, but the DEP is working on the development of TMDL's. The WV tributary meeting minutes can be found at: <http://www.wvnet.org>

Nancy Ailes discussed the West Virginia land conservation projects. There has been a development boom as most of the Lost River and Cacapon watershed landowners are out of state residents and can not vote. Today the Cacapon and Lost River Land Trust have protected 6,720 acres. WV is attempting to create a state holding agency called the "WV Coalition of Land Trusts".

Roxane Palone (USDA FSA) announced that there is pressure from the Army in PA to develop on public land that is already preserved. Fort Indian Town Gap would like to expand their base onto preserved land. More information can be found at: <http://www.savestonevalley.org>

Diane Wilson and Tracey Coulter (PA State Reps) announced that CREP sign ups continue with Northern Susquehanna contracts. The CBF is responsible for the outreach effort to promote buffers. In August, CREP training will be offered to service foresters, county conservation managers, and watershed managers.

CREP = Conservation Reserve Enhancement Program. It is a voluntary land retirement program that helps agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water. CREP is administered by USDA's Farm Service Agency that provides farmers and ranchers with a sound financial package for conserving and enhancing the natural resources of farms. CREP contracts require a 10-15 year commitment to keep lands out of agricultural production. For more info:

<http://www.fsa.usda.gov/dafp/cepd/crep.htm>

Gary Speiran (USGS) announced the recommendations of its Chesapeake Bay meeting in May; there needs to be more studies on sediment transport (in stream and flood plain not upland). The present draft work plan for the next five years includes landuse and GIS, watershed and point source water quality, and providing user friendly information.

Anne Hairston and Riley Smith (MD DNR) announced that the Governors commission on sustainable forestry will meet in June and the commission will publish a report on things that the state can do to support sustainable forestry on MD private lands.

- MD CREP efforts started up in mid-March
- State lands transfer has been pushed back to August
- In early June, MD hosted a press event to highlight goats grazed on invasives in Sligo Creek

Agricultural Nutrient Reduction Workgroup Meeting (June 9, 2005)

Russ Perkinson (VA DCR) is drafting documentation supporting workgroup BMP reduction efficiency (TN, TP, and sediment) recommendations in the event that questions arise regarding accuracy and sources. These recommendations are conservative compared to literature values to reflect "real-world" implementation.

Jerry Griswold (NRCS USDA) is assisting in preparing documentation for conservation plan strategies (conventional and conservation till, hay, and pasture). Efficiencies for poultry composters are under review.

New CBP tracking schedule:

All BMP implementation data reporting to be compiled by December 31st and sent to the Bay Program by January 30th of following year.

MD – Not a problem to comply

PA – Already has 6 month lag in data reporting and adhering to new schedule will be difficult; not enough staff or infrastructure

DE – Would prefer to keep July 15th deadline, but could possibly change if need be

WV – Can not comply with only 1 month turn-around, would prefer July 15th deadline

VA - ?

Bill Rohrer and Jennifer Campagnini (DE State Reps) discussed Water Drainage Control Structures (WDCS) as a new Agricultural BMP in DE. In the coastal plain and tidewater areas,

WDCS's are used widely in agriculture for draining fields that experience waterlogging under normal weather conditions, while allowing for water retention and subirrigation during periods of drought. There are two methods of drainage system: open ditch systems for primarily surface drainage, or underground drain tile or tubing systems for lowering the water table by subsurface flow. These methods can also be used in combination.

- A 33% nitrogen reduction is reported per area drained in DE Inland Bays fields receiving 21 pounds of nitrogen per acre annually; assigned via denitrification and slowing down water where sediments settle out; efficiencies do not matter by crop. Inland Bays have 51 structures at 31 acres apiece.
- Justification summary provided by DE DNREC, to be provided at next meeting.
- Russ Perkinson suggested that this new BMP efficiency be two-fold: Installation and use During growing season = efficiency A and year-round intensive use with cost share program = efficiency B.

Implementation Committee Conference Call (June 16, 2005)

Rebecca Hanmer (Director CBP) announced that the Chesapeake Bay Commission, Blue Crab Technical Advisory Committee's 2004 Blue Crab Report is a snapshot in time for blue crab information. Numbers have presently stabilized and/or are slightly improving but are still historically low. There is concern that with current fishing pressure, we have not yet met the goal of doubling the number of female stock. The next report is due out in November and results from the winter dredge survey will be announced soon.

- She also announced that the EPA Regions II and III are initiating a review of all EPA regulatory authorities to see how they apply to Bay restoration and whether greater use could be made of these authorities. This review was requested by Senator Sarbanes, and the EPA Administrator Steve Johnson and are committed to complete an assessment by end of summer.
- She also announced that EPA had replied to the CBF petition filed in December 2003. In its response, EPA denied the rulemaking request but described how the agency and the state would be using existing NPDES permit authorities to establish and enforce nutrient limits for Bay restoration in permits for sewage treatment plants and other point sources. The limits will be based on the Chesapeake Bay water quality criteria adopted into state water quality standards by DE, VA, MD, and DC. Maryland's standards are particularly important as they apply to the areas of the bay mainstem with the most severe problems.

Jennifer Greiner (USFWS CBPO) announced the new USFWS Blackwater National Wildlife Refuge comprehensive plan is open for review. The plan addresses invasive species and forest corridor connections. There is also a separate land protection plan that identifies two parcels of interest to FWS for land conservation.

Steve Philips (USGS) provided an update on implementation of the non-tidal water quality network. The presentation included challenges of adding additional sites due to funding constraints and sought input on potential approaches for addressing these constraints.

- Partners in the network include: six jurisdictional states, CBC, River Basin Commissions (ICPRB, SRBC), federal agencies (EPA, USGS), coordinated through the Bay Program Memorandum of Understanding.

- Non-tidal Water Quality Monitoring Objectives: Measure and assess status and trends of concentrations and loads, tributary strategy basins, factors affecting water quality, improve watershed models, and impact on tidal water.
- Nearly 200 potential sites in network.
- Stream gauge funding is most at jeopardy.

Keystone of the Month: Fisheries Ecosystem Management

Matt Fleming (MD DNR, LRSC Chair) and **Steve Giordano (NOAA CBPO)** presented a policy statement entitled “Utilization of Fisheries Ecosystem Planning for the Chesapeake Bay”. The purpose of this policy statement is to formally adopt an ecosystem-based approach to develop new or revised CBP Fishery Management Plans (FMP’s) and to use Fisheries Ecosystem Planning for the Bay (FEP) as guidance.

How Management Will Differ:

- Conserve and protect the essential properties of the ecosystem; consider the broader consequences of management actions (a new ethic).
- Ecosystem-based multi-species fisheries management plans with development guided by the FEP.
- Coordinated regional actions; states, commissions, and councils.
- Coordinated management actions of agencies with jurisdiction and authority over parts of the ecosystem (air and water quality, habitat, and land use).
- Harness the energy and resources of the CBP and other stakeholder partners.

From Concept to Practice:

- Formally adopt an ecosystem-based approach to fisheries management in the Bay.
- Gain endorsement of FEP for the Bay as the guiding framework for ecosystem-based fisheries management.
- Develop first generation, pilot multi-species FMP’s for ecosystem-based fisheries management.
- Use fisheries management as a living resource driver for Bay-wide multi-media restoration efforts.
- Provide watershed resource managers (air, water, land) with quantifiable habitat requirements from which to base decision making.
- Build a cooperative ecosystem approach to Bay resource management between state and federal partners with jurisdiction over coastal and estuarine areas.

Next Steps:

- Identify and capitalize on opportunities for collaboration with the CBP and its federal and state partners.
- Reach out to resource managers in the Bay watershed with the requisite authority to impact land use, water and habitat quality.
- Integrate non-fisheries resource managers into the FMP development process.

NOTE: The CBP will be the first in the country to use this integrated process for fisheries ecosystem management. The program will support watershed management practices. This will not eliminate single species management plans.

Urban Stormwater Workgroup Meeting (June 28, 2005)

Reggie Parrish (EPA) summarized the proceedings of the Urban Summit that was held in May at Leesburg, VA. He is in the process of developing a document of summit proceedings. The

summit participants identified several solutions based upon the feedback from their breakout sessions which included:

1. Storm water target areas for retrofit and new development
2. Minimum performance standards
3. Information/database to support minimum standard
4. Education/training for local government staff and public
5. Federal/state/local agency coordination
6. Permit process improvements
7. Increase local program capacity

The CBP highlighted three of these solutions for an action plan:

- Priority 1 – Minimum performance standards
The workgroup defined this as standards that dictate what a storm water management program and/or practice needs to accomplish to receive credit equal across the watershed.
It is important to note that this applies to programs and practices.
Reggie will work with Paula Estornell (EPA) to develop a spreadsheet soliciting state and local information on the laws, regulations, and requirements driving storm water programs and practices.
Distinction will need to be made between programs and practices applied to new development and retrofit, retrofit can not be guided by a minimum since space often limits capacity of practice/program.
- Priority 2 – Targeted education and training for local government staff
This priority will be modified to include state and federal as well as local staff. Though builders are willing to incorporate LID into projects, inflexibility at the local government level is making it nearly impossible to use anything but the standard cookie cutter approach (codes and ordinances may be driving this approach).
Current comprehensive land use plans fail to adequately address water quality issues.
The workgroup is planning to discuss with the Land, Growth and Stewardship Subcommittee about cooperating to set-up training events as well as to Local Government Advisory Committee to identify specific training opportunities.
EPA region 3 is developing LID training (for Navy personnel) designed to travel to and be applicable at multiple sites.
- Priority 3 – Program capacity building
Most important task is determining how to get funding without increasing taxes or the costs of development, storm water utilities may be a potential solution.
This priority requires funding support, staffing, and information.

Tidal Monitoring and Analysis Workgroup Meeting (TMAW)(July 7, 2005)
Announcements:

- NASA proposal to develop remote sensing tools to better monitor the Bay did not get funded, but TMAW will continue to make progress toward using this technology in the future.
- Potential major topics from the Monitoring and Analysis Subcommittee workshop include addressing the possibility that there are concave trends in nutrients and flow adjusted concentration values in the tributaries and not in the mainstem Bay. The timing issues to report as water, calendar, or SAV growing year (season) still have to be decided.
- The Talbot County creek watchers issued a failing report card on some eastern shore tributaries. To view the final report for 2004 please visit the following:
http://www.cbf.org/site/DocServer/TCCR2004_FINAL1.pdf?docID=3723
- The September Monitoring and Analysis workshop will produce a newsletter similar to the TMAW newsletters and will include a look back at the summer forecast. The fall workshop will be held on September 27-28 with the location yet to be decided.

Peter Bergstrom (NOAA CBPO) gave an update on the SAV forecast delivered to the CBPO communications group. The original forecast stated that there would be an increase in the aerial extent of SAV in the low salinity zones, some increases in the high salinity zones, and that the medium salinity zone would remain the same. Because the SAV comes up first in the southern Bay, the higher salinity zone can be analyzed first. There is scattered ground coverage for the other salinity zones. Without aerial photos the full SAV coverage can't be seen. The low salinity zone photos will not be available until late October or early November. The dark false mussels are back this year and are very small possibly because of weather, they helped clear the water last year.

Dave Jasinski (UMCES CBPO) gave an update on the DO forecast stating that the June data from the early Bay cruises shows a strong thermocline and a deep pycnocline. The Susquehanna flow does not appear to be causing this because the flow has been low for the last few months. Wind data has not been looked at as a factor. The 2005 prediction is very close to the 1998 DO prediction so far.

Peter Tango (MD DNR) gave an update on the HAB forecast stating that the prediction was based on last year being a wet year, which would cause a bloom in late spring or early summer. This has happened 100 percent of the time in the past and this year has not happened yet in the Potomac River. There was a bloom in the Bush River in early June. The reason for the bloom not occurring yet this year may be due to weather patterns, last year it was warmer in May and the warm spell this year didn't happen until June.

Shawna Karlson (NOAA CBPO) presented information on the NOAA Coastwatch Program. This program provides timely access to operational near real-time satellite data. Establishing a Coastwatch node at the NOAA CBPO will help to make a regional perspective. A remote sensing mini-symposium between Coastwatch and the Chesapeake Bay Program will be set-up by Ben Longstaff to learn more about how to integrate this technology between partners. For more information about the Coastwatch program, please check out their website at:
<http://coastalwatch.noaa.gov> or contact Shawna at shawna.karlson@noaa.gov

Bill Dennison (UMCES) announced that the March State of the bay publication will be based on a water year time frame (October 1st through September 30th). Status and trends will be based on

the criteria assessment three year time scale. TMAW needs to focus on DO, chlorophyll, and clarity.

Education Workgroup Meeting (July 7, 2005)

Shelby Laubhan (CRC Fellow CBPO) presented an overview of the education website; ChART. The new website should be launched around mid-October, just prior to the Education Summit. ChART will be connected to the larger Chesapeake Bay Program website, it will have a similar feel and design to it.

The Bay Biennial Education Summit will take place in Lancaster, PA on October 18-19th at the Willow valley Conference Center.

A plenary session will be provided by state dept. of education leads and will discuss such topics as: no child left behind guidance, environmental education for student achievement, and demonstration of integrated/model units (e.g., green schools).

Topics for MWEE concurrent sessions include the following: land/water based, technology and environment, restoration, and agriculture. Professional development concurrent sessions will include: long term systematic change, attracting teachers for advanced teacher training, curriculum alignment for MWEE, and beyond boundaries (e.g., learning a holistic watershed approach).

Modeling Subcommittee Meeting (July 12, 2005)

All power point presentations can be viewed at:

<http://www.chesapeakebay.net/calendar.cfm?EventDetails=5976&DefaultView=2>

Carl Cerco (US Army Engineer Research and Development Center) reviewed descriptions of the linkages between fieldwork, analysis, and model development.

- **Erosion rates** – Six seasonal axial surveys have been completed with two more scheduled. Observations include CTD, LISST, ADCP, OBS, TSS, VSF, and absorbance/transmittance. The August 2004 intensive study of the upper Potomac is completed and ready for analysis.
- **Sedflume** – This was designed to measure erosion under conditions of high shear stress such as would be found during storm events. One season of fieldwork in the Upper Potomac is complete and data is analyzed.
- **Light Attenuation** – Funding for this project was through the Baltimore District Army Corps of Engineers. Two 2005 surveys were completed in May and June with at least one more scheduled for September. Data collected to date has been analyzed for color, turbidity, absorption, and scattering.
- **Modeling plankton controls on suspended sediment** – VFX and monitoring data in the mainstem Bay has been analyzed in order to develop statistical relationships between: chlorophyll a and sediment sinking, environmental variables (temp., salinity, nutrients) and chlorophyll a sinking, and K_d, chlorophyll a, and TSS. Mesocosm experiments are still underway and will attempt to quantitatively test for nutrient controls on TSS and chl. a sinking. Results of these studies will be incorporated into the model sometime in winter or spring 2006.
- **Estuarine Phosphorus Model** – Fieldwork for this project is underway and on schedule by Dr. Jeff Cornwell (UMCES). Literature review and model conceptualization is underway by Limno-Tech, Inc (Ann Arbor, MI). This company is a national leader in finding solutions to difficult surface water, groundwater, and sediment problems is founded on a history (since

1975) of innovation in environmental engineering and science services. More info please visit their website at: <http://www.limno.com>

- Hydrodynamic and Water Quality Models – The new grid for the hydro model is complete and the model is running years 1993-1999 with inputs from the Phase 5 watershed model. An initial linkage to the water quality model is complete and results are under examination.
- Surface Waves – A surface wave model has been selected and implemented. The model has been forwarded to VIMS for incorporation into the boundary layer model.
- Algal Speciation and pH/Alkalinity – There is no funding currently identified for these projects and no activity has been undertaken.

Sun-Chan Kim (US ERDC) presented progress on the hydrodynamic model, wave simulation, and sediment transport model. Calibration of CH3D is complete for the years 1993-1999. Minor bathymetry edits have been made in the Upper Bay, Potomac, and Patuxent Rivers. The index of agreement (measure of how good the model matches observations) at most stations is > 0.9 for surface salinity and > 0.85 for bottom salinity.

The salinity calibration is greatly improved during the summer, however the model shows too little stratification in the spring and too much in the winter. Disagreement between the model and observed values at the pycnocline could be due to the turbulence algorithms.

Wind data for the wave model comes from four National Climatic Data Center (NOAA Satellite and Information Service; <http://www.ncdc.noaa.gov>) and one Chesapeake Bay Observing System (<http://www.cbos.org>) buoy. Wave data is available at Poplar Island, Calvert Cliffs, and Thomas Point Shoals. Data from these stations show low waves with a long period. This could be due to a swell coming from outside the model domain. Currently there is no wave data available in the Potomac or other tributaries.

Sediment data for the Sediment Transport Model include percent moisture, organic matter, grain size, carbon content, and grain size/depth profiles. These will be used to parameterize erosion, flocculation, settling velocity, and deposition. Erosion will be a function of the sediment cohesiveness, bulk density, aggregate size, and clay minerals. Flocculation is a function of salinity, concentration, and shear stress. Deposition will depend upon particle size, distribution, flocculation, and particle dynamics.

Jeff Cornwell (UMCES) presented an update on the Potomac River phosphorus speciation project. The goals of this study are to provide phosphorus speciation and cycling data at appropriate temporal and spatial scales to support model development. Specifically, this study aims to determine the influence of particulate inorganic phosphorus on water column biogeochemistry and better define the pools of inorganic phosphorus.

Experiments will focus on determining the forms of particulate phosphorus and determining if and how inorganic phosphorus is available for plant growth. Field work for 2005 includes two cruises on the Potomac River. Chemical characterization of fall line and shoreline particulates will begin in August. Algal bioassay and salinity experiments are also scheduled for summer and fall of 2005. If a large *Microcystis* bloom occurs, extra sampling will be done in those areas.

Joe DePinto (Limno-Tech) presented the focus of the refined phosphorus simulation research; which includes phosphorus-sediment dynamics, particularly the role of particulate inorganic phosphorus on biological activity and the role of the microbial food web on phosphorus. Inorganic phosphorus is present as particulate inorganic P (PIP) and dissolved inorganic P (DIP).

Potential sources of PIP include bank erosion, sediment resuspension, watershed runoff, and fluvial solids from above the fall line.

The model currently overestimates DIP in relation to observed data. Three possible solutions are being investigated including: adding a refractory PIP variable to the model, bacterial uptake and sequestration, or variable P stoichiometry in phytoplankton. Another issue being investigated is phytoplankton utilization of dissolved organic phosphorus (DOP) under limiting conditions. Phytoplankton can produce alkaline phosphatase that mineralizes DOP at the cell wall, allowing another source of available phosphate during limiting levels of DIP. The current model would be modified by allowing phytoplankton to utilize DOP if DIP is below a certain threshold.

Modeling Subcommittee Meeting (July 13, 2005)

All power point presentations can be found at:

<http://www.chesapeakebay.net/calendar.cfm?EventDetails=5977&DefaultView=2>

Carl Cerco (US Army ERDC) reviewed the initial linkages between the water quality and hydrographic models. Compared to the old grid, the Potomac River has a smaller area, with a slightly shallower base. This is because a tighter boundary around the shoreline can now be drawn. There are roughly five times as many cells as there used to be in the Potomac, all about one fifth the size of the old cells. Each cell has an area of one square kilometer. The surface area for the mainstem bay is slightly larger, with a slightly shallower mean depth. The cell mean volume is comparable to that of the Potomac.

The overall accuracy of transport has not changed significantly. The salinity suggests that there is more “ocean” in the Potomac and the Bay than previous. The change is due to enhanced circulation at the mouth or the specification of boundary conditions. The Bay is still a net exporter of nitrogen, but not as much as previous. Phosphorus import through the mouth is up slightly, and phosphorus export through the mouth is up a large amount.

There are several reasons for these differences: firstly, there are the hydrodynamic averaging intervals; secondly, there is different wind data; and thirdly, there is increased bottom velocity due to new tidal boundary conditions.

Howard Townsend (CRC NOAA) discussed the progress on the linkage of the ecosystem and water quality models. Coupling work between the Fisheries Ecosystem Model (FEM) and the Water Quality Model (WQM) took place in a March 2005 planning workshop entitled “Coupling Water Quality and Upper Trophic Level Models for the Chesapeake Bay”. The main idea is to take relative changes in monthly chlorophyll averages based on the calibration runs with the WQM, and also runs with the combined ecosystem tributary strategies to get reduction in chlorophyll, and use that to drive primary productivity in the FEM. Tests were conducted to determine how chlorophyll affected striped bass, menhaden, blue crabs, and oysters.

In the comparative analysis of calibration results, both models gave similar calibration outputs, except for SAV and zooplankton. For SAV, the WQM is probably more accurate than the FEM because it models physical properties that effect primary producers. The comparative analysis of tributary strategies results showed both models with similar patterns. However, they have a different magnitude of effects from nitrogen and phosphorus reduction.

As for as upper trophic level effects, the general trend is there is a decrease in primary productivity, and a decrease in all upper trophic levels as well. This is partially due to trophic interactions being the only thing driving the trophic level model.

The next steps include; mediation functions or other capabilities in the FEM should be developed to account for water quality effects (especially DO, SAV effects on young of year fish, and detritivore food web dynamics), and spatial resolution.

Linkage of the Atlantic State Marine Fisheries Commission (ASMFC) ecosystem-based model and the Bay WQM will be accomplished by using spatially explicit outputs from Bay WQM as input data sources to a regional dynamic ecosystem of the Bay. The fully coupled biophysical ecosystem model will be used to examine the effects of changes in water quality, exploitation, environmental variability and multi-species population dynamics on menhaden recruitment dynamics in the Bay, and its potential impacts to the wider Atlantic States multi-species ecosystem production dynamics for menhaden, bluefish, striped bass and weakfish.

Gary Shenk (EPA CBPO) presented the findings and recommendations from the panel of experts convened to review the watershed model effort. The review was conducted May 17-19, 2005. The two main themes of the review were the needs for an adaptive management framework and an uncertainty analysis. THE CBP managers and modelers have always used adaptive management concepts in that models, predictions, and management goals are refined on a periodic basis in response to new monitoring data and research. This practice will be continued while incorporating the specific suggestions in this review that will enhance our abilities in this area. While we have not been able to provide estimates of uncertainty in the past due to theoretical and practical constraints, we welcome the opportunity to pursue this analysis.

Carry Graff presented development plans for a spatially detailed watershed model of the Choptank River based on agricultural non-point sources (AGNPS) simulation. The objectives for this model are to: evaluate the role conservation practices common in the Choptank watershed play in reducing nitrogen, phosphorus, and sediment in surface and ground waters; and determine which conservation practices or combination of practices in time and space can be used to achieve specific load reductions.

The AGNPS model deals with cover crops and nutrient management. It is a continuous simulation model with a daily time step. It generates the amounts of water, sediment, and chemicals leaving land areas (cells) that flow into the watershed stream network at user-specified locations (reaches) on a daily basis. Water, sediment, and chemicals are routed throughout watershed reaches.

Data availability is dependent on several sources: climate comes from historical databases or weather generators, topographic is obtained from DEM's, and soil from GIS layers and soil input databases. This model incorporates channel erosion and there is no memory between runoff events. Historical data on German Branch, provided by MDA, will be used to calibrate the model. Data provided by UMCES HPL and current monitoring data will be used to evaluate current practices in several subwatersheds.

Gary Shenk (EPA CBPO) presented the progress of the Phase 5 model calibration especially in the development of the data bases and model structure needed for the simulation of nutrients. River calibration was done at roughly 130 sites with flow and TSS data. The simulation is checked for 24 hours before and after the observation, and a simulated value is set to a point closest to this observation. Phase 5 is complete for sediment.

Nutrient calibration was based on targets acquired from three sources; literature survey, SPARROW analysis of land use, and mass balance. Phase 4 used a combination of coefficient

modeling and mass balance modeling. It also reset the mass balance at the end of each year to stabilize the simulation. Phase 5 will be all mass balance modeling and will attempt to stabilize without resetting. For nutrient loading rules, manure stays in a county unless transport data are supplied. All fertilizer sold in the model domain is divided between land uses and regions such that all land uses receive a constant multiplier of manure demand, except for nutrient managed lands, they receive less nutrients. Data on septic systems is calculated from the US Census using 1970-1990 and people are from census estimates and projections, load per person is a constant. Sensitivity tests and setup will be finished in July. Edge of stream automated calibration will be done in August. In September, hand calibration of rivers will be done and phase 5 nutrient loads will be given to WQM in October.

Nutrient Subcommittee Meeting (July 13, 2005)

Dr. Vangimalla Reddy (Research Leader) and **Dr. Dennis Timlin (Soil Scientist)** of the Crop Systems and Global Change Laboratory, Beltsville Agriculture Research Service of USDA discussed simulation models of agricultural crops and how they can be important tools to estimate pollutant input into the Chesapeake Bay due to agricultural activities. Crop simulation models are currently available for multiple crops, such as cotton, soybean, potatoes, and cantaloupe. A model for corn and an additional model for potatoes are expected within 2 years, and a model for wheat is planned for the future. Some of these predict optimum harvesting times, while others estimate irrigation needs and fertilization strategies, based on field topography, soil type, average precipitation, and other variables. A robust two-dimensional soil processes model has also been developed to simulate water and heat movement, solute transport, nitrogen dynamics, water and solute uptake by roots, soil phosphorus chemistry, and management practices such as irrigation and fertilization. There is potential for these soil and plant models to be made compatible with the Bay watershed model to more accurately estimate movement and/or residence among segments.

Kelly Shenk (EPA CBPO) updated the committee on implementation of the feed management manure strategy drafted at the Agricultural Summit on November 30-December 01, 2004.

- The latest version of this document (July 6th revision) is to be presented to the Bay Program Implementation Committee in August and the Bay Program Principal's Committee in September.
- The final presentation will consist of three separate documents: Priority actions, more detailed work plan, and comments and responses recorded during revision phase.
- The four priority focus areas, chosen for their greatest nutrient reductions, high levels of support, and status as long-term solutions, consist of: feed management, manure/litter application on agricultural lands, alternative uses, and coordination of manure management programs (including transport).

Tom Simpson (UMD) gave an update on the BMP efficiencies re-evaluation.

- The current status is that there are placeholder efficiencies available until a literature search RFP is released and more science-based data become available.
- Because applying BMP adjustments may mean decreases in our already reported nutrient reductions, there have been difficulties in deciding how to apply the BMP's.

- A four person task group has been assigned with making a recommendation to the Nutrient Subcommittee on whether or not to proceed with BMP efficiency adjustments and how.
- There will be a re-evaluation conference on September 21-22.

Tom Simpson (UMD) presented the highlights from the results of the Tributary Strategy Workgroup discussion on barriers and solutions to the Bay Program new reporting schedule.

Agricultural Nonpoint Sources:

- Can convert with a 6 month lag time in reporting; a 90 day reporting year (water year) schedule is not feasible without additional resources; quality control and analysis in such a short period of time is difficult without dedicated staff to perform the task.

Urban Stormwater:

- Only DC has a strong reporting program, with MD having the only other one at all (MDE). VA is trying to put something in place, but overall there is a general inability to report these data.
- Urban Stormwater Workgroup is to convene in September to identify barriers and solutions to resolving this problem.

Point Sources:

- Most regulations require calendar year reporting (by February for the previous year), so would require change in permitting process and regulations.
- The Permit Compliance System (PCS) has all data entered by March-April, but only for sources above 1 million gallons per day (MGD) and for some major industries (0.4-0.5 MGD) as well as significant non-majors (those with bay related purposes) equals incomplete record.

Symposium: Managing Drainage Ditch Ecosystems on the Delmarva Peninsula (July 15, 2005, UMES, Princess Anne, MD)

The UMES research farm was acquired in 1996, it was formerly a poultry farm and borders the Manokin River, making it ideal for studies of phosphorus transport and transformations in drainage ditches. As well as nitrogen and phosphorus management with respect to receiving waters, processes which are poorly understood.

Brian Needleman (UMD) has been focusing on two particular ditch management practices: clean outs (all vegetation and sediment removed), and water control structures. He also plans to do some watershed modeling of ditches, for which there are no good existing GIS maps.

- He found in basic characterizations of the UMES ditches that they contain “soils” rather than “sediments because of their stability.
- Shallow ditches (< 3’ deep) are similar to wetlands soils and deeper (6-8’ deep) are similar to subaqueous soils in that they are unconsolidated.
- Ditches are anoxic with iron reduction and oxidation processes.
- Monosulfidic black ooze (MBO) is located at or near the surface of ditches at UMES; looks like organic matter and when agitated, MBO undergoes a rapid (~5 min) chemical oxidation with acute deoxygenation.

Peter Kleinman (PSU) has been studying the subsurface hydrology of ditches and nutrient transport using weir-type sampling and storm and base flows.

- Much soluble phosphorus exists at the surface of ditch soils (0-20 cm), up to 10 mg/kg.
- In shallow ditches, 70-98% of total flow in the ditches is storm flow on annual basis. 39-94% of total phosphorus in storm flow is particulate, while only 2-18% of total phosphorus in base flow is particulate.
- Field runoff accounted for 3-9% of annual ditch flow (2-24% particulate phosphorus, 5-22% phosphorus export), while 90% of ditch flow is subsurface flow.
- In 2003, close to 40 kg/ha total phosphorus was lost in one ditch in a year, whereas, in 2004, close to 25 kg/ha was lost from one ditch in a year.

Peter Vadas (USDA ARS) also works on the hydrology of nitrogen and phosphorus transport using nutrients monitored at discrete depths in wells.

- He has found that deep ditches control the overall flow of an area the majority of the time.
- There were phosphorus “hot spots” in the field.
- Environmentally significant phosphorus can move from 10-100’ in 3-4 days following a rain event.
- Nitrate moves freely throughout the farm.
- 65% of samples exceeded the EPA limit of 10 mg/L for nitrate (10 mg/L corresponds to 56 pounds nitrogen per acre application rate).
- There will be an extension component of this study using on-farm ditches in Somerset County, MD for sample collection.

Dabe Ruppert (UMD PhD student) has been studying the influence of organics on phosphorus transport. He has found that soil organics compete for sorption sites on iron and aluminum oxides, limiting phosphorus sorption. This interaction is pH dependent.