SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Wednesday October 1st, 2014, 10:00 AM-12:00PM
Meeting #1

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	N
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	N
Ken Staver	UMD	N
Steve Strano	NRCS	N
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	N
Tom Uybarreta	EPA Region 3	N
Support staff and guests		
Neely Law (Coord.)	Center for Watershed Protection	Y
Brian Benham	Virginia Tech (Project Director)	N
Hannah Martin	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	Y
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	Y
Emma Giese	CRC	Y
Denise Clearwater	MDE	Y
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	Y
Brian Needleman	UMD	Y
Bob Krotochvil	UMD	Y
Brenda Winn		Y

Summary of ACTION Items & DECISIONs:

- Law will send instructions to access the SharePoint site.
- Law will revise scope for expert panel to include wetlands in urban and other land uses beyond agricultural lands.

Minutes:

Action: Law will send instructions to access SharePoint site. SharePoint will be used to share resources and post meeting minutes and literature.

Water Quality GIT BMP Review Protocol and Panel Charge and Timeline (Neely Law)

The process for convening expert panels was recently updated with more explicit than last guidance. Copies provided to panel membership. Law provided an overview of the process, highlights below.

- Recommendations from the WEP will go to the Wetland Workgroup for comments/approval. Once workgroup approval is given, the recommendations move to the Watershed Technical Work Group, Habitat GIT and Water Quality GIT. Invited review by other workgroups such as Agriculture and Urban Workgroups may also occur.

The WEP Scope of work was crafted in March 2014. The Wetland Workgroup approved the scope of work for the Ag wetlands expert panel at their meeting on September 11, 2014. Previous workshops have explored urban wetlands, however they are largely engineered practices for storm water management. The purpose of WEP is to look at wetlands on agricultural land that are more naturally functioning practices.

Discussion:

- It was discussed at the Sept 11 Wetland workgroup meeting that there are in fact more natural wetlands in urban areas that provide habitat functions. The workgroup recommended that WEP shouldn't exclude this type of restoration opportunity so the group could potentially revise scope and purpose to include crediting/tracking "natural" wetlands in urban areas similar to those credited/tracked on ag lands.
    - McLaughlin: At the workgroup meeting, several individuals supported that natural wetlands are being restored in urban settings. These practices do treat storm water but that is not the main intent (habitat purpose with water quality benefits).
    - Greiner: The wetlands outcome in the Watershed Agreement is to create/reestablish 85,000 acres and enhance 150,000 acres in both ag and urban. Focus of the habitat team is on ag side but wetland workgroup talked about the other type of project that deserves some credit in the model.
    - Muir: there are opportunities to restore wetlands in urban landscapes and similar impairments across land use types (urban and ag).
    - Boomer: agree with idea of considering urban wetlands
    - McLaughlin: The reason this came up in the workgroup meeting is because urban wetlands are credited for drainage area treated by the practice while ag wetlands are credited by the actual footprint acreage of the practice.
    - Law: Also, there is different verification guidance depending on BMP on ag vs urban so credit might be similar but reporting and verification might be different.
- Action: Revise scope for expert panel to include wetlands in urban and other land uses beyond ag

Chesapeake Bay Watershed Model (Jeff Sweeney, CBPO)

Presentation on the Chesapeake Bay Watershed Model and how wetlands are currently defined, their loading rate and pollutant load reductions calculated.

The current Watershed model is in Phase 5.3.2. The model will be updated with Phase 6 by 2017 and will give a clean slate to add new BMPs and land uses. Currently, Wetland Enhancement is not credited but it is part of the wetland outcome in the Watershed Agreement.

Credit for wetland restoration is based off Tom Jordan's previous work/group (incl STAC workshop) that investigated water quality benefits of these practices. The credit is based on the area of the wetland itself and the watershed that drains to it, however since 2007, little if any reported of the watershed is reported which is needed. Therefore, a default was created and now when a drainage area is not provided, a landuse conversion from crop to forest and reduction efficiencies are assigned by hydrogeomorphic area based on regional conditions (see presentation for values).

- Sources of this data are reserve program, CREP, CEP, FWS. Wetland data are inputted by state data contacts into the National Environmental Information Exchange Network (NEIEN) and the Chesapeake Bay Program's Watershed Model receives the data from NEIEN in order to track progress and issue credits.
- The task of the WEP is it develop recommendations pre and post BMP of wetlands. Consider the available data in order to credit the mechanism. The Bay Program has EPA funding for states and can put in requirements about what needs to be collected/reported in order to receive the credits the WEP recommends.
- Things to consider
    - Reporting mechanism is NEIEN.
    - There aren't many required fields currently but it has capability to add more information for the projects being done. More we know about these projects the more likely it is meeting design standards. Good way to track projects that are more likely to be maintained.
    - Best professional judgment in comparison to other BMPs
    - Wetland enhancement: need to account for degraded condition before benefits can be applied to enhancement.
- Model Support for the WEP: Call Jeff Sweeney with specific questions about the model. Quentin Stubbs is working with Peter Claggett and the land use workgroup and will also provide technical support.
- <u>Discussion:</u>
    - Greiner: The real issue is how to get states to include certain information like enhancement data. Previously not reported. Lack of incentive to report enhancement for credit
        - Give states notice in the implementation plans and make it clear that if that field isn't filled in then they won't get credit. The need for verification is a justification for keeping that language in the WIPs.
    - McLaughlin: if groups are designing the projects, they have to know the drainage area so that's an opportunity with Chesapeake Bay Trust Fund that apply for grant funding to tell them what they need to provide. That will work in MD but needs to spread to other states.

Action: A copy of the presentation is uploaded to the Sharepoint site

Proposal to Define Wetlands as a Land Use for the Phase 6 Chesapeake Bay Watershed Model (Erin McLaughlin)

Currently, wetlands are lumped together with forests as a land use in the Watershed Model. Loading rate for wetlands are similar to forests so in the model they are represented as forest. Want to represent wetland area in the model and determine loads for P, N, and Sediment. Wetland restoration field practitioners would like to pull out wetlands and wetland types as their own separate land use. In order to add wetlands as a new land use, the WEP would be tasked to define loads from land use types.

- Why do practitioners want to have wetlands as a new land use? Wetlands process differently than forest and habitat values are different than forest and being able to track wetlands separately would be important to meeting targets of Watershed agreement. They may not have significantly different loading rates than forests but there is concern that this has not been fully explored and agreed upon.
- Olivia Deveraux (Chesapeake Bay Program) will present at Nov meeting on the land use targets that are being developed for Phase 6 of the model and tell us what they are looking for in order to have wetlands as a new land use.
- NWI is the primary data across watershed because it is standardized. There are discrepancies in states that have LiDAR maps however not all counties have LiDAR maps.

Discussion:

- Sweeney: you want to differentiate between the landuses. 1. Diff loading rates 2. Own goals you need to measure though images like NWI 3. Climate change
- Jeff, DEP: clarify streams as a landuse?
    - Currently streams represented in model are 100 cfs or greater. In the next model hoping to get more specific and detailed than that. Not modeling every creek but that is acres of streams that are greater than 100 cfs.
- Ideally would need working numbers by December and then finalized by February ideally.
    - 1. Smaller working groups to propose definitions and loading rates to the larger groups in order to vet
    - 2. Move together and focus on landuse for 4 months and then look at efficiencies.
- What wetland classifications are missing?
    - Freshwater tidal
    - Coastal
    - Tidal forested
    - Cowardin Wetland System: http://www.fws.gov/wetlands/Documents/Wetlands-and-Deepwater-Habitats-Classification-chart.pdf
    - NOAA CCAP: http://coast.noaa.gov/digitalcoast/_/pdf/ccap_class_scheme.pdf?redirect=301ocm
    - Boomer is interested in participating in smaller landuse group discussion.
    - New version of Sparrow coming out and has a delivery factor that accounts for factors that understand ground water recharge and runoff. Vegetative index. Two factors for groundwater (recharge potential in an area, AWC average water contact) carbonate areas in piedmont (factor for delivery N).

Next meetings: moving forward.

- First Wednesday of the month at 10
- Reconvene with Boomer and develop strategy to set starting point to start literature review.
- December: research workshop where we lay out articles and people are assigned and can provide summaries.
- RAE Summit first week of November, so move to second week. Look for doodle poll.

MEETING ADJOURNED: 12:10pm

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Wednesday November 12th, 2014, 10:00 AM-12:00PM
Meeting #2

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	N
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	Y
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	N
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	N
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	N
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	N
Jeff Thompson	MDE	Y
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Neely Law (Coord.)	Center for Watershed Protection	Y
Brian Benham	Virginia Tech (Project Director)	N
Hannah Martin	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	N
Peter Claggett	USGS, CBPO	N
David Wood	CRC	Y
Emma Giese	CRC	N
Denise Clearwater	MDE	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N
Brian Needleman	UMD	N
Bob Krotochvil	UMD	N
Olivia Devereux	Devereux Consulting	Y
Kristen Saacke Blunke	Headwaters, LLC	Y

Summary of ACTION Items & DECISIONs:

- Send Neely 2 articles that you will review and provide a summary at the Dec 1st meeting
- Kathy Boomer to explore use of Mendely as a repository for publications and commenting on publicationvs vs

Minutes

The main objective of the WEP Meeting #2 is to prepare for the in-person research workshop scheduled for December

Panel Announcements

- Wetland Expert Panel Stakeholder Forum is scheduled for November 21st, 9:00AM-12:00PM at the Chesapeake Bay Program Office. This will serve as an opportunity for stakeholders to present data or experiences to help inform the panel. For more information, visit the calendar website.
- The next WEP meeting is scheduled for December 1, 2014 and will be an in-person research workshop.
- Panel modifications based on comments on the WEP scope of work
    - New! Members: Dr. Jarrod Miller (UMD Extension Educator), Jeff Thompson (MDE), Ralph Spagnolo (EPA R3), Kristen Saacke Blunk (Headwaters LLC, Ag Workgroup Co-Chair)
    - New! Panel Name: "Wetlands Land Use Definition and Wetlands Restoration BMP Expert Panel"

Land use Loading Rates Phase 6 Chesapeake Bay Watershed Model

- Presentation provided by Olivia H. Devereux. Copy available on Sharepoint site. Highlights from the presentation provided below.
- The Chesapeake Bay Watershed model is currently in Phase 5 but is currently undergoing a review to update to Phase 6 with latest science for loading rates/targets and to include additional land uses.
- 3 reasons to have land uses
    - Distinct land use loading rates from literature, models, other data sources
    - BMPs are exclusive to one type of land use (e.g.: stream corridor buffers or fencing)
    - Helps jurisdictions for planning and reporting purposes. In this case, there would not be a different loading rate.
- Literature based targets are specified loading rates of pounds of Nitrogen, Phosphorus and Sediment that come off different land uses and these targets are used to calibrate the Phase 6 Watershed model.
- These targets show the relative difference among land use loading rates and actual rates are adjusted based on monitoring data and the calibration process balances loads spatially (targets may vary geographically based on nutrient balance and watershed characteristics).
- Phase 5 of the model had 24 land uses and Phase 6 has 46 proposed land uses (this includes wetlands).
- Currently, wetlands are not an individual land use in Phase 5, they are grouped together in the forest land use.
- The goal is to have targets at the smallest scale (i.e., edge-of-field) that also is best informed by data.

Timeline:

- December 31, 2014 - Sparrow and literature review results for draft land uses
- February 28, 2015 - draft targets for draft land uses
- April 30, 2015 - final targets approved by Modeling Workgroup for draft land uses

- Oct 1, 2015 - Once the final land uses are approved, we will finalize targets using a Sparrow update, final sensitivities, and other information.

Discussion:

- Wetlands are not currently mapped in the Phase 5 of the Watershed model because wetlands are grouped under the forest land use. Therefore, the model only accounts for wetlands processes and functions as a BMP (not a specific land use). Given the functions that wetlands provide throughout the landscape, the scope of work for the WEP is to decide if it is meaningful to have wetlands more directly accounted for in the model.
- The target load rates for wetlands will be identified from the literature review; Sparrow groups wetlands under the forest land use and does not have a specific loading rate for wetlands alone.
- These loading rate targets are the pounds of N, P, and S that is exported/runs off from wetlands. The most important information is what runs off the wetlands but it is ideal to know the depth of the concentrations/loads as well as the edge of the wetlands to help improve the calibration.
- Since wetlands are not currently mapped within the model, what information is available to map wetlands throughout the watershed and what is that timeline for data vs the loading rates? The mapping information is needed ASAP because the team is working over the next month to two months on merging the different land covers together to see what the best scale is for the map. Current efforts are focused on NWI, but it's necessary to transform NWI (from GIS format shapefil). Need to be aware aggregation issues and the 'dilution' of information at data is scaled to lower spatial resolutions

Summary & Discussion of Preliminary Research Findings on Wetlands Land Use Loading Rates

- Presentation by Kathy Boomer and Aileen Molloy. A copy of the presentation is available on Sharepoint
- Boomer and Molloy initiated a very broad and general literature review to identify studies that report wetland loading rates. This review included general search terms but did not include constructed wetlands

  Literature Review Results
- 26 Bay-specific articles (all reviewed, 13 not relevant)
- 70+ U.S. articles (16 reviewed, 10 not relevant)
- 6 international articles (2 reviewed)
- Not Relevant = no loading rates or no load reduction information

  Concerns about current representation of wetlands as BMPs and their definitions by the CBP
- Does not address role of natural wetlands and mitigation wetlands (treated the same as forest)
- No credit for enhancement of degraded wetlands
- Inadequate definition of conditions needed to qualify for nutrient and/or sediment reductions
- Focuses only on water quality benefits; does not address wildlife/habitat benefits.

  Presentation of Options to Better Represent Natural Wetlands in Model
- **Option 1**: Define wetland loading rates
- **Option 2**: Assign retention efficiencies as part of CBWM input
    - Develop wetland overlay
    - Assign forest or open/shrub community loading rates
    - Apply retention benefits
- **Option 3**: Recognize natural wetlands as bmp's

    - Develop wetland overlay and assign efficiencies
    - Incorporate as filter/bmp application model component
        - Incorporate effects of up-slope contributions
        - Compare predicted benefits with bmp's more directly.
        - Provides easier framework for updating information and integrating with County WIP plans

Discussion

- The explicit assignment of land use loading rates similar to other land use loading rates may not be supported in the current literature. The best option moving forward may be to get input on where the three options fit with WEP members' knowledge as practitioners/regulators.
- S. Strano states wetlands are a unique land use; need to consider how wetlands land use updated in future years
- Wetlands are unique in that they could be a land use but also function as a BMP. Ability to assign loading rates to different types of wetlands limited (J. Thompson).
- A commonality across the studies is that vegetation is a short term sink for uptake of the nutrients which had lead researchers to think of wetlands as permanent sinks.
- Option 2 and 3 may be the best options for WEP to address.
- Q. Stubbs request for wetland mapping data from States. Important to consider scale of data, define a baseline year and how acreage will change in future years

R. Spagnolo stated EPA Watershed Resources Registry as a potential source of data for mapping wetlands

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Monday December 1st, 2014, 10:00 AM-2:00PM
Meeting #3

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	Y
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	N
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	N
Ken Staver	UMD	Y
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	N
Tom Uybarreta	EPA Region 3	N
Support staff and guests		
Neely Law (Coord.)	Center for Watershed Protection	Y
Brian Benham	Virginia Tech (Project Director)	N
Hannah Martin	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Emma Giese	CRC	N
Denise Clearwater	MDE	N
Anne Wakeford	WV DNR	Y
Ken Murin	PA DEP	N
Tom Jordan	SERC	Y
Bob Krotochvil	UMD	N
Olivia Devereux	Devereux Consulting	N
Kristen Saacke Blunke	Headwaters, LLC	Y

Summary of ACTION Items & DECISIONs:

- Law will distribute the updated Scope of work
- Brooks provide publications on routing related to HGM classifications
- Staver volunteers to review two more papers
- Send doodle to schedule next meetings
- WEP Meeting#2 Minutes approved

Minutes

Updates

The WEP scope of work has been updated based on comments received from the wetland workgroup.
Action: Law will distribute the updated SOW
The WEP membership has been updated. Denise Clearwater is the new MDE alternate for Jeff Thompson and Anne Wakeford is the new WV representative (both are wetland workgroup members).

Presentation: Modeling Wetlands in the Watershed (Tom Jordan, SERC)

Tom Jordan presented on modeling wetlands in the watershed, comparing N and P removal among wetlands receiving unregulated inflows, and predicting removal efficiency from the proportion of wetlands in watersheds. Noted importance of wetland flowpaths on wetland function and effect on water quality benefits. Jordan concludes that efficiency cannot be assigned a single value because it is a function of wetland size relative to inflow and it is important to quantify uncertainties when dealing with BMP selection. Determining the uncertainty is important because just using the best-guess efficiency biases selection toward inexpensive, poorly-understood (risky) BMPs.
- Baker et al 2006 propose functional riparian metrics to account for spatial distribution of forest areas based on flow pathways. NLCD (30m) not sufficient resolution to measure buffer widths; subsequent publication by Weller and Baker applied analysis to CB Watershed

Discussion:

- Law: This presentation supports the importance of landscape positon and representation of wetlands in the model
- Saacke Blunk: Is there anyone on the WEP that can explore the question of uncertainties with the efficiency?
    - Jordan: Expert Panelss should report their estimated efficiency along with the uncertainty of the estimate so that both can be taken into consideration when designing/driving BMP selection. Report uncertainty along with metric on pollutant removal
    - Strano: Every BMP has so many uncertainties/variability associated, if you get too precise on that aspect you will never be able to get that certainty of the efficiencies related to other BMPs in the real world.
    - Staver: Bottom line is to capture the average value and you do the best you can but you have to be careful about chasing the uncertainty values. The local governments are thinking about the TMDL because they are required to meet those targets.
    - Strano: It's hard to compare urban BMPs vs ag style BMPs. Ag BMPs tend to have other benefits (wildlife, habitat benefits) and it's important to include in the presentations and document habitat benefits and how to incorporate into this report.

Presentation: Mapping Wetlands (Quentin Stubbs, USGS/CBP)

Wetlands are not currently explicitly represented in the Chesapeake Bay Watershed Model. Quentin overviewed the data requirements and land use classes. Wetlands are proposed to be a land use under the natural land uses with tidal emergent, fresh emergent, and non-tidal woody as the subclasses of wetlands. Quentin laid out specific key questions that the expert panel members must consider while discussing mapping wetlands.

1. *What is the best spatial scale to use?*
2. *How will we decipher between "perceived" versus "known" wetlands?*
3. *What will serve as the base year of wetland coverage*
4. *Is it feasible to differentiate the HGM conditions and subsequent loading rates for each land use class at each level?*
5. *How will we justify having wetland types with different loading rates?*
6. *What type of credit will we give BMPs?*
    a. *How would we translate the credit into loading rates for wetlands?*

Discussion:

- Law: Recommendations on wetland land use part of panel scope; may consider this initial mapping as a starting point.
- Brooks: Must think about landscape position and definitely need to go to 10m level and combine National Land Cover Dataset (NLCD) with high resolution. Is it possible to incorporate HDM into NWI and possibly create a hybrid classification? I like the idea of using other sources such as National Hydrography Dataset (NHD) and digital elevation models (DEMs) and soil/crop data to get closer to what areas are most likely wetlands but groundtruthing exercises will be needed to determine accuracy. Base Year; 2009 (BMPs, TMDL began), 2012 (last ag census for crop data) but PA wetlands data are from the 80's and they don't plan on updating.
- Sweeney: Base year is key and inventory, but more important is being able to do the same inventory 5-10 years in the future.
- Stubbs: USGS requested data from local jurisdictions. Quality and type of data provided highly variable
- Brooks: Nutrient removal efficiencies are different for different vegetative types for wetlands
- Law: Is there in interest for tidal/non-tidal emergent/non-emergent as 4 key groupings as a starting point?
    - McLaughlin: There is also tidal woody wetalnds
- Sweeney: what are the proposed breaks? 10 m as minimum with hybrid between level 2 and 3 to account with emergent and forested but data are needed to justify.
- Brooks: Is it possible to build in HGM with modifiers because isolated wetlands versus those associated with streams/rivers will have a different function?
- Denver: Hydrogeology based on geographic region
- Action: Brooks will send publications on flow routing/ HGM report

Literature Reviews (All)

Boomer and Malloy laid out three options at the last meeting for the WEP members to consider.

***Option 1**: Define wetland loading rates*

***Option 2**: Assign retention efficiencies as part of CBWM input (apply efficiencies as part of the input data set that drives the model)*

- *Develop wetland overlay*
- *Assign forest or open/shrub community loading rates*
- *Apply retention benefits*

***Option 3**: Recognize wetlands as natural bmp's in the landscape (efficiencies are applied in the application step to use as part of the scenario assessment process)*

- *Develop wetland overlay to existing land uses and assign efficiencies*

- *Incorporate as filter/bmp application model component*
    - *Incorporate effects of up-slope contributions*
    - *Compare predicted benefits with bmp's more directly.*
    - *Provides easier framework for updating information and integrating with County WIP plans*

Overview Discussion:

- Law: Need to define natural wetland for the wetlands land use and then you can apply wetland BMPs to it to enhance.
- Boomer: We could propose to expand to capture benefits of wetland enhancement for existing wetlands. Count explicitly/include benefits of natural wetlands which could be incentive for protection.

Literature Review Report Outs

1. **Rob Brooks**
    a. Kroger, R, RE Lizotte, Jr., FD Shields, Jr., E Usborne. 2012. Inundation influences on bioavailability of phosphorus in managed wetland sediments in agricultural landscapes. Journal of Environmental Quality 41:604-614.
        i. This would be a good paper for other EP members to review and refer to it. The tables are dense but have a lot of information and the reporting range are quite wide but overall it is a good review. The tables do not give you an idea of the specific wetland type, rather it's more flux type (amount moving through the system through various pathways). The illustrations are useful too.
        ii. Law: Might be noteworthy to see if the data reported in Fisher and Acerman is similar.
    b. Parn, J, G Pinay, U Mander. 2012. Indicators of nutrients transport from agricultural catchments under temperate climate: a review. Ecological Indicators 22:4-15.
2. **Anne Wakeford**
    a. Noe, Gregory B., et. al (2013) Hydrogeomorphology Influences Soil Nitrogen and Phosphorus Mineralization in Floodplain Wetlands Ecosystems 16:75-94
        i. Boomer: Important to map wetlands but need to determine if they have distinct loading rate that is different from forest land use.
3. **Judy Denver**
    a. Seldomridge and Prestegaard, 2014. Geochemical, Temperature, and Hydrologic Transport Limitations on Nitrate Retention in Tidal Freshwater Wetlands, Patuxent River, Maryland. Wetlands (2014) 34:641-651
    b. Kellogg, et al. 2008. Riparian Ground-Water Flow Patterns using Flownet Analysis: Evapotranspiration-Induced Upwelling and Implications for N Removal. JAWRA Vol. 44, No. 4:1024-1034.
4. **Kristen Saacke Blunk**
    a. Duriancik, L. F. et al 2008 The First Five Years of the Conservation Effects Assessment Project – CEAP Wetlands Component (NOT RELEVANT)
    b. Richardson, C.J. et al 2011 Integrated stream and wetland restoration: A watershed approach to improved water quality on the landscape
5. **Steve Strano**

a. Mitsch, WJ, JW Day, L Zhang, and RR Lane. Nitrate-nitrogen retention in wetlands in the Mississippi River Basin. Ecological Engineering 24-267-278, 2005
b. Huang, J, WJ Mitsch and DL Johnson. Estimating biogeochemical and biotic interactions between a stream channel and created riparian wetland: A medium-scale physical model. Ecological Engineering 37-1035-1049, 2011
c. Discussion:
    i. Both papers are more about BMP efficiencies but would apply to passive diversion

6. Ken Staver

a. Wilson and Morris. 2012. Biogeochemistry. The influence of tidal forcing on groundwater flow and nutrient exchange in a salt marsh-dominated estuary.
b. Rogers et al. 2009. JAWRA. Hydrologic and water quality functions of a disturbed wetland in an agricultural setting.
c. Action: Staver volunteers to review two more papers

7. Erin McLaughlin

a. Dianna M. Hogan and Mark R. Walbridge. Urbanization and Nutrient Retention in Freshwater Riparian Wetlands. 2007. Ecological Applications 17(4): 1142–1155.
b. Allison R. Aldous, Christopher B. Craft, Carla J. Stevens, Matthew J. Berry, and Leslie B. Bach. Soil Phosphorus Release from a Restoration Wetland, Upper Klamath Lake, Oregon. 2007. Wetlands 27(4): 1025-1035.
c. John M. Marton, M. Siobhan Fennessy, and Christopher B. Craft. USDA Conservation Practices Increase Carbon Storage and Water Quality Improvement Functions: An Example from Ohio. 2013. Restoration Ecology.
    i. USDA BMPs-Ohio; depends on vegetation and location of practices but it is useful to support options 2 and 3.

These literature reviews/papers will be posted on sharepoint.
There will be continued literature review to build familiarity with data out there and see if we can begin to see if one of these three options would be best supported. This discussion will continue over email exchanges before the next WEP meeting.

Continued Discussion:
1. Representing wetlands (mapping) in CBW.

- Minimum would be 10 M dataset and fine tune with other finer scale data analysis to capture tidal/nontidal, emergent/woody
- Need to make sure that the data used will be there in the future in order to continue to calibrate the model

2. Check-in with expert panel on Options 1, 2, 3

- Stubbs: Pass
- Staver: 2&3
- Wakeford: Pass
- Strano: 2&3 based on availability of data
- Denver: 3
- Boomer: 3

- McLaughlin: 3

Action: Send doodle to schedule next meetings.

ADJOURN

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Tuesday January 13th, 2015, 10:00 AM-12:00PM
Meeting #4

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	Y
Dave Davis	VA DEQ	N
Judy Denver	USGS	N
Jeff Hartranft	PA DEP	Y
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	Y
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	N
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	Y
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Neely Law (Coord.)	Center for Watershed Protection	Y
Brian Benham	Virginia Tech (Project Director)	N
Hannah Martin	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	Y
David Wood	CRC	N
Emma Giese	CRC	N
Denise Clearwater	MDE	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N
Jill Whitcomb	PA DEP	Y
Whitney Smith	EPA Region 3	Y

Summary of ACTION Items & DECISIONs:

- All: review Meeting 3 minutes to approve at Meeting 5.
- Case study mapping exercise to implement recommended wetland land uses. Quentin to present findings at next meeting
- Nominate panel chair

Minutes:

Wetland Expert Panel Meeting 4 Purpose—Presentation on a recommended approach and data to generate a map of wetland land uses across the Chesapeake Bay Watershed. The Land use workgroup and modeling team will be working together in 2015 to implement information to map wetlands and other land uses.

Presentation: Phase 6 Wetland Land Use Classification, Quentin Stubbs

a. Recommendations to use NWI coupled with other supplemental data at state and local level . A comparison of wetland mapping data options suggests NWI provides the 'best available' data as a starting point for bay-wide mapping purposes. The 3 proposed wetland land uses based on the water quality benefit functions provided by wetlands to include: estuarine, floodplain, depressional
b. Discussion:
    i. Claggett provided further clarification on input requested from expert panel. Proposing to use NWI and state wetland maps to determine where wetlands are located. Then look at how those wetlands function with respect to their water quality function for nutrient and sediment reduction. Review attributes in NWI database to assist with land use type, in addition to landscape context to determine how these wetlands (ancillary data will come in to inform the breaks between estuarine, floodplain, and depressional wetlands).
    ii. Timeline: Mid March-draft land use data set and methods needed to be given to Water Quality GIT. Refine mapping between March and October
    iii. Spagnolo: Are we going to use the NWI classifications?
    iv. Law: This will be placeholder and starting point to determine if it is or is it not a wetland and is this data sufficient to capture wetlands bay-wide
    v. Spagnolo: Why do we need the categories?
    vi. Claggett: Need to know classes/categories we are going to be mapped and define a unique loading rate with each of them. Proposing simplistic, minimum of three classes by March. March-October. This is for land use, not BMP.
    vii. Brooks: States will have different quality data, is it necessary to have consistent data across the whole watershed or can you use better data where it's available. Unlikely you will get seamless one layer of wetlands for the whole basin. Important to document decisions in metadata.
    viii. Boomer: Agree with Brooks, especially because quality of NWI varies state by state. Could someone come forward and restore a wetland that occurs but isn't mapped? Specify how you use data for practitioners and county for meeting the WIPs. Note to Panel: we need to address this as part of reporting and tracking
    ix. Mason: Need to resolve mapping of regulatory wetlands; NWI may not include these wetlands. Need to clarify
    x. Mason: Recommends creation of a tidal wetland class to include both freshwater and saline. From a modeling perspective, tidal wetlands modeled in the Estuarine model and not the Chesapeake Bay Watershed
    xi. Thompson: How did Quentin come up with the three classifications?
    xii. Claggett: Landscape position and how these wetlands would perform.

xiii. Discussion to include and/or differentiate between isolated, headwater and depressional wetlands. Panelists decided to include headwater and depressional. The use of the term isolated wetlands has a specific regulatory meaning. To avoid confusion it was decided that isolated would be captured under the depressional wetland land use.

xiv. Strano: Isolated wouldn't have runoff and they don't have a load to them. Headwater wetlands are those that affecting runoff from landscape before it goes into waterway. You need a stream and drainage ditch data set for that.

xv. Mason: Headwater wetlands receive a load and have a discharge especially in storm events. Depressional wetlands expect to have little, if any discharge.

xvi. Thompson: Flowpaths are important to wetland function; look at hydrogeomorphic issues and classifications. Correlate back to NWI based on HGM (i.e., Flats: mineral flats, coastal. Not tidal).

xvii. Law: proposal accepted by panel members to define 4 wetland land use classifications, tidal (freshwater, saline), depressional, floodplain and headwater. Assign a basic loading rates for each of those classifications and then modify based on retention efficiencies. The retention efficiency would be defined based on an empirical approach and/or landscape features that can be readily extracted and (hopefully) automated bay-wide

xviii. Boomer: Further explained that at a given location the water quality benefits of a wetland would represent factors affecting wetland function such as groundwater vs surface water controlling flux of N P and S at a particular site. Think about what attributes would be good indication of relative importance of those vectors. Local watershed area ratio could be related to those two sources. 1:1 would be headwater and have groundwater importance, smaller ratio would be lower in the watershed and have surface water importance.

xix. Question to panel members if there is sufficient data or research to rank water quality performance/retention rates for the 4 proposed wetland classes. Panel agreed.

xx. Stubbs/Claggett conduct preliminary mapping exercise to implement recommended method using 4 case study counties (Lancaster, Fairfax, Charles and Wicomico). Law and Boomer to meet with Stubbs and Claggett to refine approach.

xxi. Law, Mason and Sweeney to meet and discuss how proposed wetland mapping would be tracked and reported, historically and in the future

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Wednesday February 11th, 2015, 10:00 AM-12:00PM
Meeting #5

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	Y
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	Y
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	N
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	N
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	N
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Neely Law (Coord.)	Center for Watershed Protection	Y
Brian Benham	Virginia Tech (Project Director)	N
Hannah Martin	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Emma Giese	CRC	N
Denise Clearwater	MDE	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N
Tom Jordan	SERC	N
Bob Krotochvil	UMD	N
Olivia Devereux	Devereux Consulting	N
Kristen Saacke Blunke	Headwaters, LLC	N

Summary of ACTION Items & DECISIONs:

- Set –up meeting to review mapped wetland land uses and potential use of wetland monitoring and assessment program information to verify acreage in case study counties (Neely/Rob/Pam/Aileen/Quentin/Jeff/ Tom/Ralph)
- Request Tetra Tech to assist USGS on mapping and retention efficiency analysis
- Set-up meeting to discuss retention efficiency analysis (Quentin, Peter Claggett, Aileen, Kathy, Neely)

- Ralph Spagnolo forward EPA study on wetland nutrient and sediments
- Tom U offered to contact states for updates on wetland mapping – check with Peter and Quentin re information received from states on land use land cover as part of Phase 6
- Meeting minutes #3 and #4 approved.

Mapping Wetland Land use & Discussion (Quentin Stubbs, USGS)

- Quentin presented methods and results of preliminary mapping of wetlands land uses using 4 County case studies and multiple data sources.
- The Panel asked to provide feedback on the wetland mapping and recommendations to accept and, or modify the methods.
  1) Does the preliminary distribution of wetlands appear reasonable?

  2) What additional information may be used to further identify and map depressional wetlands?

- 4 wetland classes extracted from NWI database and supplement data to define wetland type to include: tidal (fresh and saline, floodplain, headwater and depressional
- 4 Counties used to implement proposed method to identify and map wetland land uses: Charles County, MD, Wicomico County, MD, Lancaster County PA and Fairfax County, VA
- Methods and results are summarized in the presentation (attachment provided).
- A hierarchical method used to label wetland land use classes
  (tidal >floodplain>headwater>depressional)

- Findings
  - Experimented with data sources to differentiate amongst wetland classes (spatial resolution of data sources such as geology vs SSURGO, 10 m DEM vs NHD)
  - Tidal and floodplain wetlands generally readily identified
  - Results of mapping identified challenge to identify depressional wetlands, data to identify floodplain wetlands may under-represent this class; spatial resolution of data and connectivity of stream channels affects identification of headwater vs depressional (NHD, 10m). Other mapping efforts by Bay Program support use of 10m DEM; NHD layer won't pick up a lot of the streams, specifically the Eastern Shore
  - Coastal area missing mineral flats
  - Found wetland distribution in Lancaster County "spotty". This may not be a result of the data sources, rather a result of geology and limestone sinkholes resulting in a lack of surficial hydrologic connectivity
  - J. Hartranft noted that in PA the impact of legacy sediment disconnects wetlands from streams
  - K. Boomer notes geomorphology identifiers in SSURGO dataset along with NWI floodplain provide a reasonable approximation for wetlands in these areas (K. Boomer)
  - Model representation. What time period does this wetland land use represent?

CBWM Land Use Data

- Land use change in time 1985 – 2025 for other land uses
- Some NWI data represents a 2nd point of wetland coverage but NWI layer completed in mid 1980s so would be represented as a baseline condition
- Additional data source from MDE can provide an inventory of restored wetlands

    - Need to think about accuracy with level of effort given what is lost and gained given relative percentage of land use. E.g. wetland resotraiton small percentage of total land area in County
    - Voluntary restoration no location data
    - Look into Status and Trends reports
- **Tom U contact states for updates**
- **State wetland mapping efforts, PA DEP e-fact mine for permitting actions, state data not updated recently e.g .MD 1990s**

Wetland Verification

- What is the ability to ground truth wetlands mapped vs existing (Jeff) Quentin replied there is limited capacity to do so – could ask localities
- Pam suggested verification of wetland acreage mapped by model could be cross-referenced with monitoring and assessment programs, PA DEP Jeff focus on streams, very small number of wetlands
- Rob Brooks: 50% of wetlands not detected (clarify was assessment was updated)
- **Rob/Pam/Aileen/Quentin/Jeff – Tom/Raph: follow-up call for verifying wetlands (review verification guidance)**
- Rob classification MidAtlantic HGM classification: headwater complex. Kathy and Steve agree
- Steve wetlands not truly isolated act or function as headwater
- *Quentin thesis: Delmarva peninsula on net gain 1%, correlation with permitting agencies

Retention Efficiencies

- Jeff S. reminded expert panel that efficiencies would be relative rates to forest land use loading
- Kathy B stated that we are more concerned with variation in retention
- Judy and Pam stated this would make best use of available data reported on welands
- ***EPA study N, P and Sediment, Ralph will forward**

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Tuesday June 2nd, 2015, 10:00AM-12:00PM
Meeting #6

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	N
Denise Clearwater	MDE (for Jeff Thompson)	Y
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	Y
Michelle Henicheck	VA DEQ	Y
Robert Kratochvil	UMD	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	Y
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	N
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Hannah Martin	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	Y
Peter Claggett	USGS, CBPO	Y
Katherine	EPA Region 3	Y
Kristen Saacke-Blunk	Headwaters LLC, AgWG Co-Chair	Y
Anne Wakeford	WV DNR	Y

Summary of Action Items:
ACTION: Hanson will coordinate with Habitat GIT and Water Quality GIT about approving the expert panel recommendations for wetlands to be included as a land use in Phase 6 model
DECISION: one watershed from four different counties will serve as case studies for discussion on a future call-Fairfax County (completed), Lancaster, Wicomico, and Charles
ACTION: Claggett will get back to Hanson about ETA of other case studies
ACTION: Contact Hanson if you are interested in volunteering as Chair/Co-Chair of the panel

Minutes:
Introductions

- Jeremy Hanson (Virginia Tech) is the new panel coordinator. VT has a cooperative agreement with the Chesapeake Bay Program to coordinate expert panels. Brian Benham is principal investigator on the cooperative agreement.

Recap Panel Status

The previous coordinator, Neely Law with the Center for Watershed Protection (CWP), needed to step down after the CWP grant was renegotiated with the Chesapeake Bay Program. Before CWP ended their contract, this expert panel met five times with the most recent time in February 2014. The expert panel was focused on the discussion of wetlands being included as a land use in the Phase 6 model.

Timeframe: Phase 6 Land use recommendations needed to be confirmed back in April 2015 but there is another opportunity to add recommendations later this year. Recommendations from the Wetlands Expert Panel need to be approved by the Wetlands Workgroup, Habitat GIT and Water Quality GIT. Ideally the relevant GITs and workgroups can endorse the panel's recommended land use classes, loading targets and methods by the end of August.

ACTION: Hanson will coordinate with GIT coordinators on dates in August for the approval process.

Post-meeting note: The Wetland Workgroup has a call on July 16th. The Modeling Workgroup has its quarterly meeting scheduled for July 21-22. The WQGIT has a scheduled conference call on August 10. The Habitat GIT has no scheduled calls or meetings in that timeframe, but they can be invited to join the WQGIT on August 10 to consider the panel's recommendations at that time.

Update on mapping wetlands a land use in the watershed (Quentin Stubbs and Peter Claggett)

Stubbs provided overview on the progress so far on the expert panel's first task to make recommendations for wetlands to be included as a new land use in the Phase 6 model. In order to do this, wetlands need to be mapped and the best data set was determined to be NWI (most of the other datasets are rooted in NWI). Through the process it was discovered that it is difficult to distinguish between the four suggested wetland classifications so it's recommended to move to three categories (Tidal, Floodplain, headwater) or two categories (Tidal vs non-tidal).

DECISION: one watershed from four different counties will serve as case studies for discussion on a future call-Fairfax County (completed), Lancaster, Wicomico, and Charles. These would be mapped and Tom Jordan's first order efficiency equation would be applied. Initial findings suggest that regardless of resolution, non-tidal areas located in floodplain and intercept a lot of flow and impact would be 20%. That raised questions about applying in other areas and refine technique but wetlands floodplain have riparian buffers and receive credit and hard to discern if reductions are real (collective reduction or exclusive to wetland). Buffer effect vs wetland effect. Load adjustments needed, will it nullify wetlands? Early stages and only looked at one watershed.

Deliverables: continuous raster maps: creating what percentage of each pixel is each landuse (general wetland cover, tidal wetlands, non tidal wetlands). Still analyzing state/local data and had to combine wetland cover with forest cover in order to get better idea of continuity of tree cover vs urban tree canopy

Discussion:

- Staver: reconsider role of things and because watershed model is calibrated based on delivered loads, understand why source loads are higher than delivered loads. Justification to protect existing wetlands. We know that in a lot of watershed you lose 50% of nitrogen between edge of field and delivered load—wetlands are a big part of that. Understanding that would be good scientific exercise and mgmt.
    - Claggett: one option is to take ratio of wetland area to drainage area in every catchment (sparrow model) and include percent of stream miles buffered by forest in the sparrow

model and see if the ratio comes out as significant variable compared to riparian buffer variable.

- Strano: does it affect other land use activities to make up for the other practices?
    - Claggett: that's what we have to tease out conceptually.
    - Strano: if loading rates for the wetland areas are a lot less, calibrating to what comes out, then loading rates for ag areas and urban areas would go up. Would that result in more needing to be done?
    - Claggett: potentially yes, haven't talked about loading rate for wetlands. Wetlands load like forests until this panel decides otherwise. Wetlands are really going to have their impact on their treatment of runoff, that's not loading rate that's the reduction from other land uses. Presumably some loads from other land uses would go up because they aren't treated by wetlands.
- Denver: there are different areas where denitrification is occurring so it can't determine fully that it's retained in wetlands.
- Strano: confused on loading rate of ag lands that drains through a wetland and those don't. We aren't doing that yet except that when we put a bmp place. I thought loading rate was purely land use
    - Claggett: loading rate is purely land use, but new version of the model for sediment and nutrient, explicitly in space trying to account for streams and wetlands in estimating how land use loads get from edge of field to point of the watershed and what happens to them. Given what we know, what level of generalization is needed to more accurately portray wetlands and loads coming from landscape.
    - Land use loading rates: talking about rates delivered to the water from the particular land use. Wetlands; assume they are different than forests but need to address this still.
- Hartranft: There was a recommendation heard earlier that recognizing landscape position is critical when assigning loading rates, how has that been addressed? Do we have confidence in Jordan's equation?
    - Claggett: Need to get recommendation from the panel to use Jordan's equation, if not, how else how should we do this?
    - Strano: use the equation for existing wetlands that function as BMPs, how different is that from the current reductions given to wetlands?
- Sweeney: wetlands occupy area in watershed so they are a land use but at the moment they are assigned as forests because they are thought to have similar loading rates. If they occupy space, whatever the loading rate it's the inverse of retention efficiency. Figure out retention efficiency on various types of wetlands, take inverse to get the loading rate and compare to other landuse like forests. Is it more or less for N and P and sediment between the land uses and how does it vary among the categories?
    - Boomer: found in the literature review, depends on landscape position, what is delivered to the wetland.
    - Staver: possible to get how much attenuation between sources and edge of stream throughout the watershed?
    - Sweeney: yes but difficult once you get to the headwaters, that's what we are trying to get different in this model to better understand attenuation between edge of stream. Calibrated to land use and then the gauging stations and attributing to sources
- Claggett: NWI + is something we are looking into. They have landscape position water flow path classification that can be tagged onto NWI but hasn't been done in too many places. Some

degree talking about tom Jordan's equation is to use landscape position as one factor when looking at wetland efficiencies.

- Quentin: Option 1: have to do this if you can't come up with different efficiencies between the different types Option 2: preferred if there is a distinct difference between the categories
    - Denver: need range of potential efficiencies related to what you are trying to retain and where it is in the landscape. Can't give a blanket retention efficiency. Wouldn't feel comfortable. Need a matrix otherwise it's not meaningful
    - Mason: helpful to have and look over the case studies accomplished to review (maps and efficiency information).
    - Denver: identify areas where wetlands are more effective than other areas. Better understanding where adding wetlands is more valuable.
    - Sweeney: TMDL purposes all about implementation of restoring/constructing wetlands and that's what will be tracked and assessing where we are towards the goals. Focused on the benefits of wetlands that are already there, need to do something with the information. Maybe publish a study like forestry workgroup that did the consequences of forest loss and use the model to support. Benefits of restoring/enhancing a wetland for TMDL purposes.
- **ACTION**: Claggett will get back to Hanson about ETA of other case studies. Prototype in Fairfax County completed but has not done the three other counties. It would be informative to do the other three case studies. Need to answer question with modelers what type of impact will that have on TMDL if we go more complex route. What other non TMDL benefits might we gain from proceeding on more complex route? Certain thing we know about the landscape if we didn't account for would be ignoring information.

Moving forward

- Schedule end of June and July conference calls
- Next meeting: discuss what Claggett/Stubbs have in order to get idea of how we want to distinguish all the wetlands.
- Panel Chair and co-chair need to be identified by the end of this month to help present recommendations from the group to the partnership in august and beyond for BMP panel report. If you are interested contact Jeremy.

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Tuesday June 30th, 2015, 10:00AM-12:00PM
Meeting #7

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	Y
Dave Davis	VA DEQ	N
Judy Denver	USGS	N
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	Y
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	Y
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	N
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	Y
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Hannah Martin	CRC	N
Jennifer Greiner	USFWS, Habitat GIT Coordinator	Y
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	Y
Katherine	EPA Region 3	N
Denise Clearwater	MDE	N
Kristen Saacke-Blunk	Headwaters LLC, AgWG Co-Chair	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	Y

Summary of Action Items:

- Small group (Jeremy, Ralph, Pam, Peter, Quentin) will talk offline about presentation/update to the Modeling Workgroup on July 21-22.
- Hanson will distribute a poll to schedule next call for last week of July or first week of August
- Panel will receive updated lit review from Malloy next week (~July 7th or shortly thereafter).
- Hanson will share the WetCAT links/materials from Henicheck with the full panel.
- The panel will revisit the wetland types and opportunity decisions after considering the updated literature review and WetCAT information.

Minutes:

Welcome and Introduction

- Jeremy asked for any final corrections or edits to the June 2nd minutes. None were raised; the minutes were approved.
- **DECISION**: The June 2nd call minutes were accepted as written.

Review and discussion of retention case study results

Stubbs reviewed the objectives, methods and results of the pilot study. Charles, Wicomico, Lancaster, plus they included two additional areas Steuben (NY) and Cumberland (PA). He asked the group to consider if there are any variables missing, if the reductions are too high, or any other comments. Brooks asked for clarification about the relationship between the summary table and the graphs. Proportionally, the coastal plain areas have higher percentage of wetlands, so that appears to be main reason for the higher reductions compared to the Piedmont or Appalachian areas. Later this summer the GIS and modeling team has plans to use work from Weller and others to more explicitly incorporate forest buffers into the modeling tools. A lot of the wetlands are floodplain wetlands, and those NWI polygons include the open water of the stream. We essentially nulled those out. It was noted that Wicomico may also be tidal and would likely need to include the open water treatment for tidal-fresh and tidal-saline. Peter pointed out that Jordan's equation doesn't include direct interaction with the water column. Judy was unable to join the call, but Quentin explained some of her concerns with the methods regarding relationships to groundwater and surrounding land covers. For the land uses we want to know if the removal efficiencies are dramatically different across the types. Then determine how to adjust the rates based on the known differences using NWI, etc.

- Brooks pointed out that the range of removal efficiencies for wetlands is extremely large in the literature, ranging from significant sinks to sources. Looking at the literature most wetlands do act as sinks but we can see cases where they act as sources. We can probably learn more about what factors make a wetland a source vs. a sink.
- Sweeney noted there are options for how the panel can address large flow events, but all panels should account for it somehow. The easiest way to account for it, is to assume that at least one or two large events will occur over a certain number of years (e.g., 10) and adjust the reduction accordingly.
- Mason mentioned that the group may need to crosswalk with some of the tidal wetland considerations from the shoreline management panel's recommendations. She recapped that the first question to resolve is whether the group wants to revisit changing the number of types? We had four, were down to three, and now five were under discussion. She noted Stubbs and Claggett need that answered first before they can update their analysis. Then there is the issue of opportunity for the wetlands to treat the surrounding areas or land uses. Looking at percentage of total acres treated, how much weight do we apply to factors like that? Will need to answer that eventually.
- Claggett: we have land cover data for the entire watershed. Based on the ratios, Jordan's equation and the land covers we can make the necessary adjustments. The type question is more difficult.
    - It was suggested to wait until after the literature review is updated to define or distinguish the types.
    - Henicheck mentioned WetCAT, which scores wetlands based on habitat or other stressor factors. WetCAT is GIS analytical tool from VIMS and VA DEQ that was developed for permit programs, but also for monitoring and assessment. Fairly comprehensive tool that incorporates water quality, habitat, land use and other variables. So it is another tool that could potentially be used to help guide our approach

to classifying wetlands or extrapolating their retention or effectiveness. Henicheck will send link and documents to Hanson.

- Claggett: Eastern Shore will likely be most challenging area, so perhaps they could test out applying the kinetic equation to the entire Shore and get a better sense of how to adjust or apply the equation/methods.
- There was general agreement from the group that over the next few weeks everyone can look at WetCAT and the literature review to help modify how, and justify why, we distinguish the 3-4 classes/types.

Literature review update and status

Malloy cautioned that while the spreadsheet has quite a few entries, there is a smaller subset of studies that have relevant loading data broken down by wetland type or other factors of interest. The group agreed that she continue to not exclude data or information if it is only nitrate. The model and panel can still use nitrate as a part of TN. The same goes for other species of N (or P, where available), such as dissolved, ammonia, etc. Malloy noted she has added a few sources and need to rerun some of the numbers. Will try to more fully explain and include a discussion of factors that affect nutrient removal, such as retention time, etc. in the narrative. May not be able to do quantitative analysis due to limited results, but can at least describe them qualitatively. She mentioned that she will continue to come across studies looking at constructed wetlands for stormwater and she asked how the group felt she should handle those studies. It was agreed that while they are not an explicit part of this group's charge, they can still be included overall, but separated from the natural wetland studies. They may provide some insight when compared to the natural wetland studies, though the group will need to be wary of the methods and how to properly compare and contrast their results.

Confirmation of Panel Co-Chairs

DECISION: Pam Mason and Ralph Spagnolo were confirmed as Co-Chairs for the panel.

Moving forward

Hanson outlined some next steps for the group. See summary of action items above.

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Wednesday July 29th, 2015, 10:00AM-1:00PM
Meeting #8

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	Y
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	Y
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	N
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Hannah Martin	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	Y
David Wood	CRC	Y
Denise Clearwater	MDE (attending for Jeff Thompson)	Y
Kristen Saacke-Blunk	Headwaters LLC, AgWG Co-Chair	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N

Summary of Action Items:

- Hanson will share conflict of interest disclosure form for WEP Members to fill out
- Hanson will follow up with modeling team on specifics on modeling tidal wetlands in the estuarine vs watershed models (potential presentation at next meeting)
- Claggett will contact SPARROW modelers to see if it's appropriate to add wetlands as a primary landuse and run analysis similar to that of forested to come up with values.
- Initial drafting team (Hanson, Mason, Spagnolo, Clearwater) will draft narrative to support the wetland classification recommendations
    - August 5th- Share narrative draft with WEP membership
    - August 12th- WEP membership submit comments on narrative draft
    - August 13th- Hanson to make revisions to narrative

- August 14th- Submit wetland classification recommendations and narrative to Water Quality GIT for review
- August 24th-Water Quality GIT meeting to discuss/approve panel recommendations.

- Hanson will send doodle for a next WEP call in late August

Minutes:

Welcome and Introduction

- Hanson asked for any final corrections or edits to the June 30th minutes. None were raised; the minutes were approved.
  - **DECISION**: The June 30th call minutes were accepted as written.
- Updates made to the BMP Expert Panel Protocol—changes affect the process for writing the final report and comment review period.
- Panel members must now fill out the conflict of interest disclosure form. **ACTION**: Hanson will share the form with panel members
- Mason presented to the modeling workgroup; slides were provided to WEP members

Discussion of wetland loading rate(s)

NONTIDAL-Use SPARROW to confirm Jordan equation. The WEP decided to take all nontidal wetlands in watershed and apply the Jordan 1st order kinetic equation to the entire watershed and then take efficiencies and average within NHD+ catchments. USGS SPARROW model—takes multiple variables (like forest riparian buffers) and overlays wetland efficiencies and SPARROW will determine at regional scale if the efficiencies calculated with Jordan equation explain N, P and sediment efficiencies are comparable. If coefficient is 1 then it works, if it's 2 then the efficiencies should be twice as much as the equation. If 0 then wetlands don't have an effect that can be explained with the Jordan equation. Ideal would be coefficient of 1 which gives us confirmation/confidence that Jordan's equation is ideal method.

- Denver: important to understand; I like running kinetic equation but would prefer it to be done for the entire area that will give us information about where that equation represents. Riparian wetlands are the last place water goes before it enters stream. Need to determine where the equation comes close to 1 and then look at those areas and how it's related to hydrogeology to determine if wetlands are a contributing factor to that area. Also, get results of that analysis and compare directly to places that we know what's going on in order to learn a lot about what's important for attenuation. Don't screen so we can look at areas that don't work and determine why. Explain importance of attenuation and factors in certain areas.

TIDAL—both fresh and saline then it would be taken out of watershed model and no longer be a landuse because accounting for their loads and functions would be moved to the water quality model (Estuarine Model). Issue is that the estuarine model does not handle crediting BMPs—unclear how tidal wetland restoration/enhancement would be credited.

ACTION: Hanson will follow up with modeling team to get more information on the best approach to modeling tidal wetlands. Is it possible to build a module similar to the SAV in estuarine model with load reductions? How can we best realistically account for tidal wetlands as a natural resource as well as tidal wetlands that are a restored/created resource—do these belong in the same model?

Initial call with Modeling team will include Hanson, Claggett, Spagnolo, Mason, and Boomer.

Potential presentation for August WEP meeting.

Since Tidal wetlands are unclear and may be moved to the Estuarine model, this WEP meeting will focus on deciding the recommendations for the non-tidal wetland classification categories and loading rates.

The panel members provided professional opinions that the loading rates are probably different than those of forests, however the current literature review and science cannot support these opinions. For example, nontidal wetlands should have higher rate for sediment than forest due to typical vegetated patterns. Some members expressed dissatisfaction with the results of the literature review, and that there are relevant studies which were not included. Some members offered to re-examine the literature for more studies, which could be used to produce a defensible loading rate in the future.

Mason: The isolated depressional wetlands are chronically going to trap sediment, unless there's a discharge event like a major storm. How that varies from forest, that's probably still a net trap of sediment. From landscape position, they don't have a load into the waterway which makes them a perfect sink. Statistically knowing how much it represents on landscape, they aren't the majority of the wetlands. Least information about those systems (least amount of literature) because they are assumed to be sinks. More groundwater relationship
Denver: tend to be sources of groundwater, add to groundwater. Not intercepting much. Sending clean water to the streams, don't add sediment or P.
Clearwater: The scrutiny given to wetlands as landuse should be no different than other land use. For example, if one study was used to set loadings or efficiencies for forests, one study should also be sufficient for wetlands. . Also curious if any of the forested studies were done on hydric soils and could be pulled out for this purpose.

- The next SPARROW run will add all Phase 6 landuses with unique loading rates and therefore SPARROW sets the primary loading rates. Can wetlands be added as a primary rate to get a difference between wetlands and forests?
- **ACTION**: Claggett will contact SPARROW modelers to see if it's appropriate to add wetlands as a primary landuse and run analysis similar to that of forested to come up with values.

DECISION: Based on the available science and NWI classifications, WEP members agreed on the table of recommendations for three wetland categories (PFO, PSS, PEM) as the initial building block for Non-tidal Wetlands. If an area is identified as a wetland complex, it will be classified as the first category shown in NWI.

NONTIDAL (Palustrine) Classification	Loading Rate-Nitrogen	Loading Rate-Phosphorus	Loading Rate-Sediment
PFO (Forested)	100% TRUE forested	100% TRUE forested	100% TRUE forested
PSS (Shrubs)	100% TRUE forested	100% TRUE forested	100% TRUE forested
PEM (Emergent)	100% TRUE forested	100% TRUE forested	100% TRUE forested

A narrative is needed to document how the WEP membership came to consensus on this table. **ACTION**: Initial drafting team (Hanson, Mason, Spagnolo, Clearwater) will draft narrative to support the wetland classification recommendations.

- August 5th- Share narrative draft with WEP membership
- August 12th- WEP membership submit comments on narrative draft
- August 13th- Hanson to make revisions to narrative

- August 14th- Submit wetland classification recommendations and narrative to Water Quality GIT for review
- August 24th-Water Quality GIT meeting to discuss/approve panel recommendations.

Wrap-up and next steps
ACTION: Hanson will send doodle poll for Aug meeting.

Next Meeting: Someone from modeling team to clarify tidal wetlands in the next model.
Start moving into BMP questions.

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Wednesday September 2nd, 2015, 1:00PM-3:00PM
Meeting #9

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	Y
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	N
Quentin Stubbs	USGS, UMD	N
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	N
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	Y
David Wood	CRC	N
Denise Clearwater	MDE	Y
Kristen Saacke-Blunk	Headwaters LLC, AgWG Co-Chair	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N
Lew Linker	EPA CBPO	Y

Summary of Action Items & Decisions:

- Decision: The July 29th call minutes were accepted as amended.
- Action: Lew Linker will share the agenda for the upcoming October 5th Modeling Workgroup quarterly meeting, which will include a more detailed discussion of tidal wetlands in the next version of the Water Quality and Sediment Transport Model. Hanson and Runion will distribute the agenda to the panel and wetlands workgroup, respectively.
- Decision: The existing NWI data layer will be used as the basis for the initial October 2015 calibration. Note: Newer data from the jurisdictions can be incorporated during the 2016 review period.

- Action: Claggett can be on the WQ GIT meeting to reassure group that changes can be made within the model to include new data as it becomes available.
- Decision: NWI data for riverine, palustrine, and lacustrine wetlands will be used as the basis for the wetland land uses in the initial Phase 6 model calibration (upon Water Quality GIT approval). Riverine (vegetated) and lacustrine (vegetated) will be changed from open water to wetland when there is overlap with acres of the existing open water land use. Acres of all three (palustrine, riverine and lacustrine) will then be split into the Floodplain and Other classifications using a combination of FEMA and SSURGO maps, as Peter and Quentin have already been doing. Note: If adjustments need to be made to the rules to change how the acres are split between the two "buckets," they can be made following the October 2015 calibration.
- Action: WEP members should reach out to WQ representatives colleagues and inform them of these land use changes to gain support for the 9/14 WQ GIT vote.
- Action: Edits or comments on the recommendations memo should be provided (in track changes format) to Jeremy (jchanson@vt.edu) by **COB Thursday 9/3 (tomorrow)**.
- Action: Hanson will send doodle poll for next meeting in October.

Minutes:

Welcome and Introduction

- Hanson asked for any final corrections or edits to the July 29th minutes. None were raised; the minutes were approved.
  - Decision: The July 29th call minutes were accepted as amended.
- Review/summary of Wetland WG call from 8/28
  - Non-tidal wetland land-use categories for Phase 6 model moves from three vegetation-based classes to two landscape classes: floodplain and other.
  - Process has been collapsed in a short timeframe that has caused frustration and confusion. The preferred deadline to determine number of categories was months ago and the timeline of the group conflicts with this. Now we are limited to three or fewer classes with the first calibration on October 1st. The two proposed classes have support from the workgroup, though, and two land uses for nontidal wetlands would be a major achievement.
  - Hanson: Overall, we will have wetlands added to the Phase 6 (with WQ GIT approval 9/14). Today we will review the recommendation memo and land use labels.

Discussion of tidal wetlands loading rate(s)

Lew Linker:

- Motivation behind including a tidal wetland:
  1. Assessment of effect of climate change/sea level rise on the TMDL and other standards on the Bay with a loss of tidal wetlands.
  2. There has now been documentation of attenuation of N and P in tidal wetlands – TN/TP attenuated 46/74% from tidal wetlands (Anderson, Iris et. al.)
  3. Model needs update in attenuation.
  4. Alignment with other expert panels.
- Calibration of tidal wetland attenuation will be initiated this month.
- Will be able to credit tidal wetland creation.
- Attempting to provide an assessment to guide management.
- Timeline – Both should be fully operation by the end of 2015 and review by CBP by 2016.

- Action: Lew Linker will share the agenda for the upcoming October 5th Modeling Workgroup quarterly meeting, which will include a more detailed discussion of tidal wetlands in the next version of the Water Quality and Sediment Transport Model. Hanson and Runion will distribute the agenda to the panel and wetlands workgroup, respectively.

Discussion of updated Phase 6 land use recommendations

- Review of most recent recommendations document – altered to reflect the Wetland Expert Panel's recommendation as supported by Wetland WG. PA dissent from WG recommendation has been documented as against adding wetlands as a land use due to the age and inaccuracy of NWI in their state, although they expressed support of the land uses to allow for reporting BMPs such as wetland enhancement.
- *Hanson*: The current need for the model is to include wetlands in this first calibration in order to add new, more accurate data next year wherever better data may exist.
- *Staver*: Critical part of differentiating wetlands and forests in the model is attenuation, not loading rate.
- *Claggett*: We're in agreement that attenuation of wetlands comes from surrounding lands. WQ GIT is resistant to adding wetlands as a land use because loading rates are different from efficiencies. Including efficiencies adds transparency to the model.
- *Staver*: Need to include wetlands to have a "mechanistic narrative" in order for the model to be understandable.
- *Hanson*: Second criteria for new land use described as "contribution" in the memo rather than loading rate or efficiency in order to be more comprehensive.
- *Mason*: Incorporating this data gives additional opportunities within the model such as habitat uses.
- Updating the wetland mapping model
    - Decision: The existing NWI data layer will be used as the basis for the initial October 2015 calibration. Note: Newer data from the jurisdictions can be incorporated during the 2016 review period.
    - Starting 1/1/16 there is a full review period of the calibrated model. There would be opportunity to change or make improvements (NWI+) whenever available. This adds incentive to develop NWI+ and put resources towards new data
    - Action: Peter Claggett can be on the WQ GIT meeting to reassure group of this.
- Decision: NWI data for riverine, palustrine, and lacustrine wetlands will be used as the basis for the wetland land uses in the initial Phase 6 model calibration (upon Water Quality GIT approval). Riverine (vegetated) and lacustrine (vegetated) will be changed from open water to wetland when there is overlap with acres of the existing open water land use. Acres of all three (palustrine, riverine and lacustrine) will then be split into the Floodplain and Other classifications using a combination of FEMA and SSURGO maps, as Peter and Quentin have already been doing. Note: If adjustments need to be made to the rules to change how the acres are split between the two "buckets," they can be made following the October 2015 calibration.
- *Sweeney*: Creating a land use in the model is difficult and the modelers are prepared to enter zero for these land uses; the WEP must be able to answer various questions from different groups. Ex. Why do we have multiple wetland classes if the loading rate/efficiencies are the same?
- Action: WEP members should reach out to WQ representatives colleagues and inform them of these land use changes to gain support for the 9/14 WQ GIT vote.
- Action: Edits or comments on the recommendations memo should be provided (in track changes format) to Jeremy (jchanson@vt.edu) by **COB Thursday 9/3 (tomorrow)**.

Wrap-up and next steps

Action: Hanson will send doodle poll for next call in October.

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Thursday November 5th, 10:00 AM-12:00PM
Meeting #10

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	N
Rob Brooks	Riparia, Penn State	Y
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	Y
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	Y
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	N
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	N
Jeff Thompson	MDE	Y
Tom Uybarreta	EPA Region 3	N
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	N
Kristen Saacke-Blunk	Headwaters LLC, AgWG Co-Chair	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	Y
Lew Linker	EPA CBPO	N

Summary of ACTION Items & DECISIONs:

- **DECISION**: The September 2nd call minutes were accepted.
- **ACTION:** Members will send any additional literature to be reviewed by Tetra Tech to Hanson. Any that emerge after 11/6 will need to be reviewed and summarized by a panel member.
- **ACTION**: Rob/Erin will provide list of common wetland practices that the panel will then work to categorize under reestablishment, rehabilitation, or enhancement.
- **ACTION**: Ralph, Pam and Erin will discuss the tidal wetland conversion issue offline.

- **ACTION**: Erin will share the wetland workgroup's NEIEN wetland BMP data flowcharts with the panel. She will work with Virginia (Pam & Michelle) to get their flowchart similar to the other jurisdictions.
- **ACTION**: Conflict of interest forms for the panel should be in to Hanson by Tuesday, 11/10/15.

Minutes:

Welcome and Introduction

- Hanson asked for any final corrections or edits to the September 2nd minutes. None were raised; the minutes were approved.
    - **DECISION**: The September 2nd call minutes were accepted.

Updates and Timeline

- Our tasks at a glance…
    - Recommendations for the Phase 6 wetlands land uses were made as two classes: "floodplain" and "other."
    - Recommendation of loading rates for Phase 6 Land Uses is ongoing
    - Evaluation and recommendations of wetland BMPs is ongoing
- Timeline outlook
    - November 2015: finalize additional literature for inclusion by Tetra Tech.
        - **ACTION:** Members will send any additional literature to be reviewed by Tetra Tech to Hanson. Any that emerge after 11/6 will need to be reviewed and summarized by a panel member.
        - Literature to be separated between constructed/restored and natural wetlands.
    - December (week of the 7th): Panel call to refine BMP definitions Peter and Quentin to begin SPARROW analysis. Build report outline.
    - January 2016: Updated nutrient/sediment literature review from Tetra Tech & SPARROW analysis to be discussed. Continue report outline.
    - March: Work to complete first full draft of report. Face-to-face meeting.
        - Murin: Should try to deliver the draft report to the panel as soon as possible to ensure all can review and comment in time.
    - April: Begin comment/review/approval process. Present recommendations to Wetlands WG, Habitat GIT, Watershed Technical WG, WQ GIT.
        - Spagnolo: Ideally will have comments from these groups in time for them to come back to the Panel for review before final approval.
            - Hanson: Any substantive changes will come to the Panel, but minor changes in language etc. will be dealt with by the Chairs/Coordinator.
    - September: All model inputs must be final.
    - October 2, 2016: Final Phase 6 CMWM is calibrated.
    - Members should give Hanson, Spagnolo, and Mason notice if they are taking time off or have issues with any content.

BMP Definitions

- For Phase 6, we want to
    - Have more clarity in the BMP definitions used by CBP for annual progress reporting
        - Mason: Definitions that exist were created to be used for agricultural settings. Moving forward, we want to consider all BMPs.

        - McLaughlin: We're also building new categories of restoration to include practices where there is an ecological uplift, but no gain in acres.
    - Distinguish restoration, creation, and enhancement
    - Recommend distinct effectiveness values for each of the BMPs
- Will be helpful to create a list to identify specific implementation practices that could be classified under these BMPs for CBP reporting (as well as a list of practices that should not be classified).
    - Example: Legacy sediment removal is currently a CBP approved Stream Restoration BMP but should be changed to a Wetland BMP.
    - Spagnolo: Cannot have people start converting land just for the sake of BMP credits. Even if there is a rise in water quality with a change, it may not be justified when weighed down by the tradeoffs.
        - Will set qualifying conditions for these practices to ensure tradeoffs aren't net negative
    - **ACTION**: Rob/Erin will provide list of common wetland practices that the panel will then work to categorize under reestablishment, rehabilitation, or enhancement.
- Murin: There is an existing regulatory definition from the EPA and USACE based on their mitigation role from 2008. We could utilize this consistent definition for the various wetland types. The NRCS Conservation Practice Standards definition could be used as an example for the type of activity that qualifies for the wetland BMP.
    - Brooks: Should not have to be exclusive in which we use. NRCS definitions are more consistent with practitioners as opposed to the regulatory definition.
- Reestablishment, Rehabilitation, and Enhancement as categories under Restoration
    - McLaughlin: Enhancement involves tweaking/improving one function while Rehabilitation consists of multiple functions.
    - Mason: We should keep these categories separate for now, but if we cannot determine loading figures later on they can be consolidated into fewer categories.
        - Staver: List the practices and have them define the categories.
    - McLaughlin: There won't be a land-use change for rehabilitation, but there will be an acreage of improved function. Value change, not an area change.
    - Mitigation is not counted/credited by the Bay Program.
        - Constructed wetlands that are created for a purpose such as waste/pollution treatment. Similar to mitigation but often done voluntarily
            - Hanson: There are other BMPs and panels that deal with engineered stormwater wetlands. Will list and refer to the appropriate panel in the BMP list.
- Creation
    - Creation is straightforward once the qualifying conditions are set.
- Tidal Wetlands
    - Mason: What do we call vegetated wetland creation on near-shore shallow waters? NWI already classifies this area as wetlands, so how can this be called creation? Ex. Living shorelines that give an ecological lift and are given BMP credits but replace existing aquatic resources.
        - McLaughlin: Conversion/enhancement of one wetland habitat to another with improved function.
    - Could be included in other panels, such as living shorelines, and we should defer to that panels' recommendations.

    - **ACTION**: Ralph, Pam and Erin will discuss the tidal wetland conversion issue offline.
- Restoration to be split into four categories: Reestablishment, Rehabilitation, Enhancement, and Creation.
    - Spagnolo: Creation vs. other restoration can be separated by the presence of hydric soils.

Wrap-up and next steps

- The Wetland Workgroup will meet on 11/19, 1-3 pm. All panel members are welcome to join.
    - The Upper Susquehanna Coalition will be giving a presentation on a potential method to update NWI data for PA.
- Wetland WG has put together a flow chart for each state of who is reporting to the NEIEN contact. Mainly NRCS practices but expanding, so these contacts are helpful.
    - **ACTION**: Erin will share the wetland workgroup's NEIEN wetland BMP data flowcharts with the panel. She will work with Virginia (Pam & Michelle) to get their flowchart similar to the other jurisdictions.
- Specific questions/topics for subgroups
    - What practices should be on the lists of approved and non-approved wetland BMPs? (also to be reviewed by Wetland Workgroup)
    - Review of issues where other panels also exist (ex. Tidal wetland creation → living shorelines)
    - Identify format of BMP loading coefficients (ex. fixed percentage or sliding scale) and order of effectiveness of restoration activities.
- **ACTION**: Conflict of interest forms for the panel should be in to Hanson by Tuesday, 11/10/15.

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Friday December 11, 2015th, 9:00 AM-12:00PM
Meeting #11

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	N
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	N
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	N
Jeff Thompson	MDE	Y
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	Y
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	N
Kristen Saacke-Blunk	Headwaters LLC, AgWG Co-Chair	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	Y

Summary of ACTION Items & DECISIONs:
DECISION: The November 5th call minutes were accepted.
ACTION: If you find any additional literature, please provide a summary of the key elements (e.g., site description, methods and relevant findings) that the panel can readily add into the lit review or the panel's full report.
ACTION: Panelists should review the BMP table at the end of the "Proposed BMP categorization" document and send additional comments to Hanson. (comments made during this meeting are listed below)
ACTION: Hanson will follow-up with Bill Stack and CBPO modelers to answer some questions raised by the panel in relation to the CBP-approved stream restoration BMP protocols. Specifically, is it possible

for the acres reported under the stream restoration BMP (Protocol 3 for floodplain reconnection) to be used for tracking purposes under the Watershed Agreement's outcome for wetland restoration? **ACTION**: Hanson will update the table based on the discussion during the call or offline and share it with the panel.

Minutes:

Welcome and Introduction

- Hanson asked for any final corrections or edits to the November 5nd minutes. None were raised; the minutes were approved.
    - **DECISION**: The November 5th call minutes were accepted.

Updates and Timeline

- About 50 pieces of literature were sent to Aileen Malloy at Tetra Tech for review. So far 15 have been reviewed, with 7 having relevant data (1 from Chesapeake watershed). Most had a removal efficiency or a way to determine it. Findings from the literature review should be delivered to the Wetland Expert Panel in mid-January. **ACTION**: If you find any additional literature for Tetra Tech from now on, please provide a summary as Aileen's hours are limited.

SPARROW Analysis

- Mason: Questions arose last summer when the group became aware of the SPARROW model process which was used to set the forest values for the Chesapeake Bay Watershed model. This validated model could also be used to determine a loading rate for wetlands within the model.
- Stubbs: Timeline update (best case timeline for modelers, not WEP):
    - Mid-December: In contact with USGS liaison to determine a timeline for the SPARROW model to run. We are creating a spreadsheet vector dataset of the area of the wetlands by NHD catchment to evaluate the wetlands in SPARROW. We will forward the spreadsheet next week to run the SPARROW model.
    - Late December/early January: Results of the SPARROW model in so we have time to run through the results and ensure there are no glaring errors.
    - Mid-January: Go back to the algorithm from Tom Jordan to calculate the wetland efficiency rate.
    - Late-January: The results will be forwarded to the WEP for review.
    - Early February: Sent to Wetland Workgroup for review.
        - Hanson: Reminder of calibration timelines: January 1st, 2016, first calibration/beta version. April, second beta version. June/July, third beta version. All inputs final in September. When can we deliver the efficiencies? In time for a beta?
- Pros and cons of this group having more time vs modelers having more time…
    - Hanson: The later the modelers receive a WQGIT-approved recommendation, the less likely it is to be included. A simple loading rate is easy/quick, while a more complex approach (curve, etc.) would be more difficult and require more time to build into the modeling tools.
        - Murin: WEP is supposed to deliver best science decision. Need to be aware of timelines with modeling, but that can't be the driver of our decision. Can't rush and deliver a poor product.

- Mason: The current timeline seems to allow for the recommendations to possibly be incorporated into that third beta version. The timeline would give both the panel and modelers time to prepare and adjust.
    - Greiner: Would involve delivering to the Wetland WG and Habitat GIT in May/June
- Hanson: The recommendation requires a comprehensive memo, so it would not be efficient to split the loading rate into N/P/… in order to deliver some product sooner.
    - Hanson: call mid-late January to examine Tetra Tech review and SPARROW analysis review. Early March – face to face meeting, Baltimore, Annapolis. Comments in first 30 days after…
        - Stubbs: Potential for new wetland area numbers as we find methods to update maps. New numbers could require another SPARROW analysis. Hopefully that can be automated, so not time consuming.
            - Hanson: Ideally would have SPARROW and literature give us a uniform loading rate for each of the two wetland land uses. Then it might not be necessary to redo the SPARROW runs.
            - Murin: We hope to have PA wetland mapping (USC & UVM proposal) set to work by January 1 and completed by the end of July.

BMP

Provided to the group was a BMP categorization as well as an old "WetlandTrackingDefs" slide that provided a base for our categorization of wetland BMP practices. Jeremy explained that he used that old 2005 table as a template for a way to categorize the panel's recommendations for Phase 6 wetland BMPs. The panel discussed how various practices may be included or excluded under the Phase 6 wetland BMPs.

- Wetland vs. stream restoration, credits for BMPs
    - Legacy sediment removal, often done as floodplain reconnection outside of the stream channel, could be counted towards wetland BMP and acre gain rather than stream in many cases.
        - McLaughlin: Huge potential for wetland acreage towards the Watershed Agreement; do not mean to take away from streams but need to credit wetlands as they are reconnected.
            - Spagnolo: Clear way to do it (not how it is being done right now) is that in channel areas go towards stream restoration and floodplain areas go to wetland credits.
        - Spagnolo: This sediment itself can become a source of pollution if not transported/used properly. We need to be careful when categorizing this as legacy sediment is done in different ways by different people/states.
            - Questions for Jeff Sweeney and Bill Stack: Are states reporting floodplain reconnection as wetland or stream credits? Varies state to state. Should coordinate with Stream Health Workgroup (CWP contractual support ends 12/31/15, so any questions for them should be asked quickly).

        - Mason: What do we do with non-georeferenced projects along waterways with regards to area of wetland creation and nutrient reduction?
        - Do the nutrient reduction efficiencies for these stream restoration projects include floodplain sediment trapping?
    - Modelers can avoid double count IF they receive the geo-reference from the state every time (not always the case).
        - Staver: Are stream restoration benefits counted with wetlands benefits? Don't need to capture the nutrient reduction, but want to use the acres for wetlands towards the goal
- "Other Wetland Restoration project types" credited under stream but have potential for wetland
    - Regenerative stormwater conveyance
        - McLaughlin noted that when done outside of a stream channel, RSC is called Coastal Plain Outfall. (same technique)
    - Hanson: some not ambiguous, creditable elsewhere (living shoreline, constructed wetlands, and riparian tree plantings)
        - Living shorelines - gap in crediting
        - Invasive species - not credited elsewhere,
        - Wetland meadow planting – restoration.
            - Strano: planting herbaceous vegetation on cropland with hydric soils. Restoration in that they are installing vegetation where it used to be, but whether or not they work with hydrology is another question. Land is not under protection – can be converted back to cropland.
                - Mason: This results in a wetland acreage gain.
                    - Strano: This practice is done under NRCS code 327 (conservation cover). Associated with wetland restoration. Should assign 657 over the whole area and 327 over just the meadow planting. Should avoid double counting: can't count 327 as enhancement and entire 657 area as restoration.
- **ACTION:** Panelists should review the BMP table at the end of the "Proposed BMP categorization" document and send comments to Hanson.
    - Greiner: Background on initial table: this table is about a decade old, based on how practitioners were reporting in 2005. Definitions taken from White House wetland working group in the 90s. Seeking to make this table more reflective of current work and terminology.
    - McLaughlin: Create new category for rehabilitation (functional gain) rather than having it within enhancement. Invasive species removal should be moved to enhancement. Floodplain reconnection would fall under rehabilitation. Legacy sediment removal would fall under restoration.
    - Mason: Similar thoughts… comes down to explaining our decisions to who it effects
    - Spagnolo: Note that "Practice and Project Examples" is not comprehensive
        - Should clarify "regulate flow…" under enhancement
            - Greiner: Group was trying to distinguish between habitat and water quality within enhancement.
            - Murin: NRCS, PA berms, with control structure to expand wetland area into wetlands

        - Strano: Restoration/creation if it is upland
    - Need to be clear that rehabilitate is repairing to natural/historic functions, while enhancement is functional gain of some kind.
- Staver: Agree
- Strano: Include "reestablishing native vegetation on cropland with wetland hydrology" in restoration.
    - Many pastures require the hydrology be restored to be considered wetlands again.
        - Will need to clarify if pasture will be included in land uses.
- Thompson: Enhancement, waterfowl – this does not consider moist soil management
    - Ditch plugging would be rehabilitation if done in the woods, restoration if done in agricultural lands
- Will need qualifying conditions and disclaimers to ensure the BMP credits aren't being taken advantage of with regards to actual benefit to wetlands.
    - McLaughlin: Counties putting in BMP practices in order to gain credits… implementing practices that gain more credit rather than the practice that is best for the site. Mostly in developed areas, suburban, not ag

Follow up

The WEP will have another call in mid to late January to examine the literature review from Tetra Tech. We plan to have a face to face meeting in late February or early March in the Baltimore/Annapolis area. Depending on progress and workload, we may have another short call in early February (Delaware wetland conference in early February is a scheduling conflict). Be on the lookout for Doodle polls soon for these 2-3 dates.

We hope to have our report released in April to go through groups at the CBP and have loading rates approved for the summer beta version of the Phase 6 Watershed model.

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Wednesday January 27th, 2016, 9:00 AM-12:00PM
Meeting #12

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	Y
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	Y
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	Y
Kristen Saacke-Blunk	Headwaters LLC, AgWG Co-Chair	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N

Summary of ACTION Items & DECISIONs:

DECISION: The December 11th call minutes were accepted.

ACTION: If you find any additional literature for Tetra Tech from now on, please provide a summary as Aileen's hours are limited. We are now focused on the literature review for unintended consequences and ancillary benefits of wetland BMPs.

ACTION: Hanson and Runion will send a table listing chapter assignments. Please email Hanson if you'd like to help with any other section.

ACTION: Draft sections due March 9th. March 16th as back-up deadline. Must be done before March 23rd meeting for members to review.

ACTION: The Chapter 5 outline will be updated to reflect the categorization proposed today and shared with the group by Hanson

Minutes:

Welcome and Introduction

- Hanson asked for any final corrections or edits to the December 11th minutes. None were raised; the minutes were approved.
    - **DECISION**: The December 11th call minutes were accepted.

Updates

- The revised BMP categorization table was distributed; we will continue to revisit and revise the document as needed.
- Hanson spoke to Bill Stack and modelers at CBP about stream restoration BMPs. No news to report, but will be an evolving conversation.
- We hope to see SPARROW results in mid-February; hopefully in time to discuss during out 2/18 call.

Literature Review, Aileen Malloy

- About 50 pieces of literature were sent to Aileen Malloy at Tetra Tech for review. Of articles addressing wetlands in the Chesapeake Bay watershed, 13 were identified as having potentially useful data.
    - 18 studies had TN load reduction efficiencies
    - 20 studies had TP load reduction efficiencies
    - 9 studies had TSS reduction efficiencies
    - Studies varied geographically
        - 8-10 data points within the Bay watershed
    - Wetland types were very different
    - Results are broken down by nutrient and sediment reduction efficiencies by wetland and vegetation type in table 2 of the literature review (distributed)
        - Mean % reduction given in this table was calculated using only data points given in studies, not data ranges. The ranges are also described above the table.
- The spreadsheet distributed along with the literature review document gives all studies provided and provides a reason for rejection for those studies that were not used (columns J and K).
- Boomer: Would like to thank Aileen. The literature review is a great head start into the report. The processes affecting the fate and transport of nutrients could be addressed better in the final report.
- The literature review of unintended consequences and ancillary benefits of wetland BMPs has not yet been started. Some current literature could be used, but additional relevant literature would be appreciated.
    - Hanson: The focus is on restoration/BMPs of wetland habitats, not just wetlands in general. Will be more of a qualitative rather than quantitative review. Any benefits/consequences besides nutrients/sediment (habitat, toxic contaminant, etc.)
        - Staver: Benefits could even include downstream effects on hydrology related to stream channel erosion. There is a large scale thinking of benefits.
            - Strano: These studies look at a single type of wetland. In large storm events, headwater wetlands become overrun and floodplain wetlands become even more important.

- Boomer: Wetland importance can also be shown with water storage and hydrograph effects.

- **ACTION**: If you find any additional literature for Tetra Tech from now on, please provide a summary as Aileen's hours are limited.

SPARROW Analysis, Quentin Stubbs

- We are in the process of reformatting two datasets for SPARROW. We have to create an updated wetland layer to include MD wetlands, and a layer that accounts for land cover that is between agriculture and stream bank. Want to see if they can actually detect if there is forest or wetlands between the agriculture and stream. Trying to identify how many nutrients these wetlands are absorbing. After we have those two layers, we will resubmit to the modelers to run. A long line of other groups wanting to run SPARROW things.
    - Hanson: Output from analysis?
        - The basic efficiency rate from the analysis will be entered into the Jordon equation, which is what is of interest to us.
    - Hanson: Hope to have this before 2/18 call.

Report Outline

- We have to release our report in April in order to have it approved by September. Priorities are land use loading rates and wetland restoration BMPs in the calibration history.
- Will need input and effort from everyone in writing the report. Look at the outline
- Chapter 1: Charge and membership of the expert panel
- Chapter 2: Definitions of terms used in the report
- Chapter 3: Background on wetlands and wetland BMPs in the Chesapeake Bay Watershed
    - Chapters 1-3 are background and can be done by staff here at CBP
- Chapter 4: Review of available science
    - Literature review is a good start here, but some sections can be expanded on (processes affecting the fate and transport of nutrients)
    - Boomer, Denver
- Chapter 5: Recommendations for Wetlands as land-use and BMPs in Phase 6 Watershed Model
    - A, Wetlands as a landuse
        - Staver, Strano
    - B, Wetlands as landscape efficiencies and BMPs
        - Break out by restoration/creation/enhancement/rehabilitation or tidal, non-tidal floodplain/non-tidal other?
            - Looking through BMP categorization and determining what projects can take place in floodplain/other can help clarify this.
        - Floodplains: Strano, Boomer, Greg Noe, Denver
        - Non tidal/headwater depressional: Staver, Denver
        - Tidal: ?
    - Hanson: Note the distinct difference in wetland loading rate and wetland as a landscape efficiency.
        - Staver: 5b and the recommended loading rates may be the most important section; everything is built to defend the numbers in 5b.
            - Sweeny: 5a is just as important, as when wetlands are reported, the land is moved from whatever it is classified as into wetlands, creating a

benefit as it will no longer be moving to forests. TMDL will receive credit just for that move.
        - Staver: Loads from wetlands as a landuse are going to be uniformly smaller than loads coming from upland, aka the landscape efficiency
    - Staver: Experimental issues such as waterfowl, cover crops, etc. External sources of nutrients that may overall remove/replace nutrients beneficially but can credit/blame these nutrients on wetlands.
- Chapter 6: Accounting mechanisms
    - McLaughlin and Clearwater
- Chapter 7: Unintended consequences and ancillary benefits of wetland BMPs
    - Forthcoming literature review from Tetra Tech, Malloy will provide a base here
    - Spagnolo, Uybarreta, Mason
- Chapter 8: Future research and management needs
    - Likely to populate as a group
    - Mason, Spagnolo, Uybarreta
    -
- Chapter 9: References
- **ACTION**: Hanson and Runion will send a table listing chapter assignments. Please email Hanson if you'd like to help with any other section.
- These reports can be updated as needed but only by a new panel, so it may take 3-5 years.
- **ACTION**: Draft sections due March 9th. March 16th as back-up deadline. Must be done before March 23rd meeting for members to review.

Next Steps

- Habitat/other consequences (other than nutrient/sediment effects) literature should be sent to Aileen. Focus should be on BMPs.
- Next call: February 18th. We don't expect to have first draft of report yet, but hope for it to be started. Chapter 4 is a priority and having a draft of that for 2/18 or shortly after would be ideal.
- **ACTION**: The Chapter 5 outline will be updated to reflect the categorization proposed today and shared with the group by Hanson
- March face to face meeting: Wednesday March, 23rd 10am-4pm. Location is TBD.

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Thursday February 18th, 2016, 10:00 AM-12:00PM
Meeting #13

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	Y
Michelle Henicheck	VA DEQ	Y
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	Y
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	N
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	N
Jeff Thompson	MDE	Y
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	Y
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	Y
Kristen Saacke-Blunk	Headwaters LLC, AgWG Co-Chair	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N
Bill Stack	CWP	Y

Summary of ACTION Items & DECISIONs:

- March meeting: Wednesday, March 23rd. 10am – 4pm.
  - NRCS office, 339 Buschs Frontage Rd #205, Annapolis, MD 21409
  - There is a WaWa nearby for lunch. We will also look into delivery options.
- **ACTION**: Draft report deadline: March 9th. March 16th as backup deadline.

Minutes:

Welcome and Introduction

- Hanson asked for any final corrections or edits to the January 27th minutes. Some panelists have not reviewed minutes; approval pending further review.

Literature Review, Aileen Malloy

- Tetra Tech has moved on to their second literature review based on unintended consequences.
- Malloy: We have gotten through all the articles that were sent in (over 100). Roughly half were found to be relevant (others continued to focus on nutrient and sediment reductions, which were addressed in the initial literature review).
    - Many articles addressed benefit to habitat. Other positive impacts included flow reduction, water storage, storm abatement, aquifer recharge, and water quality improvements.
    - Negative impacts found included nuisance vegetation, toxics concentration, unintended flooding, and methane emissions.
    - Other topics mentioned by panelists: carbon storage and sequestration, denitrification and how it changes with varying water tables and soils.
- Hanson: Some studies came out in this search that involved nutrients. These should be double checked to ensure they were included or are added in the previous literature review.

SPARROW Analysis, Jeremy Hanson

- SPARROW analysis is not going to be completed within our necessary timeframe. This analysis still could be useful to various GITs and workgroups, but it will not be complete until after our report is out for review/completed.
    - Mason: Large portion of time required for SPARROW is USGS's round of QA/QC, which was not accounted for in our timeline.
    - Clearwater: Our report should note that the recommended efficiency could change based on the results of this model.
        - Greiner: Could place an addendum based on newly available information in these reports.
    - Hanson: There will be CBP modelers trained in SPARROW in early March, who would be able to conduct this analysis with an expected completion date of this summer.
    - Hartranft: Does the literature support moving forward with these efficiency recommendations? The original charge stated that if it did not, we would make recommendations on what new science is required.
        - Hanson: No recommendation yet but there does seem to be sufficient information to determine rates. We just need to review and agree on numbers.
            - Hartranft: Could also consider scaling up and lumping categories together to determine a loading rate rather than splitting down to each specific practice.
                - Mason: Splitting further is unlikely. We would need to have many studies for each categorization. Terms are not explicitly defined (as we have done) in literature.
                - Greiner: CBP adopted the federal tracking definitions in 2005. Recommending anything other than those to change those would require significant effort for approval.
    - Denver: SPARROW is particularly important as it can take geographical conditions into consideration.
    - **Post-meeting note:** On Feb. 24th, Hanson was informed that USGS is no longer able to provide SPARROW training for CBP modelers until June or July at the earliest, if at all. This new information makes it extremely unlikely that the desired SPARROW work and

subsequent analysis could be done in time to inform the final Phase 6 model calibration. Hanson will keep the panel informed if any new ideas surface or anything changes.

CBP BMPs, Bill Stack

- Hanson: There are two panels (stream restoration and shoreline management) that have released reports that relate to our floodplain and tidal wetlands sections. There is some content here we could possibly use and build on. Those panels' recommendations have already been reviewed and approved by the partnership, so we should utilize information that we can and make sure the protocols are consistent or do not lead to double-counting.
- Two panels have dealt with this nutrient and sediment removal efficiency related to wetland processes.
- Sujay Kaushal, UMD, and Paul Mayer, EPA, did research on nitrogen reduction with reconnection of a stream to its floodplain. They developed recommendations for quantifying denitrification in the hyporheic zone (applies to baseflow, stormflow has other protocol).
    - Hartranft: In Kaushal's study, are the floodplain access areas actually wetlands? Actual wetlands rather than floodplain areas could have even higher nutrient removal.
        - Stack: They installed monitoring wells in the stream up to the floodplain wetlands. Connectivity of the water table was the key in these areas meeting our qualifying conditions of this study. Qualifying conditions to determine wetland status were not developed by the expert panel.
            - Clearwater: "Reconnection" is misleading in this process as it assumes the floodplain is being used with any stormwater while the cutoff in natural channel design for disconnection is flooding at over the 2 year storm event. To treat it like it is disconnected can be misleading.
                - Stack: This protocol pertains to baseflow, the stormflow protocol addresses that issue.
- Credit for floodplain reconnection volumes during storm flow
    - Floodplain connection volume of stormflow increases when floodplain is more easily accessible.
    - We then took efficiencies from the Tom Jordan curves and multiplied by the volume of annual runoff.
    - A certain ratio of wetland area to watershed area proved to be optimal for nutrient removal.
    - Floodplain reconnection has to reconnect to a wetland as defined… same assumptions as Tom Jordan.
        - Spagnolo: Were these wetlands categorized? Was hydrology measured?
            - Strano: The wetlands used in this study were restored wetlands, not floodplain wetlands used in the study.
                - Hartranft: The criteria for categorization of restoration sites in the Jordan study was different than what we are working under. The ratio of wetland size to watershed size was not statistically significant, but rather a general trend that he established. This relationship may work well at large scales (watershed) in theory but it may not at floodplain wetland scales and even up to several order tributary scales.
                    - Stack: Two parts of this protocol. First part estimates the volume of annual flow that enters the wetland area. This affects the efficiency more that the Jordan curve. Second, the expert panel used that ratio of watershed area to wetland area to try to address the uncertainty associated with the method;

this tries to be conservative. The 1% ratio chosen helped account for sufficient hydrologic retention time.

- Wetland vs floodplain size drives denitrification, though there are other factors such as landuse and inputs.
    - Hanson: The phase 5 rates are largely based on Jordan equations. Nitrogen: 16.75%, Phosphorus: 32.18%, Sediment: 9.82%.
        - Hartranft: Is the panel considering a removal rate attributed to floodplain wetlands in addition to or in lieu of an acre efficiency?
            - Hanson: Load reduction – pound figure, efficiency – calculated based on upland loads or the loads of that landuse.
            - Clearwater: The floodplain reconnection protocol is considered part of the stream restoration BMP whether or not there are existing wetlands there or ones are created or restored.
                - Stack: This credit applies to the volume of upland runoff treated by the wetland.
                - Hartranft: Recommendations for stream restoration apply to all types of floodplain reconnection, whether it be wetland restoration or stream work. For example, legacy sediment removal was named in the urban stream restoration expert report, but lumped with other types of BMPs (no specific removal rate).
                - Spagnolo: Stream restoration getting credit for wetlands created after restoration.
                    - Clearwater: What's measured is the difference between pre- and post-construction volume.
            - Stack: There are three different protocols for stream restoration projects based on different processes. Though they don't directly define an efficiency based on legacy sediment, we allowed flexibility on the efficiency based on monitoring data.
            - Do not want to double count, but do want to accurately track and report between streams and wetlands.
                - Spagnolo: Credit is on an area basis. Will have to discuss minimum project size at March meeting.
                - Mason: The modeling workgroup (or whoever may be appropriate) will have to deal with double counting. We can say in our report that there might be complications in tracking the data.

- Tidal shoreline management protocol
    - Protocols 2, 3 and 4 apply to living shorelines/fringe wetlands. A literature review led to median values applied to area of wetland. Credits applied as annual reductions. Verification recommendations ensure that wetlands are still functioning. Credits are adjusted accordingly.
        - Denitrification rate (TN)
        - Accretion that occurs due to fluctuation tides (TP, TSS)

        - Marsh Redfield Ratio: biomass stored in wetland. One-time annualized credit over 20 year period based on standing crop (TN, TP)
    - Mason: Protocol 1: sediment prevention/retention remains largely unknown, so TSS rates are project specific.
    - Hanson: Could these same protocols apply to tidal wetlands? We could save ourselves a lot of work, but do not want to do so just for convenience sake, the panel would need to agree that the shoreline management protocols are valid estimates of reductions for tidal wetland BMPs.
        - Mason: The panel would need to consider if there have there been any significant studies on this science since these recommendations were made. VIMS researchers are looking at N & P uptake of living shorelines, but otherwise doesn't seem to be much more new information to modify the protocols.
    - Clearwater: Unfortunately, habitat is not yet being counted. Until a habitat multiplier is developed, it may as well be counted as a shoreline BMP.
        - Hanson: Even if living shorelines and tidal wetlands are credited the same, having them reported separately can be useful towards our tracking efforts.
        - Mason: Differentiating between tidal wetlands and living shorelines categories in the crediting can help show other ecosystem services such as habitat.
            - Greiner: In terms of the direction of this partnership, there is a value added by differentiating and keeping habitat in mind. Should include enough in report to begin to develop this distinction.

Next Steps

- Tidal discussion to continue at our March meeting.
- March meeting: Wednesday, March 23rd. 10am – 4pm.
    - NRCS office, 339 Buschs Frontage Rd #205, Annapolis, MD 21409
    - There is a WaWa nearby for lunch. We will also look into delivery options.
- Draft report deadline: March 9th. March 16th as backup deadline.

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Wednesday March 23rd, 2016, 10:00 AM-4:00PM
Meeting #14

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	Y
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	N
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	N
Jeff Thompson	MDE	Y
Tom Uybarreta	EPA Region 3	N
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	N
Kristen Saacke-Blunk	Headwaters LLC, AgWG Co-Chair	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N
Bill Stack	CWP	Y

Summary of ACTION Items & DECISIONs:

DECISION: The minutes from our February 18th call are approved.

ACTION: Boomer and Denver request help in describing the distribution of physiographic provinces. They will contact Brooks.

DECISION: Panel agreed to cite and use reductions for TN, TP and TSS from the Shoreline Management Panel (sum of protocols 2, 3 and 4) as reductions for tidal wetland restoration BMP.

ACTION: All updated draft report chapters are due to Hanson and Runion by 4/15/16.

DECISION: The panel agreed that reduction efficiencies for TN should be the same between the Floodplain and Other land uses.

DECISION: The panel agreed that reduction efficiencies for existing wetlands will be the same between Floodplain and Other.
ACTION: Molloy will attempt to tease out physiographic regions and wetland:watershed ratios from the literature review to see if we are able to tease out regarding those attributes.
DECISION: There was consideration for using reduction efficiencies from the Riparian Forest Buffer report (2014), but the panel agrees that our own literature review is likely more accurate and will continue to discuss this. Hanson will distribute the RFB Report.
ACTION: Staver will chase down the CBWM 5.3.2 reduction efficiencies for current land uses.
ACTION: Stubbs will separate out wetlands using the beta watershed model calibration for Maryland and one other state (DE or PA) by 4/1/16.
Next Steps: We will schedule a two hour call during the week of 4/11/16 and another face to face meeting will be scheduled during the following weeks. Please complete the NeedToMeet polls by Thursday 3/31: April two hour conference call; April face to face meeting

Minutes:

Welcome and Introduction

- Hanson asked for any final corrections or edits to the February 18th minutes. None were raised. **DECISION**: The minutes from our February 18th call are approved.
- The focus of today is to make decisions about how to structure BMPs of the land uses; whether or not we want to have different rates for floodplain/other, physiographic regions, and restoration/creation/rehabilitation. The next step is to decide values or at least ranges of reduction efficiencies for these BMPs.
- Our overall deadline is the Phase 6 calibration in September. We hope to have the report released by the end of April/early May in order to be able to get through the review process in a timely fashion.

Review of Draft Chapters

Please send any comments to the chapter authors and Hanson

Chapter 1. Charge and membership of the expert panel, Hanson

- Mason: Some of the description should be more definitive in how some of these things evolved. "In addition to review…." Be clear that the group is in support of rather than determine if there is sufficient evidence for including wetlands in the Chesapeake Bay Watershed Model (CBWM)

Chapter 2. Definitions, Hanson

- Will be added for next version

Chapter 3. Background on wetlands and wetland BMPs in the Chesapeake Bay Watershed, Hanson

- Mason: It is important for our partners to check the nontidal/tidal wetlands percentages as they may be dated. If anyone has a specific reference, please share with Hanson & Runion.
    - Boomer: Would also be worthwhile to ensure our geospatial datasets are matching up with these numbers. We'd also ultimately want our NWI tables to be separated by county and physiographic region.
        - Hanson: This will be worked out with the modelers. Our maps and numbers will likely change once we receive the updated Pennsylvania mapping from the Chesapeake Conservancy/University of Vermont/Upper Susquehanna Coalition

project. Stubbs will also have literature on how the GIS layer was created to include in an appendix.
        - Denver: Suggest we split the Eastern and Western shore with in the Coastal Plain for our physiographic provinces. Wetland functions are very different between the two.
- Denver: It would be nice to have some graphics to show tidal/nontidal and floodplain/other on maps or pie charts to give an understanding of where and how we are targeting these wetland BMPs.
- Mason: Flow diagram from the wetland verification guidance may need updating. We also need to clearly state that this data does not include wetlands created primarily to capture stormwater runoff.
    - McLaughlin: The Wetland Workgroup is looking into tackling this issue of urban wetland restoration projects.

Chapter 4. Review of available science, Boomer and Denver

- Boomer: Chapter 4 has three basic sections
    - Conceptual model overview based on combination of hydrogeomorphic, hydrogologic, and stream classification framework
        - There is still some literature to review. The framework is well built, but we need to pull additional references and discuss what we know in hydrogeomorhpic and watershed position.
        - Mason: Considering the baseflow contributions from groundwater and the capacity of wetlands, is the relative contribution of wetlands something to think about?
            - Boomer: Thinking of wetlands as a source of nutrients, and that the amount retained will really depend on the amount in the contributing area.
                - Staver: Will the model show that delivered loads much lower than source loads where there are wetlands?
                    - Denver: The SPARROW model does this now. Higher water content is associated with wetlands, and we'd likely see a correlation between source and load with wetlands.
    - Boomer reviewed the N and P Dynamics they'll cover in the chapter: available in the slides distributed along with these minutes.
    - Predicting importance of biogeochemical processes based on location in relation to landscape model
        - We'll need to marry what we know about these processes with the distribution of wetlands across the landscape in different physiographic provinces.
            - Denver: A map or pie chart with the distribution of wetlands within physiographic provinces would be helpful here as well. Recognize that Eastern and Western shores are separated within the outer coastal plain.
    - Boomer reviewed their remaining to-do list for Chapter 4:
        - Incorporate key landscape model papers

        - Description of general hydrogeology by physiographic province, including overview of HGM type distributions
        - Outline dominant N and P transport processes based on landscape framework
        - Discuss human impacts on wetland nutrient & sediment processes
        - **Action**: Boomer and Denver request help in describing the distribution of physiographic provinces. They will contact Brooks.
        - Mason: The text of the chapter could be integrating instead of bullets to make it flow like a report.

Chapter 6. Accountability mechanisms, McLaughlin

- Initial verification that the proposed practice was installed correctly, and is hydrologically, vegetatively, and physically stable should be done by the installing agency. That agency should deal with record keeping and report to state NEIEN. Note that the database must be modified as we start to collect enhancement and rehabilitation.
    - Clearwater had put what is currently stated in the BMP verification guidance: as long as you can verify you have the three parameters and are keeping an eye on invasives you should be good; remote observations can serve as a proxy.
    - Spagnolo: Accountability is visual/on site. Is there a procedure CBP uses a site will be registered as a wetland after 5 years monitoring? As land use changes, how do we update it? Having a form that practitioners can register to put the landuse change on a map would be helpful (if we could register is as a polygon & tabular data)
        - Hanson: The model updates land uses year to year but changes are typically to agriculture and urban areas as that's where the data is. Presumably the wetland land uses would be held constant and only change based on BMP implementation or when changes to other land uses force changes to the wetland acres. Other groups in the partnership beside this panel will work out those specific details as needed.
            - Stubbs: Also depends on the resolution of the imagery. If the size of the project is less than minimum mapping unit then it doesn't get counted through the imagery.
            - Mason: Is there no GIS post processing that goes along with data submissions to convert landuse data layer from agricultural to wetland when wetlands are created?
                - Stubbs: No, but in Phase 6 there could be the landuse change BMP
                    - McLaughlin: This may be helpful in capturing restoration area. We have current landuse vs restored landuse but we do not have landscape position.

Chapter 7. Unintended consequences and qualifying conditions of wetland BMPs, Spagnolo

- We do not want to have projects where ecosystems of high quality are altered or degraded, functionally, just to receive wetland BMPs. "Wetter isn't necessarily better."
    - Could be worth defining "high quality wetlands," or it could be left up to the jurisdiction.
        - Hartranft: Suggests using "natural" rather than "high quality" as in PA there are instances where it would be beneficial to restore a degraded "high quality" ecosystem (think degraded forested wetland). "Highly functional"?

- Mason: Would be worth cross-walking BMP description in this chapter with our BMP categorization table (which largely follow the existing NRCS definitions). Would also be worth including that BMP table and examples in Chapter 2 rather than laying out the BMPs here.
- Ralph thought it may help to define "pre-application meeting." Input from other states as to if this is necessary would be appreciated.

Chapter 8. Future research and management needs, Mason

- Though literature is scarce on wetlands as a source, there is plenty of literature on removal efficiencies largely focused on wetlands explicitly served for nutrients.
- Helpful future research would investigate wetlands as both sources and sinks, efficiencies of inputs from other landuses, and determine load reductions for various practices and attributes (landscape position, hydrology, vegetation, etc.).
    - SPARROW would have been helpful to get numbers (we still may, in order to compare, but not in time to add to the report).

ACTION: All updated draft report chapters are due to Hanson by 4/15/16.

Discussion of how to frame, determine, and finalize wetlands reductions for TN, TP, and TSS

Tidal

- As discussed in a past call with Bill Stack, the Shoreline panel has already developed reductions using literature on the nutrient and sediment processes of tidal marsh areas. Note: we are only concerned with Protocols 2, 3, and 4. Protocol 1 is not applicable for our purposes.
- **Decision**: Panel agreed to cite and use reductions for TN, TP and TSS from the Shoreline Management Panel (sum of protocols 2, 3 and 4) as reductions for tidal wetland restoration BMP.

Nontidal

- Floodplain and Other
    - Stubbs: These categories were originally floodplain vs headwater/depression, but are now lumped into Floodplain and Other following the partnership's decision in the Fall. Floodplain is mapped with FEMA plus SSURGO and overlaid by water layer. A wetland can make the first cut with NWI but is disregarded if it is overlaid by open water.
        - Denver: If only third order or high count in Floodplain, does Other include floodplains that are 1st or 2nd order?
            - Stubbs: FEMA and SSURGO are primary sources. Third order mainly used to check what could be open water; trying to preserve third order floodplains.
            - Denver noted the distinction between floodplain and other may be more important for TP and TSS than it is for TN.
                - Spagnolo agreed, as denitrification is generally lower in floodplains associated with flashy hydrology.
                    - Mason: The reduction efficiency should be the same for TN between Floodplain and Other. Objections? None raised.
                    - **Decision**: The panel agreed that reduction efficiencies for TN should be the same between the Floodplain and Other land uses.

- Creation vs Restoration
    - How to credit existing wetlands
        - Hanson: With Phase 6 being a new model, the effect of existing could change in the model.
            - Staver: Realistically, loads to the Bay will not change with our efficiencies. Existing should be the same between Floodplain and Other as there will be no change in function and therefore no change in effect/benefit to the Bay.
        - **Decision**: The panel agreed that reduction efficiencies for existing wetlands will be the same between Floodplain and Other.
    - Discussion of using percent reduction or removal rate by area
        - Mason: We can't give a percentage reduction without knowing the drainage area. If we give a lbs/acre measurement, the model would then calculate that percent.
        - Hanson explained that it doesn't exactly work that way in the modeling tools. A percent reduction (i.e. efficiency) is much easier to use in the model for a number of reasons and will not require translation from the results of our literature review. Absolute reductions (in pounds) can get much more complicated from a modeling perspective. The panel is strongly encouraged to consider what the relative impact of a wetland or wetland BMP is compared to a no-wetland or no-BMP baseline. We should be able to do that with the literature available.
        - Staver: Have to consider the wetland:watershed ratio in securing accuracy of this method.
        - Staver suggested the panel could consider using the same efficiencies from the Riparian Forest Buffer report from 2014.
        - Denver: Agree. Converting the RFB numbers into a range would be more comfortable. These numbers also include physiographic regions (though not exactly the ones we laid out), which is helpful.
        - Hartranft felt the RFB panel's numbers should be our minimum as wetlands assuredly have higher removal efficiencies than RFBs.
        - Mason noted there is some suspicion that the RFB numbers are too high in their own right. We shouldn't copy any potential mistakes. The mean removal rates from our literature review is the best option we have and they are notably lower than any of the RFB values. In the report we can acknowledge that further investigation is needed and give opportunities to modify.
        - Hanson pointed out that the panel would want to very carefully consider the RFB panel's underlying assumptions before deciding to adopt their numbers wholesale or not. Especially if they are still largely based on the original RFB work from the 1990s, which was not updated in the Simpson and Weammert (2009) review, and again not updated by the latest (2012) RFB panel. Would need to fully understand what assumptions they are making regarding the performance and longevity of buffers in the real world vs. optimal or perfect conditions, among other things.

        - **Action**: Molloy will attempt to tease out physiographic regions and wetland:watershed ratios from the literature review to see if we are able to tease out regarding those attributes.
        - **Decision**: There was consideration for using reduction efficiencies from the Riparian Forest Buffer report (2014), but the panel agrees that our own literature review is likely more accurate and will continue to discuss this. Hanson will distribute the RFB Report.
- Rehabilitation vs. Enhancement
    - Staver: These cannot be as high as existing, as we are interested in the change/increase of function. It cannot receive full credit for function if it already has a fraction of that function.
        - Boomer: if we've got some suboptimal efficiency, there can be a burden placed on counties in determining which are high quality and thus cannot be restored.
    - Discussion on this topic will continue at the next call & meeting.
- **Action**: Staver will chase down the CBWM 5.3.2 reduction efficiencies for current land uses.
- Stubbs: Within the model, there is an option of looking at state, county, or portion of province in a county or state.
    - **Action**: Stubbs will separate out wetlands using the beta watershed model calibration for Maryland and one other state (DE or PA) by 4/1/16.

Next Steps: We will schedule a two hour call during the week of 4/11/16 and another face to face meeting will be scheduled during the following weeks. Please complete the NeedToMeet polls by Thursday 3/31: April two hour conference call; April face to face meeting

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Monday April 18th, 2016, 9:00 AM-11:00AM
Meeting #15

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	Y
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	Y
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	Y
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	Y
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N
Jana Davis	CBT	Y
Matt Johnston	UMD, CBPO	Y

Summary of ACTION Items & DECISIONs:

Action: Any member that has wetland:watershed ratio values from a study or project, please send them to Hanson this week for consideration. We can review these in full at our next meeting. McLaughlin, Strano, and Clearwater mentioned they each have values.

Decision: The panel will tentatively move forward with option 3A as the upslope efficiency for wetland restoration (TN: 42%, TP: 40%, TSS: 31% based on all wetland types, excluding constructed). Any other feedback should be sent to Hanson.

Action: Updated report chapters are due; please send to Hanson and Runion.

Welcome and Introduction

- Mason: We are so close to finishing up and while it has taken a lot of time, we have accomplished a lot and are close to delivering a finished product.
- Davis: Big appreciation to the WEP, as expert panels can be strenuous work. It seems the panel is very close, and we are at a very opportune moment within the Watershed Model's timeline where we can benefit by adding wetlands as a land use. We will have opportunities to refine the BMP numbers in the future, so we just need our best possible recommendations now to incorporate into the model before the upcoming calibration.
- Greiner: Would also like to thank the panel members for their hard work. Many expert panels are behind and the WEP even had an extra bump in the road with the land use classification process, but the finish line is in sight and we hope to finish strong.

How Wetlands Differ Spatially Across the Watershed, Matt Johnston, UMD

- Johnston reviewed and clarified some common land use & BMP terms. Refer to powerpoint, distributed to the panel.
- Landscape effects: Factors come from SPARROW analysis.
    - Land-to-Water. Ex. Nitrogen is more likely to move from edge of field to small order streams in the Susquehanna system, while phosphorus transport is very efficient in the coastal plain.
    - USGS is working on improving SPARROW and trying to determine how much drainage area there is per wetland. This may be done in time for the next calibration, but would be addressed outside of this panel by the Modeling Workgroup, which would coordinate with the Wetlands Workgroup or other workgroups as needed.
- Mason: The efficiency aspect is largely accounted for. Our focus should be on the BMP side of things.
    - Staver: Important to characterize existing wetlands as a sink of nutrients to show their value. This idea should be captured in the report and identified as a task for the next panel.
- Johnston: There is currently no difference between wetlands and forest in the model but by separating wetlands, you are giving USGS ability to differentiate within these factors.
    - Mason: The panel feels that this is a high priority.
        - Johnston: Recommends that the panel includes this in a list of requests.

Discussion of wetland restoration BMP effectiveness estimates

- Hanson: Focusing exclusively on BMPs and removal efficiency values.
    - Numbers used currently in the Phase 5.3.2 model are shown in Figure 1, with a description of how they were developed below.
        - Denver: Just as this section states that the kinetic equation does not account for wetlands as a source, we should recognize the shortcomings in our report as well. The kinetic equation also does not account for groundwater inputs, only surface flows.
    - Six different options are proposed based on the summarized results of values in the literature. Options are fully described and listed in the "Wetland reduction option"

document. Both mean and median are listed as options. Some options differentiate values for Floodplain and Other, while some do not.

- Constructed refers to wetland stormwater facility.
- Staver: What/where are these number applied? We need to further discuss the potential to develop a watershed:wetland ratio for these efficiencies. A 1:1 ratio will lead to the efficiencies being very conservative. A qualifier should be included that this only applies to newly created and restored wetlands.
    - Mason: We do not have the capacity to do this right now, but part of this effect is captured in the landscape effects for existing wetlands. By acknowledging there is an issue with the ratio applied to the BMP, we can incorporate the appropriate efficiency values and allow this issue to be resolved in a later model run.
        - **Action:** Any member that has ratio values from a study or project, please send them to Hanson this week for consideration. We can review these in full at our next meeting. McLaughlin, Strano, and Clearwater mentioned they each have values.
    - Clearwater: We have always been trying to get the size of the watershed when a project is reported, but many did not report and 1:1 was used as a default. Leaning towards option 3.
    - Strano: Agrees that the effect will likely be severely underestimated on a 1:1 watershed scale.
    - Staver: Riparian Forest Buffers (RFBs) have a 4:1 and 2:1 ratio for N and P, respectively. Reasonable that wetlands should have at least this area treated, but the modeling folks don't agree. The scrutiny level will increase as our proposed ratio gets higher.
        - Strano, Clearwater, and McLaughlin agree that the RFB ratios can serve as a minimum value for our ratios.
        - Hanson: Wary of comparing efficiencies with the RFBs as we are unsure of their accuracy as applied to wetlands in the next version of the model. Their ratios are conservative as well, but we would need a basis to accept them. We will revisit this discussion at our next meeting. Then we can look at some of the available information about wetland:watershed ratios. Important to consider that we don't select a ratio that would be too high as there will be projects that are closer to a 1:1 ratio.
        - Sweeney: Right now there's no basis for using the RFB upslope ratios of 4:1 and 2:1 for wetlands. The panel could justify using those ratios but they need to explain why those ratios are useable for wetlands.
- Vote on option 3A (values from the literature review for all wetlands, excluding constructed wetlands. Floodplain and Other are combined).
    - In favor: Mason, Spagnolo, Thompson, McLaughlin, Clearwater, Denver, Staver, Miller, Strano.

- Boomer asked for some time to review and send her thoughts via email vote, but tentatively agreed.
- **Decision**: The panel will tentatively move forward with option 3A (TN: 42%, TP: 40%, TSS: 31% for all wetland types, excluding constructed). Any other feedback should be sent to Hanson.

- Mason: The efficiencies from Table 1 that are separated out into geomorphic provinces are based on any landscape ratios of 1, 2 and 4% - having a background on these values would be helpful.
    - Sweeney: Will find out and share with the panel.

Wrap-Up

Action: Updated report chapters are due; please send to Hanson and Runion.

Our next meeting is Thursday, April 28th from 10am-4pm at the NRCS office in Annapolis. If you cannot attend, please provide any input or comments to Hanson before the meeting.

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Thursday April 28th, 2016, 10:00 AM-4:00PM
Meeting #16

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	Y
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	Y
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	N
Ken Staver	UMD	Y
Steve Strano	NRCS	N
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	N
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N
Matt Johnston	UMD, CBPO	N

Summary of ACTION Items & DECISIONs:

ACTION: Please send any report comments to Jeremy and the appropriate chapter author by the end of next week (5/6/16).

ACTION: Panel members should review Chapter 2 (Definitions), and send any recommended additions to Hanson.

ACTION: Panel members should review the updated Chapter 4 and provide comments to Boomer and Denver by early next week (5/2-5/6).

ACTION: Panel members should review the "Justification for wetlands land uses" section in Chapter 5 as it is from an older memo (September 2015) and may require updates or clarification based on our progress.

ACTION: Panel members will need to help explain the reasoning for why the reduction efficiencies we are proposing are an improvement to the current Phase 5.3.2 method.

ACTION: If anyone has photos appropriate for the report, please provide them to Hanson.

DECISION: Minutes from the 4/18/16 conference call were approved.

ACTION: Wetland verification guidance figure (contact Clearwater if any edits are necessary) moved from Chapter 3 to Chapter 6 (Accountability Mechanisms). Table 3.X updated with 2015 annual progress run.

ACTION: Changed "Freshwater" to "Non-Tidal" in title of Chapter 4.

ACTION: Stubbs will cut the wetland area in Chapter 4, Table 1 to only the watershed.

ACTION: Reformatted Table X of reductions to move the "All except constructed" Wetland type to the bottom of the table and include those numbers in the below text.

DECISION: Based on geologic features, the panel tentatively agreed on the following Physiographic Subregions: Coastal Plain Western Shore incised, Coastal Plain Eastern Shore well-drained, Coastal Plain Eastern poorly-drained, Coastal Plain lowland, Piedmont, and Plateau/Ridge & Valley.

ACTION: Boomer will consult with Greg Noe for review and help with classifying categories for retention efficiencies.

ACTION: Please complete the NeedToMeet poll for mid-May call.

Welcome and Introduction

DECISION: Minutes from the 4/18/16 conference call were approved.

Overview of current points of agreement and remaining decisions

- During our last call (4/18/16), we tentatively agreed on using wetland reduction values from our Tetra Tech literature review, excluding constructed wetlands, with no difference between floodplain and other wetlands. The mean values were chosen: TN 42%, TP 40%, TSS 31%.
    - One of the remaining decisions is what area to apply this reduction efficiency to (watershed:wetland ratio). The current, default value is 1:1, but the panel agreed that this was generally too low. We have some data from panel members which allowed for example ratios, which we can review for our Phase 6 recommendations.
- Mason: The work by this panel to create land uses for wetlands for the Phase 6 model and start to attribute load reduction values will open opportunities for future panels.
    - McLaughlin: The high resolution imagery completed for parts of VA and DE is using forested and emergent classifications for wetlands, which is a cause for concern. They likely used NWI as a basis, but Stubbs was worried as they were not separating tidal and non-tidal. He will be asking for comment from the panel, and we should be working with the workgroups in this modeling work.

Discussion of panel report, remaining tasks, and writing assignments

- Chapter 1: No changes
- Chapter 2: Terms chosen to define are those that may be left to interpretation, or those which have a specific definition for the panel. Our audience must include the public, so scientific and technical terms (especially those in Chapter 4) may be later defined in a glossary.
    - **ACTION**: Panel members should review Chapter 2 (Definitions), and send any recommended additions to Hanson.

    - Glossary definitions should be consistent – USGS may have existing glossaries to use as starting point.
    - The table of wetland creation/restoration/enhancement/rehabilitation definitions will also be included in Chapter 2.
- Chapter 3: **ACTION:** Wetland verification guidance figure (contact Clearwater if any edits are necessary) to be moved to Chapter 6 (Accountability Mechanisms). Table 3.X will be updated with 2015 annual progress run.
- Chapter 4: Recently updated by Boomer and Denver. The basis of the chapter has not changed, but some edits and additions were made.
    - **ACTION:** Change "Freshwater" to "Non-Tidal" in title of Chapter 4.
    - A summary of the types of wetlands that occur in different physiographic provinces was added (5th paragraph).
        - The classifications made in this paragraph could be merged with table 1 below.
            - The wetland acres in this table includes some out of the watershed areas. Adding a wetland percentage of total area in each physiographic province would be helpful. **ACTION**: Stubbs will cut the wetland area in Chapter 4, Table 1 to only the watershed.
        - Brooks: Slope can be a major factor differentiating these provinces. The unidirectional flow which is mainly a groundwater contribution breaks down in the coastal plain without geologic contact zones.
            - Boomer: A shallower gradient in the coastal plain will lead to slower flow
    - Boomer: In this paragraph we started to lay out biogeochemical processes, but haven't quite connected them back to wetland types. This could be expanded on.
    - **ACTION**: Panel members should review the updated Chapter 4 and provide comments to Boomer and Denver by early next week (5/2-5/6).
- Chapter 5: Still incomplete and awaiting some of the panel's decisions.
    - We are unsure of the current status of the Pennsylvania wetland mapping project. The final report is due in August, anticipated in time for the new calibration. This can be represented in Chapter 5.
    - **ACTION**: Panel members should review the "Justification for wetlands land uses" section in Chapter 5 as it is from an older memo (September 2015) and may require updates or clarification based on our progress.
    - Hartranft had comments on the "Wetland BMPs" section, which were incorporated into the most recent draft summarizing the basis for the Phase 5.3.2 BMP.
    - Important to note that wetlands used for Simpson and Weammert study (Phase 5.3.2 model) were mainly constructed.
    - **ACTION:** Panel members will need to help explain the reasoning for why the reduction efficiencies we are proposing are more accurate than the current method.
    - Boomer: Breaking down our table by wetland type and physiographic province will show the importance of landscape setting. How we can populate this table will provide evidence of our research limitations.
    - **ACTION**: Reformat Table X of reductions to move the "All except constructed" Wetland type to the bottom of the table and include those numbers in the below text.

- Boomer: Supports Denver's idea of developing a table with an array of wetland type by region and assigning high/medium/low retention capacity with specified retention percentage ranges. A basis for assigning that range will be provided from the literature.
    - Staver: Another idea is to provide a default credit and then offer higher levels of credit with data provided to increase efficiency. This will help steer management toward collecting that data.
- Hanson will review entire document to make formatting and layout more consistent; he will hand off to Aileen for Tetra Tech to do more thorough editing for consistency through the whole report.

Discussion of default upslope acres for Phase 6 wetland restoration BMP

- **ACTION**: If anyone has photos appropriate for the report, please provide them to Hanson.
- The goal of the afternoon portion of the meeting is to work towards defining a recommended wetland:watershed ratio for which projects receive credit if they do not report the drainage area.
    - Panelists sent in a total of 69 usable sites for Hanson to review watershed:wetland ratios.
        - Data was analyzed both including and excluding the ratio while including the wetland area in the watershed (drainage) area. There was a minor change, and including this conflicts with past calculations (Jordan).
        - The implied upslope acres per acre of wetland restored (watershed:wetland ratio) came out to for the be 2 for the Coastal Plain, 4 for the Piedmont, and 8 for the Appalachian Plateau and Ridge & Valley.
    - The physiographic regions should be divided into subregions in order to accurately define retention efficiencies and acres treated.
        - Denver: The Coastal Plain is extremely non-uniform, so this is especially important to separate.
        - Sweeney: This is mappable by county reported. We can classify down to coordinates, so any additional information given, such as HUC-10 is helpful, but the minimum data we receive is the county in which the project took place.
            - Boomer: Could be classified by land-river segments.
        - **DECISION:** Based on geologic features, the panel tentatively agreed on the following Physiographic Subregions: Coastal Plain Western Shore incised, Coastal Plain Eastern Shore well-drained, Coastal Plain Eastern poorly-drained, Coastal Plain lowland, Piedmont, and Plateau/Ridge & Valley.
            - Denver: Depressional wetlands should only receive the wetland acreage for nitrogen as most of the nitrogen is focused in groundwater, and the water table is not sufficiently interacting with the wetland to remove nitrates. The only substantial nitrogen effect is where the reduction of fertilizer application takes place.
                - Nitrogen moves by groundwater (subsurface process) and, overall in the Piedmont and Coastal Plain, the removal will be variable. This is where a Low/Medium/High rate of removal will

help. Phosphorus and sediment are simpler as they are surface processes.
        - McLaughlin: A 1:1 ratio for nitrogen fits here. Phosphorus should have a 2:1 ratio based on surface features.
    - Denver: Lowland needs to be separated as they tend to be finer textured, with very little groundwater interaction. Poorly drained uplands are on the drainage divide for the Chesapeake with a sandy subsurface. Well drained also occur on the eastern shore in stream valleys.
    - Denver/Boomer: Nitrogen efficiencies for the Coastal Plain western shore will be high as stream incisions cut through the aquifers. Nitrogen efficiencies for Coastal Plain eastern shore well drained will be lower for nitrogen removal as there is a better opportunity for transport due to slope (low retention time). Nitrogen efficiencies for Coastal Plain eastern shore poorly drained will be medium because much of the organic matter that traps nitrogen is removed in this region. Nitrogen efficiencies for Piedmont is medium because of often erosion/incision in the stream in this region. Nitrogen efficiencies for the Coastal Plain lowland will be medium/high because of the low flow volume and high efficiency of nutrient reduction.
    - Floodplain TN is set at medium and TP/TSS at high as a default.
        - Piedmont: a combination of high stream incision (lower interaction) and the angle of flow interaction led to the nitrogen efficiency being medium.
    - Phosphorus and sediment can generally be tracked together, unless otherwise stated. General topography led to TP and TSS removal being medium in other wetlands and high in floodplain wetlands.
- Acres treated are taken from Hanson's project review.
    - Coastal Plain eastern shore poorly drained and lowland should have a watershed:wetland ratio (acres treated) of 1 because of the low slope.
    - Coastal Plain western shore incised and eastern shore well drained (besides west TN) will follow the ratios found in Hanson's review.
        - TN for Coastal Plain western shore incised is treated similar to the Piedmont because of a higher slope.
    - Floodplain acres tested are double of other as a placeholder.
        - These wetlands are receiving the baseflow delivery as well as a storm pulse – justification for doubling these numbers.
            - Staver: Could back this up using per acre trapping rates for floodplain wetlands (discussed in a previous call).
        - Panel should remember that "Floodplain" wetlands also include those wetlands within a certain distance of the stream, not just those directly adjacent.
        - McLaughlin: This will provide more justification for projects to be sited in floodplain locations, which would be a negative consequence of

having ratios this high. These projects convert nice existing slope wetlands into reconnected floodplains.

- Could place a cap on maximum acres treated, as a ratio too high will lead to projects not reporting drainage area.

- Hanson summarized that based on the discussion confidence seemed higher for "other" than "floodplain" at this time. Boomer offered to get feedback from Greg Noe about the panel's approach for floodplain. Panel can revisit and finalize at its next call.

- **ACTION:** The panel will consult with Greg Noe for review and help with classifying categories for retention efficiencies.

		Retention Efficiency			Acres Treated		
Physiographic Subregion	**Other**	**TN**	**TP**	**TSS**	**TN**	**TP**	**TSS**
CP West incised	Y (Headwaters)	H	M	M	4	2	2
CP East well drained	Y (Headwaters)	L	M	M	2	2	2
CP East poorly drained	Y (Delmarva Bays)	M	M	M	1	1	1
CP lowland	Y (Flats)	M/H	M	M	1	1	1
Piedmont	? (Headwaters)	M	M	M	4	4	4
Plateau, R&V	? (Headwaters)	H	M	M	8	8	8
Physiographic Subregion	**Floodplain**	**TN**	**TP**	**TSS**	**TN**	**TP**	**TSS**
CP West incised	Y (Overbank)	M	H	H	8	4	4
CP East well drained	Y (Overbank)	M	H	H	4	4	4
CP East poorly drained	Y (Overbank)	M	H	H	2	2	2
CP lowland	Y (Backwater)	M	H	H	2	2	2
Piedmont	Y (Overbank)	M	H	H	8	8	8
Plateau, R&V	Y (Overbank)	M	H	H	16	16	16

*best guess with two hydrologic sources

Next Steps

- We will be scheduling another call for mid-May. **ACTION:** Please complete the NeedToMeet poll for mid-May call.
- The Wetland Workgroup will be meeting on 5/26/16 from 1-3pm at MD DNR in Annapolis. WEP members are encouraged to attend or call in, as we hope to give the workgroup a review of our report.
- **ACTION**: Please send any report comments to Jeremy and the appropriate chapter author by the end of next week (5/6/16).

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Monday May 16th, 2016, 10:00 AM-4:00PM
Meeting #17

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	N
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	N
Jeff Hartranft	PA DEP	Y
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	Y
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	N
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	N
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	Y
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N

Summary of ACTION Items & DECISIONs:

- **ACTION**: Boomer and Denver will clearly define the physiographic subregions and provide logic for the proposed efficiencies in Chapters 2 and 5, respectively.
- **ACTION:** Hanson will touch base with Denver and Stubbs regarding a map of the subregions.
- **ACTION**: Hanson will check with Boomer and Denver regarding feedback from Greg Noe on retention efficiency and acres treated in the developed table.
- **ACTION**: Panelists should provide comments and edits to the report by 5/20. Please use the SharePoint link, distributed by Hanson, if possible. Otherwise, use the version distributed by Hanson on 5/13 to make edits using track changes.

- **ACTION**: Panelists should make every effort to attend or call in to the Wetland Workgroup's meeting on 5/26 as the workgroup will be reviewing and asking questions about the report. Hanson will give key highlights and major points of the report, but other panelists must be available to answer questions. Another meeting may be held in June for approval of the report.
    - **ACTION**: McLaughlin will follow up with Greiner regarding the role of those who are on both the expert panel and the workgroup.

Welcome and Introduction

- Minutes from the 4/28 meeting were distributed on 4/29. Any comments or edits should be sent to Runion and Hanson by 5/20.

Minutes

- The main product of our last meeting was the "Wetland Retention and Acres by Physiographic Subregion" where six physiographic subregions were developed, retention efficiencies were assigned as high, medium, or low, and an acres treated ratio was developed for each.
    - Some titles are unclear in a wetland sense, such as incised and well-drained.
        - **ACTION**: Boomer and Denver will clearly define the physiographic subregions and provide logic for the proposed efficiencies in Chapters 2 and 5, respectively.
        - **ACTION:** Hanson will touch base with Denver and Stubbs regarding a map of the subregions.
    - **ACTION**: Hanson will check with Boomer and Denver regarding feedback from Greg Noe on retention efficiency and acres treated in the developed table.
        - Currently the Floodplain category is doubled in the acres treated section to account for both hydrologic sources: groundwater and surface flow.
- Clearwater: Explanation for why certain studies were considered but excluded from the literature review should be provided.
- In "Option for combining mean nutrient and TSS removals with panel BMP framework" document, Hanson laid out a summary of means from the Tetra Tech literature review to provide preliminary options for the high, medium, and low retention efficiencies. This Table 1 needs to be refined into Table 2, ideally with input from another expert such as Noe.
- Staver: Substantiating our findings with past work may help during the review process.
    - Mason: The 1:1 ratio used with the Jordan equations were a placeholder based on the best available science. The data we have mined of watershed ratios gives us better available science and has more merit in being included in the Watershed Model. This fits the adaptive management approach that the Chesapeake Bay Program is following.
- Hanson: For most BMPs that are entered in the scenario builder, there is one element to calculate reduction. For example, in the Phase 5 BMP, the reported wetland area determines the area of land use change and treated acreage using the 1:1 default ratio. The issue is if we ask them to report drainage and wetland area, there are then two elements necessary to calculate the reduction in Scenario Builder, meaning that the drainage area determines the upland area treated by the BMP efficiency while the wetland area determines the area for the land use change. This can be done, but modelers will need notice in order to code this into the tools; only other BMP that uses more than one element is stormwater performance standards. Our options

are to either just have it as a land use change, or have a default ratio for upland acres regardless of whether or not the drainage area is reported.
    - Sweeney: No reporting agency has ever asked us to accommodate the need to report the area of the wetland and the treated area (in 5-7 years). The model can accommodate this, but having never had to do so, it may be unlikely that we will in the future.
        - McLaughlin: The information is available, as they have the numbers when designing projects but it is never reported.
            - Mason: The Bay Program has an opportunity to include this information going forward so we can continue to improve how wetland BMPs are managed with regards to water quality.
- **ACTION**: Panelists should provide comments and edits to the report by 5/20. Please use the SharePoint link, distributed by Hanson, if possible. Otherwise, use the version distributed by Hanson on 5/13 to make edits using track changes.
    - Hanson would like the draft report finished and distributed to the partnership by COB 6/14. The report will be changing throughout the review period, but it must be at a near-final stage by this date. The following appendices are still needed for addition to the report: glossary, minutes, Tetra Tech literature reviews (2), scenario builder technical appendix, and a BMP protocol checklist.
    - The verification guidance flowchart could be updated. Clearwater or Greiner may have the original (currently an image in report).
- **ACTION**: Panelists should make every effort to attend or call in to the Wetland Workgroup's meeting on 5/26 as the workgroup will be reviewing and asking questions about the report. Hanson will give key highlights and major points of the report, but other panelists must be available to answer questions. Another meeting may be held in June for approval of the report.
    - **ACTION**: McLaughlin will follow up with Greiner regarding the role of those who are on both the expert panel and the workgroup.
- Hanson: As this panel is running short on time, wetland creation can be a land use change and credit will be assigned at a 1:1 area treatment.
    - McLaughlin: With the long time to establish function, creation should not be given the same efficiencies.

Adjourned

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Monday July 18th, 2016, 1:00 PM-3:30PM
Meeting #18

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	N
Quentin Stubbs	USGS, UMD	N
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	N
Jeff Thompson	MDE	Y
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Paige Hobaugh	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	N
Anne Wakeford	WV DNR	Y
Ken Murin	PA DEP	N

Summary of ACTION Items & DECISIONs:

- **ACTION**: Solicitation for volunteers from the Wetland Workgroup to assist USGS with SPARROW analysis will take place on the next WWG meeting on Thursday, July 28th.
- **DECISION:** The panel will include in the report recommend efficiency rates of 42% TN, 40% TP and 31% TSS for Wetland Restoration in Phase 6.
- **ACTION**: Panelists should carefully review Chapter 5 for to ensure our comments/caveats regarding our recommendation are included as well as other chapters where content may fall under your expertise.

- **ACTION**: Boomer and Denver will provide strawman of table 2 adjusted for 7/22, 9-10:30 am call for discussion and vote. The updated Chapter 4 and the slides from this meeting will be distributed.

Welcome and Introduction

- Since our last call, we have updated Chapters 4 and 5. Kathy, Judy, and Pam have worked to complete the recommendations, which we will vote on today. Chapters 1-3 and 6-8 remain largely the same. Remaining appendices are to be completed by Jeremy with help from other CBPO staff as needed.

Minutes

- The USGS SPARROW timeframe will be too late for this panel. The Wetland Workgroup may be able to work with USGS on setting up the SPARROW analysis and coming back to the partnership with an analysis, which may or may not have implications for the Phase 6 Watershed model. **ACTION**: Solicitation for volunteers from the WWG will take place on the next WWG meeting on Thursday, July 28th.
- Kathy explained the framework that she and Judy had worked on since the last call. Wetland water quality effect is largely based on the strength of the source, size of contributing area, and likelihood of bypass could be linked to acres treated. Wetland types were characterized by geological occurrence within each physiographic province (Blue Ridge and Karst terrain added).
    - Ratings (high/medium/low) were given for each wetland type that occurred in each physiographic province for likelihood of both elevated contaminant supply rate and hydrologic contact. Analysis attempts to include watershed position within physiographic provinces for each type of wetland. These ratings are available in the "Efficiency recommendations" powerpoint (distributed, email runion.kyle@epa.gov for access).
- Staver: Worry that reported acres may include the buffer area, inflating the number of acres.
    - McLaughlin: MD DNR is careful about separating the buffer since that acreage could be reported as a separate BMP, but not sure this is the case everywhere. The projects used for our upland acre assessment were reported appropriately regarding buffers.
- Boomer: In support of breaking out removal rates into categories of floodplain and other with physiographic regions. The acres treated data is lacking. Examining the distribution of wetlands within a physiographic province and key drivers behind that distribution can give a relative size of contributing area that you can expect those wetlands to treat. This may give a more accurate and appropriate measure than the limited dataset we have used.
    - Mason: There is also a lack of data here to tease this out. We previously asked the Bay Program for modeling to get some numbers here but it didn't happen.
        - Boomer: Recommend that Table 2 be made consistent with Chapter 4 and to have two columns for floodplain and other wetlands. Floodplain numbers would be different as those wetlands receive water from both groundwater and surface flow water. We had "floodplain" acres at double the "other" acres at a previous meeting, but the panel is not confident in this arbitrary measure. Based on the high/medium/low assignments, we could assign the current acres

treated number to medium and then give a percent increase/decrease for high/low.

- Mason: Sites with an acre reported can be modified and put into the BMP tracking database. The panel developed table 2 at the face to face meeting – without additional information, our options are to use it as a recommendation, acknowledging that it is not ideal but the best we have, or to remove table 2 and have the model continue the overall 1:1 acres treated.
    - Hanson: These numbers may not be perfect but are certainly a step forward from the current acres treated numbers (1:1 across the board). They are within a safe margin based on the context of existing BMPs (with a possible exception of the 8:1 ratio).
        - McLaughlin: These numbers also make sense based on the Jordan curves.
        - Staver: Suggests to lower the Plateau R&V acres treated ratio from 8:1 to 4:1.

- Hanson: Final timeline for the report release is early August if decision is reached on the outstanding issues soon.

Question #1: Do you agree with the following statement: "I support using the suggested efficiency rates of 42% TN, 40% TP and 31% TSS for Wetland Restoration in Phase 6."

Table 1 – Proposed removal efficiencies for wetland restoration BMP in Phase 6 Watershed Model, applied to upland acres treated

TN removal (%)	TP removal (%)	TSS removal (%)
42	40	31

- Votes
    - Yes: Mason, Spagnolo, McLaughlin, Boomer, Denver, Staver.
        - **DECISION:** The panel will include in the report recommend efficiency rates of 42% TN, 40% TP and 31% TSS for Wetland Restoration in Phase 6.
    - For those not on the call, any objections must be communicated to Hanson, Mason, and Spagnolo by COB on 3 August 2016 with an explanation and alternative solution. Please understand that the panel will proceed with the majority decision but that any dissent will be included as a part of the report.
- Comments regarding decision
    - Staver: The data comes from diverse sources and these numbers are reasonable and appropriate.
    - Boomer: The variability in function will be captured in the second table/question.
    - McLaughlin: Report should state that these percentages can be adjusted as new data is made available in the future with upcoming panels.

- **ACTION**: Panelists should carefully review Chapter 5 for to ensure our comments/caveats regarding our recommendation are included as well as other chapters where content may fall under your expertise.

Question #2: Do you agree with the following statement: "I support using the acres treated shown in Table 2 for Wetland Restoration in Phase 6."

Table 2 – Proposed ratio of upland acres treated, by physiographic subregion, for use in Phase 6 Watershed Model

	Number of upland acres treated per acre of restored wetland
CP West dissected	4
CP East well drained	2
CP East poorly drained	1
CP lowland	1
Piedmont	4
Plateau, R&V	8

- Votes
  - Yes: Mason, Spagnolo, McLaughlin
  - No: Boomer, Denver, Staver
- Comments regarding decision
  - McLaughlin: In support of it as this was the consensus we made at one of the last meeting. We do not have the perfect amount of information but these are the best we have and it can be changed.
  - Boomer: Since the last meeting we have had time to assemble info to substantiate numbers (presented earlier in this call). From that work, there is a strong basis to structure table 2 in a way that is more parallel to new science framework. The group should work to modify numbers accordingly based on this new info. Also recommends that Plateau be separated from Ridge & Valley and Karst be added as a physiographic province. The numbers may be the same, but there is a need to recognize the functional difference between provinces.
    - **ACTION:** Boomer and Denver will provide a strawman of an updated table for the panel to review for a call on 7/22 from 9-10:30am.
  - Denver: Feels the Plateau, R&V ratio is high. Supports reducing it to 4.
  - Staver: Agrees with Denver; having a certain practice 8x more effective than another is a red flag. Efficiency generally decreases as contributing area increases, which isn't addressed in our work.

- Denver: Would like to follow up offline with Hanson and Stubbs regarding acreage mapping.
  - Boomer: Plan was to have Quentin intersect data from SSURGO and NWI to assign wetlands with floodplain or other and then intersect that with physiographic province based on data layers that Judy has provided. Review acres based in the intersections. Would like to move forward with this if possible.

Wrap-Up

- ACTION: Boomer and Denver will provide strawman of table 2 adjusted for 7/22, 9-10:30 am call for discussion and vote. The updated Chapter 4 and the slides from this meeting will be distributed.

Adjourned

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Friday July 22nd, 2016, 9:00 AM-10:30AM
Meeting #19

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	N
Ken Staver	UMD	Y
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	N
Tom Uybarreta	EPA Region 3	Y
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N

Summary of ACTION Items & DECISIONs:

- **ACTION**: The following edits will be made to the "Likelihood..." table: Outer Coastal Plain poorly drained uplands sloping and floodplain wetlands are given medium and high rankings, respectively, and Karst depressional and sloping wetlands are changed from high to medium.
- **ACTION:** In the "Acres Contributing..." table, Karst will be reduced from 4 and 6 for other and floodplain wetlands to 2 and 3 acres, respectively. The Inner Coastal Plain will be revisited.
- **ACTION:** Strano will work with Boomer and others to edit the "Acres Contributing" table based on Strano's comments.

Welcome and Introduction

- On Monday, we voted on questions 1 and 2 (removal efficiencies and upland acres treated ratios). Question 1 was approved at 42% TN, 40% TP, and 31% TSS. Question 2 was not approved. Boomer and Denver have worked to provide a revised question 2, which will be presented today.

Minutes

- Boomer and Denver worked together to develop a new table of upland acres treated ratios including columns for both floodplain and other wetlands. The framework for this involved describing wetland distributions by physiographic province and wetland type and then assigning a quantitative value for likelihood of hydrologic contact with non-point source contaminated waters. These quantitative values were then translated into an acreage ratio. All descriptions are available in the "Efficiency recommendations 22June16" file, distributed by Kathy on the morning of Friday, 7/22.
    - "Karst" was added as a physiographic province. Karst areas have a medium/high potential for contamination and nutrient removal where it occurs within other provinces.
    - "Likelihood of Hydrologic Contact..." table takes into consideration not only size of contributing area but information of likelihood of impact due to human land management and potential of through-flow vs bypass. This table provides the reasoning for the acres treated numbers. A low likelihood will correspond to a lower acres treated ratio.
        - Denver: Outer Coastal Plain – Poorly drained uplands, sloping wetlands should be given a medium ranking due to the often low contact due to ditches yet high organic matter. Floodplain in the same province should be listed as high with large potential for contact. Karst also may have lower contact and should have a medium ranking in both depressional and sloping wetlands.
        - Strano: Suggest to include category of converted wetlands, specifically within the outer coastal plain poorly drained to address the issue of site selected restoration projects vs natural placement (which is the basis of this table). Ex. many restoration projects are placed directly where uptake will occur, so the low ranking doesn't accurately describe this.
        - **ACTION**: The following edits will be made to the "Likelihood..." table: Outer Coastal Plain poorly drained uplands sloping and floodplain wetlands are given medium and high rankings, respectively, and Karst depressional and sloping wetlands are changed from high to medium.
    - The "Acres Contributing..." table was developed using the previous "Likelihood" table. Other wetlands with low rankings were assigned 1 acre, high rankings were assigned 4 acres, and medium rankings were assigned 2 acres. Floodplain wetlands were assigned 150% of the other wetland figure within the same physiographic province.
        - **ACTION:** In the "Acres Contributing..." table, Karst will be reduced from 4 and 6 for other and floodplain wetlands to 2 and 3 acres, respectively. The Inner Coastal Plain will be revisited.

    - Staver: Suggest including a paragraph stating this is a foundation for how wetlands work in our landscape, this generalizes their position relative to land use to transition into the discussion of restored hydrology.
- Hanson confirmed with participants that they agreed with the overall framework and approach described and presented by Boomer. He asked if anyone else had significant concerns or comments outside of the specific rows or issues raised so far, e.g. by Staver and Strano. Hanson noted the time and that some of the specifics in the tables still need some additional work in light of the discussion before a decision can be made, but there is agreement on the general approach as well as most of the categories. So the panel is making progress and is one step closer to a decision.
- **ACTION:** Strano will work with Boomer and others to edit the "Acres Contributing" table based on Strano's comments.

Wrap-Up

- After panelists have some time to talk offline and make edits to tables, either a call will be planned to discuss and vote on approval, or a poll will be distributed to seek approval.

Adjourned

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Wednesday October 19th, 2016, 1:00 PM-3:00PM
Meeting #20

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	N
Jeff Hartranft	PA DEP	N
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	Y
Jarrod Miller	UMD	N
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	N
Steve Strano	NRCS	N
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	N
Tom Uybarreta	EPA Region 3	N
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	Y
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	Y
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N

Summary of ACTION Items & DECISIONs:

- Panel members should review the draft report to check if their comments have been addressed **by COB Tuesday 10/25.** Please indicate if the comment was addressed; if your comment has not yet been addressed to your satisfaction, please provide a suggested resolution or additional language to include in the report as a response to your comment.
    - Jeremy distributed the complete draft report on October 19th (4:19pm).
    - If you didn't have comments carried over in that distributed version you are still encouraged to glance through for a sense of what feedback you want to provide by Friday 11/4.
    - Contact Jeremy (preferably by phone) if you have questions on a specific comment between now and Tuesday the 25th.

- Next Wednesday, Jeremy will remove comments that have been addressed and distribute a cleaner version of the report on SharePoint and by email for final feedback/comments/edits **by COB Friday November 4th.**
    - If you're able to access and make edits via Sharepoint, please do so as that will be more efficient for the group; if not you can email your feedback on the report using track changes to me and Kyle.
    - Ralph asks that members (particularly regulatory folks) read over the unintended consequences chapter once more for any final feedback by the November 4 deadline.
    - Kathy requests members review Chapter 4 to see if there's anything to add.
    - Panel members are encouraged to contact each other directly between now and November 4th regarding technical questions or items as they work on providing feedback; contact Jeremy with overall or process-related questions.
- **Please follow this link to indicate your availability** for a call on Wednesday November 9th to discuss final comments and edits before report becomes final. Please provide your availability **by COB Tuesday, 10/25.**
- Following the call on November 9, Jeremy will coordinate with others as needed to resolve any final revisions before the report undergoes final formatting/editing prior to release to the partnership. **The report will be ready for release no later than Tuesday, November 22.**
- At this stage any disagreements from panel members on panel recommendations described in the report must be provided in writing and then may be included in the report as a dissenting opinion.

Welcome and Introduction

- The goal for the panel is to have the final report released by Thanksgiving. Specific edits and language is required from panel members. We have developed a timeline today to complete this task.

Minutes

- The Water Quality GIT is meeting October 24-25 and will make a decision regarding deadlines for full approval of BMP panels, including ours.
- On September 15th, the Wetland Workgroup approved our preliminary results, allowing for the framework to be included in the most recent beta version of the Watershed Model. Minutes and other materials from that meeting are available online.
- Denise: MDE's caveat was to not include the enhancement and rehabilitation BMPs until we are certain that the data system has distinct categories for them and they won't be included with acreage gains.
    - Jeff Sweeney: In the Phase 6 model, you will be able to designate practices with land use change (restoration and creation) with those that do not (other categories)
- Panel members should review the draft report to check if their comments have been addressed **by COB Tuesday 10/25.** Please indicate if the comment was addressed; if your

comment has not yet been addressed to your satisfaction, please provide a suggested resolution or additional language to include in the report as a response to your comment.
    - Jeremy distributed the complete draft report on October 19th (4:19pm).
    - If you didn't have comments carried over in that distributed version you are still encouraged to glance through for a sense of what feedback you want to provide by Friday 11/4.
    - Contact Jeremy (preferably by phone) if you have questions on a specific comment between now and Tuesday the 25th.
- Thanks to Quentin we now have a map of the physiographic regions and acreage numbers. Updated numbers may come in a few weeks as the GIS team is currently running datasets for each county with the new high resolution land cover data.
- Kathy: It may be helpful to include the spreadsheet of Tetra Tech's literature reviews in the appendix for those who want to see the data behind our recommendations.
    - Jeremy: The summary tables will certainly be included in the report and the actual spreadsheets could either be included or be posted somewhere online and referred to in the report.
- The USGS SPARROW report is yet to come but we are hoping for it in early 2017.
    - MD still has a desire to have the report completed.
- Next Wednesday, Jeremy will remove comments that have been addressed and distribute a cleaner version of the report on SharePoint and by email for final feedback/comments/edits **by COB Friday November 4th.**
    - If you're able to access and make edits via Sharepoint, please do so as that will be more efficient for the group; if not you can email your feedback on the report using track changes to Jeremy and Kyle.
        - Ralph asks that members (particularly regulatory folks) read over the unintended consequences chapter once more for any final feedback by the November 4 deadline.
        - Kathy requests members review Chapter 4 to see if there's anything to add.
        - The Chapter 5 BMP section following the discussion of the Phase 5 Model version requires a review from panel members to ensure it is accurate and conveys the thoughts of the panel.
    - Panel members are encouraged to contact each other directly between now and November 4th regarding technical questions or items as they work on providing feedback; contact Jeremy with overall or process-related questions.
- Table 11 will be removed by Jeremy.
- It had been said in a previous call that the Chapter 6 graphic based on wetland BMP reporting matrix could be updated; if anyone has a more recent graphic, please provide it.
- Table 2 will see some edits based on comments from September Wetland WG meeting.
- The two literature reviews provided by Tetra Tech are Appendices A & B. Appendix C is the technical appendix for the scenario builder. Appendix D is the meeting minutes. Appendix E is a

glossary which may need some updates. Appendix F is a BMP checklist which Jeremy will complete.

- If there are maps that we need to include in the report, the map must be already existing to fit into our timeline. If it already exists, we may source and cite the map in the report.
- Documents such as the land use memo to the WQ GIT and the preliminary report to the Wetland WG will not be included – all of this information is already included within the report.
- **Please follow this link to indicate your availability** for a call on Wednesday November 9th to discuss final comments and edits before report becomes final. Please provide your availability **by COB Tuesday, 10/25.**
- Following the call on November 9, Jeremy will coordinate with others as needed to resolve any final revisions before the report undergoes final formatting/editing prior to release to the partnership. **The report will be ready for release no later than Tuesday, November 22.**
- At this stage any disagreements from panel members on panel recommendations described in the report must be provided in writing and then may be included in the report as a dissenting opinion.

Wrap-Up

- Check and provide resolutions to your comments by October 25th
- Complete this NeedToMeet poll by October 25th.
- Jeremy will provide a clean version of the report by November 4th
- November 9th: placeholder for 90 minute call if necessary.
- The report will be released no later than November 22nd.

Adjourned

SUMMARY OF ACTIONS AND DECISIONS
Wetlands Expert Panel
Wednesday November 9th, 2016, 1:00 PM-3:00PM
Meeting #21

Name	Affiliation	Present? Y/N
Kathy Boomer	TNC	Y
Rob Brooks	Riparia, Penn State	N
Dave Davis	VA DEQ	N
Judy Denver	USGS	Y
Jeff Hartranft	PA DEP	Y
Michelle Henicheck	VA DEQ	N
Pam Mason	VIMS	Y
Erin McLaughlin	MD DNR	N
Jarrod Miller	UMD	Y
Ralph Spagnolo	EPA Region 3	Y
Ken Staver	UMD	Y
Steve Strano	NRCS	Y
Quentin Stubbs	USGS, UMD	Y
Jeff Sweeney	EPA CBPO (CBP modeling team rep)	Y
Jeff Thompson	MDE	Y
Tom Uybarreta	EPA Region 3	N
Support staff and guests		
Jeremy Hanson (Coord.)	Virginia Tech (Project/Panel Coordinator)	Y
Brian Benham	Virginia Tech (Project Director)	N
Kyle Runion	CRC	Y
Jennifer Greiner	USFWS, Habitat GIT Coordinator	N
Aileen Malloy	Tetra Tech	Y
Peter Claggett	USGS, CBPO	N
David Wood	CRC	N
Denise Clearwater	MDE	N
Anne Wakeford	WV DNR	N
Ken Murin	PA DEP	N

Summary of ACTION Items & DECISIONs:

- **ACTION:** Hanson will make edits to address the ditching issue and confirm changes with Strano and Staver.
- **ACTION:** Table 11 asterisks will be removed as they were notes back from when acres treated were described as high/medium/low rather than acreage number. All of this information is captured in the text.

Welcome and Introduction

- The report will be distributed to the partnership on November 23rd. Today's call will ensure everyone is up to date on changes and all final comments are addressed. The majority of comments and edits requiring discussion are in Chapters 4 & 5.

Minutes

- Chapter 4:
    - Boomer: Chapter 4 edits did not contain any major changes to the direction of the text. Figures were more directly tied to the content of the text.
    - Box 1 had edits from multiple authors to bridge the gap between Chapter 4's physiographic province descriptions and Chapter 5's land uses/mapping.
        - National Elevation Dataset requires citation (Stubbs).
    - Staver: Is there a restored wetland inventory to date anywhere? This can help show the future potential of restored wetlands.
        - Boomer: This would be helpful: a table showing current wetlands and which of those are restored.
        - Hanson: We have summarized what was reported in the Phase 5 Watershed Model under that definition of the "wetland restoration" BMP, and we have the baseline data from NWI for existing wetlands. The report does include some language along those lines, which is tied to Strano's earlier comments about prior converted wetlands.
            - Boomer: This is a good response to make regarding PA DEP's concern on how we're tracking wetland restoration.
        - Boomer: Next on our to-do list: capture PA DEP's concerns and involve this restored wetland inventory in the section on uncertainties/future direction. There is some related discussion in Chapter 4. This could either be pulled to the end of Chapter 4 or put into Chapter 7.
    - Strano: In the "Advanced understanding of human impacts..." section, the sentence starting with "where ditching has lowered the watertable..." should be edited to convey the conversion of groundwater flow to surface flow paths being the cause of bypass.
        - Revision offered: "Ditching lowered the water table, allowing former wetlands to be farmed and developed. However, the ditching also short-circuited the natural groundwater and surface flowpaths, resulting in less contact time with, or even complete bypass of natural wetlands and marshes where processing of nutrients and trapping of sediments occurs."
    - Staver: The big issue with ditching was that it allows for a bypass of nutrient processing and creates a potential for a nutrient source in farming. Mentioning this double whammy issue would strengthen the "Advanced understanding..." section.
        - Boomer: The "Across the Bay watershed" sentence could be expanded to include ditches with channelization and mention that ditching reduces the interaction between contaminated waters with wetlands.
        - Staver: Could also add that are source loads for nutrient inputs" to the "As a result, many flats..." sentence earlier in this section.

        - **ACTION:** Hanson will make edits to address the ditching issue and confirm changes with Strano and Staver.
    - Hanson asked if there were any other issues to discuss on Chapter 4; none were raised.
- Chapter 5:
    - Boomer: Most of the changes made to Chapter 5 are structural and help make the chapter parallel the presentation given to the Wetland Workgroup in September, outlining how we came to the ultimate set of recommendations to estimate wetland retention function. The chapter begins with an overview of the recommendations and a summary of key factors considered and follows with land uses, loading rates, and logic behind our recommendation for wetland restoration loading rates and acres treated ratios.
        - Staver: The mean values used for retention efficiencies are appropriate and match what expert panels generally report. Fine scale estimation isn't possible without fine scale reporting, which hasn't been provided by the states.
        - Mason: The framework created here will be extremely helpful for future panels.
- Staver: During the review period, a major argument may be that the reduction efficiency for all of the regions is the same. While this is articulated in the report, we should be prepared to answer questions such as this. The acres treated is biggest difference between Phase 5 and our recommendations, so this may also be under scrutiny.
- **ACTION:** Table 11 asterisks will be removed as they were notes back from when acres treated were described as high/medium/low rather than acreage number. All of this information is captured in the text.
- Hartranft: The Chapter 6 tracking component, field 8 lists acreage gains for establishment and reestablishment while these terms have been abandoned by the panel and replaced with restoration and creation.
    - Hanson: Table 2 earlier in the report clarifies these are essentially interchangeable terms for CBP purposes (i.e. restoration and re-establishment; creation and establishment). We can add a citation back towards this table to avoid confusion. [viii. (refer to table 2 for term definitions)]
- Hanson asked if there were any other issues to discuss for Chapter 5 or other parts of the report; none were raised. He noted that panel members can contact him directly if anything else comes up following the call. Given the extensive discussions in meetings and offline it seems the panel has consensus on the major points and logic of the recommendations, with standard caveats that there is room for improvement in the future.

Wrap-Up

- Hanson noted this is the panel's final conference call. He thanked everyone for all their time and effort over the past 2+ years and commended them for the excellent work.
- The Water Quality GIT is holding BMP panels to the end of 2016 deadline for completion. The review period will be condensed, described below.

Review Period

- November 23rd: Final Panel Report released for Partnership review
- December 1st-2nd: Webinar to discuss Final Report with the Partnership.
    - Wil require assistance from certain panel members to lead the technical aspects of the report. If you are interested in presenting, please let Hanson know.
- December 7th: All comments due to Hanson, Mason, and Spagnolo
- December 13th: Wetland Workgroup meeting to seek approval of the report (1-3pm)
- December 19th: Water Quality GIT conference call with Habitat GIT to seek final approval of the report.

Adjourned