National Technical Committee for Wetland Vegetation
Annual Meeting-Charleston, SC
18 April 2013

Questions/Comments from Tuesday

- Concerns and comments on the Challenge Study
  - Sample point adequacy
  - Cost
  - Test a species that is common and easy to locate and identify
  - We could potentially ask district offices to help with field sampling
    - How many offices and people would need to be involved?
    - NRCS has an office in every county and each office could do 10 sample points
    - It's also a possibility to get a master student to complete the study
      - Student could sample 200 points a year over 2 years (400 total) with one field assistant
  - Potential to link the Hemlock experiences, including lessons learned, to the *Ilex* challenge study

Update-Database and algorithms to support the NWPL

Database and algorithms to support the NWPL-Part 2 NPS Inventory Data-*Presented by Matthew Buff*

Study Objectives

- *Create a database of plant species occurrences in both wetlands and uplands at a regional and national scale*
- *Use that database to calculate wetland indicator status for each species*
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Last Time

- *USFS FIA*
- *Very large (~16 million tree records, ~1.3 million plot records, ~400 tree spp., national coverage)*
- *Complex structure (e.g., mixed variable/fixed area plot design)*
- *Wetland/upland classification poorly defined*

USGS-NPS Vegetation Characterization Program

- *Classify and map vegetation communities*
- *Ongoing, 1992-present, half complete*
- *Will cover >280 parks*
- *107 parks, 16,000 plots, 400,000 species records*
- *>8000 plant taxa*
- *Grandsect (gradient transect) sampling*

Database Structure

- *Issue with the database structure*
    - *Database structure started in 92 and structures have been constantly changing*
    - *Data is also published in excel spreadsheets*
        - *Contain a lot of missing data*
        - *Plots are classified using the Cowardin system allowing us to determine if the plots are in a wetland or upland*

Error Correction (completed)

- *Parks not using plots*
- *Blank records, missing values in critical fields (plot code, species name)*
- *Duplicate records (in some or all fields)*
- *Plots w/out sp. records or vice versa*
- *Species recorded outside of plot*
- *Inconsistent code/event usage*
- *Code/event typographical errors*

In progress

- *Normalization of codes*
- *Normalization of taxonomy*
- *Label parks and plots by region*
- *Count sp. Occurrence on wetland/upland plots by region*
- *County all wetland/upland plots by region*
- *Apply landscape and plot area adjustments*
- *Calculate adjusted frequency in wetlands*
- *Translate frequency to wetland indicator status*

Correcting for the prevalence of wetlands on the landscape

	wetland	upland	
present	n_{pw}	n_{pu}	$n_{p\bullet}$
absent	n_{aw}	n_{au}	$n_{a\bullet}$
	$n_{\bullet w}$	$n_{\bullet u}$	N

$$\frac{n_{pw}}{n_{p\bullet}} = \frac{n_{pw}}{n_{pw} + n_{pu}} \quad \frac{1}{1 + \frac{n_{pu} \cdot n_{\bullet w}}{n_{pw} \cdot n_{\bullet u}}}$$

Discussion:

- How do you determine whether or not a plot is actually in a wetland?
    - No absolute way to determine
    - The National Park Service (NPS) is out in the field making the call and one would assume it was correct
        - People with vegetation experience are collecting the data but they aren't necessarily trained to make the correct wetland calls
- How could we better determine whether or plot is in a wetland or not?

    - Look at the vegetation in the plot
        - Look at all species in the plot (excluding *Ilex*) and objectively use the indicator statuses to determine if the wetland call was made correctly
            - If you had more than 50% cover of OBL and FACW you could make the assumption you are in a wetland.
        - We could also look at only the wetland vegetation community types to make the call
        - If it meets the FAC neutral test than you can determine that it meets the wetland requirements
            - Issue with calculating FAC neutral using database is first trying to align correct nomenclature and there would also be issues with records that are not fully spelled out (ex: *Acer sp*.)
    - Lay the plot's GPS coordinates over multiple data layers in GIS to check the validity of the wetland calls
    - Use of soil data to determine hydric soils
        - Using soil data would be a separate exercise
        - Would be a very large effort to work with soil county data
    - Could use the drainage classes and hydrologic regime data for a wetland determination
- Other ideas for the database
    - Need ways to program the plot data so you don't have to look through the data manually
    - Look at all species in the dataset and see how the indicator statuses play out
    - Calculate landscape correction for species that are confined to a certain area
        - Could be problematic when including plots in the region that do not have similar habitat so there needs to be some sort of landscape correction to address this issue
- Other national databases to take into consideration/investigate
    - National Heritage database, NY database, etc
    - Other datasets may have more detailed descriptions to determine soil and hydrologic conditions
    - Matt has multiple GIS layers from his dissertation that could be incorporated
        - We could use another species at a smaller scale with this dataset
        - What species might be worth applying to Matt's data?
            - Any species would work
            - We could do *Tsuga canadensis* or *Acer rubrum* because they have already been sampled at a smaller scale
                - Other species that were also sampled: *Pinus strobes, Onoclea sensibilis, Maianthemum canadense, Galtheria procumbens, or Trientalis borealis*
                - This way we would have field data and Matt's state data for comparison
- What final product would be the most useful for the NTCWV?
    - Should it include interpreting Hemlock data?
        - This could be done at the state level using the database

        - Could also combine NH and VT Hemlock challenge study data to this analysis
        - A statement from this database analysis could potentially help the committee to design the challenge study
    - Matt's final product could be a publication about the data that represents what the committee is working on
    - Look at all species in the dataset and see how the indicator statuses play out
    - We need to itemize a few questions to include in the final product

Hydrophytic Vegetation Technical Standard

Background: The NTCWV received comments for the Revised Corps Manual including comments regarding the development of a technical standard for hydrophytic vegetation from HQ USACE. To move this discussion forward, they proposed a technical standard for consideration by the NAT and NTCWV. They also stated that the hydrophytic vegetation definition cannot serve as the tech standard, and that the standard must contain a defined measurement to test for accuracy.

NTCWV Discussion:

- The NTCWV needs a response back to NAT about a hydrophytic vegetation technical standard
- Committee started hypothesizing about this last year and create a definition for hydrophytic vegetation
- Ideas and thoughts for a hydrophytic technical standard:
    - Use the hydrology technical standard (stated below) as the hydrophytic vegetation technical standard:

      "*The site is inundated (flooded or ponded) or the water table is ≤12 inches below the soil surface for ≥14 consecutive days during the growing season at a minimum frequency of 5 years in 10 (≥50% probability). Any combination of inundation or shallow water table is acceptable in meeting the 14-day minimum requirement. Short-term monitoring data may be used to address the frequency requirement if the normality of rainfall occurring prior to and during the monitoring period each year is considered."*

    - The only thing you can measure is the hydrology
        - Nothing you can measure with plants
        - Plants will never exhibit physiological adaptations that could be measured
        - The soil technical standard also requires the hydrology standard of 14 consecutive days along with anaerobic conditions
        - The AK supplement (Chapter 5) uses hydrology standard to determine hydrophytic vegetation
    - What if someone asks about the species and not the community?
        - You can say they are hydrophytes because they are existing in water
        - The wording in the tech standard will have to be laid out properly to include this
- Final thoughts on the technical standard for hydrophytic vegetation

    - The technical standard will lift words from the hydrophytic definition (stated below) tested with hydrology
        - Paul will write this up and send around to the committee for comment

          "Hydrophtyic vegetation is the assemblage of vascular plants, and bryophytes in some regions, growing in water or on a substrate that is saturated at a sufficient frequency and duration during the growing period to influence the composition of vegetation"

        - Possibility to publish this as a tech report
- Federal Register & Vegetation Section of the Mother manual
    - Hoping by May to have questions and comments regarding the mother manual back to headquarters
    - Circulate around again to the committee for any further comments
    - Present at the NAT meeting
    - Earliest it would go to the FR is in the Fall
        - Who responds to questions after going into the FR?
            - Headquarters will hand them down to this committee to address

<u>Continuing Challenge Study Discussion</u>

- We need to know what the potential restrictions or constraints may be before a study design is decided upon
- Defining frequency
    - Big step forward deciding what the basis is for frequency
    - Need to make sure we have this definition and it is well known
    - Definition was defined by Reed but how they sampled was not
        - Cumulative opinion
- Confidence Interval
    - What should we use and is 80 to low?
- Challenge Study Scale-region, subregion, or smaller?
    - Region
        - A regional scale would solve the entire problem and not just a few small areas within a region
    - Subregion
        - Could be based on MLRAs or a challenger could propose a different subregion based on other variables
        - A challenger could challenge at this scale because we already have ratings at this scale for certain regions
        - If you can't challenge the subregions, then the subregions we have now are invalid
    - Smaller Scale
        - We know that a 12 digit HUC is too small (ex: Hemlock study)
        - Need a scale that's ecologically large enough
        - Ex: Why would you challenge *Lolium* at a regional scale in the Arid West?

        - *Lolium* occurs in the Mediterranean area of this region and not in the cold desert area
    - Other options
        - When a challenge comes in, the NTCWV will look at the scale it was proposed at and make suggestions to either broaden or shrink the study area
        - Challenger could either propose a region or subregion
        - Study area could be driven by the habitat of the plant
        - Consider performing the challenge in the area of concern instead of focusing on a larger area that may not be relevant
    - The scale doesn't necessarily need to be decided on at this point in time. We can just develop the study design and it can be used for either a large or small scale area.
- Sample Design
    - Needs to be statistically robust
- Integrating databases into the study design
    - For example, in the NENC subregion, use a database that MN has and calculate percent frequency from this data
        - If state data has been submitted to the Regional Panel, they may resolve it and it may never get to the National Panel
    - We need to first figure out a field design that is statistically sound and then figure out how we can incorporate databases
        - Maybe there is some intermediate level of work we can do with the field data we have now and the database information

Follow-up Questions and Discussion on Sampling Designs with Tony Olsen

- ***Is it a possibility to run a known simulation to save energy and make the design tighter?***
    - Need species and locale information; existing datasets
    - A known situation would guide you through the process
    - How well would this generalize other species and how would it compare to other plant species?
    - Possibility to run a simulation for multiple sample designs to determine how useful each design is
        - Simple random sampling
        - Stratification
        - Cluster analysis
        - Spatially balanced design (GRiTS)
- ***Adaptive cluster sampling***
    - Useful when species are clumped naturally
        - If things are clustered, you can spend your time searching in these areas rather than areas where there are no occurrences.
        - More efficient when sampling a large area
    - You can then do a dandom sample of the cluster sites
    - At each cluster site you will need a stopping point/goal (a certain number of occurrences)

- ***Which sampling design is better for our purposes?***
    - Depends on how things are distributed through space and also need to consider cost implications
    - Cluster sampling is a good because it is cost effective
    - It may come down to travel time or time on the plot for each design
    - Would the particular sample design that is selected change upon the distribution and habitat information of the target species?
        - Ex: adaptive vs. random when you have a species pattern that is clumped
            - Adaptive would be better than the random
    - Might be a good idea to describe distribution patterns of species first and then decide upon the study design
        - Would be a lot of work but doable
- ***Frequency, Plot Size, and Sample Design Questions for Tony***
    - Concern about the distribution of wetlands across the landscape compared to the uplands and taking these both into consideration for a study design
        - Is this something Tony can give us advice on
            - Yes, if you can get a representative sample of wetlands and uplands with an equal number of plots
            - Tony defines relative frequency as stratifying by wetlands and uplands and having equal number of plots for both
    - In the uplands, would you make sure you were in the potential habitat rather than just any random upland and vice versa for the wetlands?
        - Yes for both the wetlands and uplands
        - Just make sure to properly define what the habitat is
    - What if you went to the point thinking you have narrowed it down by habitat but you do not find the species? Can you drop that point and move to another point?
        - Yes, but you need to make sure people record that plot and also record that it's not the correct habitat
        - Calculating what percentage of plots that turned out to be the correct habitat vs. plots with incorrect habitat could be valuable information for the future in terms of the way you define species habitat using GIS layers
        - Need to make sure that all plots were actually visited regardless of species presence; cannot cherry pick the plots
        - You may also find this species in places you don't except it and you lose out on this information if you narrow the study down to a particular habitat based prior range.
            - Doesn't leave room for expansion of the species range
    - What's the correct plot size for a sample?
        - If you only need the occurrence (occurs once/relative frequency),the larger the plot size, the more likely the relative frequency is going to be 50%
        - Plots that are too small has its own set of problems
        - Is there any literature in wetland science on what size plot to use and what has been used in the past?
        - What if you have wetland and upland in the same plot? Would you count that as one sample point?

- Example of where you would want to keep track of what proportion of the plot is wetland and upland, and the occurrence on each side to help you obtain the relative frequency
    - Ex: 100m radius circle, draw the plot and what occurs in this plot, % wetland/upland and occurrences

- ***Concerns with random sampling***
    - We will completely lose the habitat of *Ilex* and not get results
    - Possibility to create a distribution map for a particular area and then use that to generate random sampling
        - This would help to prevent meaningless upland points
        - Could use historical information to make the maps and create areas of species occurrence and probability categories (high, medium, low)
            - If a design like this is used, you could sample all three categories but have the majority of sampling occur in the high probability areas (This method was previously used by Olsen)
            - We would need well defined boundaries that you can pay attention to in GIS
                - Ex: Use HUC 12's and assign them a category for species habitat (high, medium, low) and then place your plots in the HUCs based on this analysis.
                - You can keep refining the design down based on other layers and factors.
                - Payoff for this design is less cost in the field
            - If we do a stratified cluster procedure and use HUCS, we could develop a data structure and map of the wetlands (based on existing information) and randomly chose within and outside wetland polygons
                - Cost saving method
- ***Confidence Interval***
    - Standard is 95
    - We could have justification for using 90 or 80 but we need a very strong reason or it could be used against you
    - What confidence interval do you think we should obtain for?
        - In other words: what should the sample size be?
        - Comes down to the resources that we have
        - Our goal is a highly contested species, and we only need to do it once but need to make sure it's highly reliable.
        - Put it into hypotheses type testing for the indicator status rating
            - Reject or fail to reject what rating it has
        - Margin of error is around 3-5% is typically acceptable (assuming simple random sampling)
- ***As a group we need to decide whether we want to design the study***
    - We need to come up with ideas/suggestion on what design we want to use
    - Need to design a study that's objective
    - Mary could then go back to Tony and discuss our highlighted points
- ***Ideas/suggestions for sampling designs***

- Get a distribution map first and then do the sampling
- Develop species distribution within the HUC and eliminate the useless points
  - Just need to be prepared to defend how we eliminated the lands we didn't use and why
- Possibility to go to the location of a species (a certain number of points) and measure the hydrology and look at soils instead of going to specific wetlands and uplands
  - You would still need a distribution map to know where the species exists
  - Also need to make sure this methodology would be statistically sound
- What about fragmented habitat like here on the east coast or a fragmented distribution pattern?
  - You would take account for this when selecting your sample points and deal with the fact that plots may be partly in the habitat and partly not
- What about disturbance species that are spreading and occurrences are more dependent on disturbances? Ex: sensitive fern
  - How do you deal with this? Can you factor prior disturbance in the study
- Using HUCs in a sample design
  - How do you determine how many HUCs need to be sampled in a large area like a region and what number of plots do you have within those HUCs?
    - Depends on the margin of error and also what the allocation between the number of HUCS and number of sites within a HUC is
    - This is a single stage design and not a cluster design
    - Need to incorporate cost information, getting to each HUC, and how many plots you can have in one plot
    - What about using 12 digit HUCs and x number distributed across the region. Go into a HUC based on a sampling scheme and a minimum of 3 sample zones will be randomly picked. In that zone, mark all individuals and randomly sample individuals. Lastly decide whether the individual is in a wetland or upland
      - Concern again about sampling in the non-habitat zone
      - Need a species distribution map and determine whether it's in a wetland or upland (GIS exercise)
    - Instead of using zones, what about using a transect approach?
      - Choose representative transects
      - Look for species along the transect and determine along the transect whether you are in a wetland or upland

- ***What is the most efficient way to expend your effort?***
  - Need to make sure whatever we decided that the process can be used for all species and not just the species in question (the ultimate goal from this study)
  - Issue is there is not enough information on species habitat which restricts us to a certain methodology of sampling
- ***Where to go from here?***
  - Move forward and design a study
    - Whatever the design, still include 400 sample points

        - Design will be a general design for *Ilex* but can be modified for other species
    - Possibility to get a masters student for under $100,00 to complete the study
        - Need to have the exact study design to hand down to a student
        - Another possibility would be to hire a tech to get this done
            - They would be finished with course work, have no tuition, and get a salary
    - Support from other agencies
        - $25,000 from each agency to support this study
        - Would help to have a letter from higher up requesting money
            - Bob will draft a letter to send to Jen Moyer and then send to all the agencies
    - Tony should be advising and critiquing as we move forward in the process
    - Committee should make a list of all study options we came up with, discuss with statistician, and then make a decision
    - Are we going to sample one species or multiple?
        - May be a good idea to look for multiple as long as they have the same range
        - Although when you start looking for multiple you may lose out on certain habitat on the one you should be focusing on
    - Sampling for *Ilex* should be done in the spring when you can see signs of hydrology
        - Could even push until Jan/Feb/March
- ***Helping Matt move forward***
    - Options for Matt to filter plots to help determine whether a it is a wetland or upland
        - Filter plots using the hydrologic regime and soil drainage class
            - All factors in the database were determined in the field including drainage class
        - Use presence of OBL and FACW species
        - Use current formulas and apply to species in plot
        - Use vegetation at the community level
        - FAC neutral test
            - *Ilex* habitat may not lend itself to the FAC-neutral test (FACU dominated)
            - Use habitat information then use FAC neutral for the remaining
            - Matt's not just using data for *Ilex* but also other species and in that case FAC neutral should still be used
    - Final Product from Matt
        - Still funding left to continue working through December
        - Final product should be tied back to the indicator status and a database
        - Could test 5 different species in each region. Examples below:
            - *Lollium*
            - *Rhamnus*
            - *Ilex*
        - Findings could be an informative comparison

        - Might raise interest in looking at particular species
    - Initial goal was to compare the database indicator status findings to the actual indicator status
    - Possibility to look at a species that occurs across the country that has different ratings in multiple regions and see if that remains true after running the data from the database
    - Limitations for what is a wetland vs. upland needs to be laid out
    - What would the committee like to see from this?
        - A publication
        - Committee will send ideas to Don and Matt for certain species across the country to get some kind of comparison to wetland ratings
        - Run all wetland species in all regions using the supplement boundaries

Morphological Adaptations

- Goal: Look at morphological adaptations and how they may or may not pertain to the wetland boundary
    - Nobody has previously done this
    - Are they really useful?
    - Are there other morphological adaptations that are better indicators of hydrology or hydrophytes?
- Morphological adaptations
    - Have to be observed in the wetland individuals and not the upland individuals because they can occur in both the wetland and upland individuals
    - Previously used as a hydrology indicator
    - Presently used as a hydrophytic vegetation indicator in most regions
    - People have an issues with buttressing and what it really is
        - Ex: Oak trees where roots are getting close to the surface
        - May need further clarification on what buttressing is and what it isn't
    - Only time one would use morphological adaptations is when you have FACU hydrophytic vegetation and then look at soils and hydrology. Go back to then look at the FACU species to see if they have morphological adaptations
        - What FACU species have these adaptations?
        - More pronounced on FAC and FACW species
- Opinion -Eliminate morphological adaptations because in FACU dominated wetlands you still have to go to chapter 5 anyway
    - Possibility to go through literature and find further information
    - Morphological adaptations are indicators in multiple regional supplements but we are dropping the PI and DR for the HCI so why wouldn't we also drop the morphological adaptations?
    - We could always move them to chapter 5
        - But where would they fit
- No decision on how to move forward

Closings thoughts and comments

- New chair candidates
  - Paige Wolken
    - Defers, wants more experience before committing to the position
  - Mary Butterwick
    - Next chair
  - Hans will be Chair for one more year and Mary will be Vice Chair and then Chair for the following 2 years
- Possible meeting locations for next year
  - Portland, OR
    - Would allow Tony Olsen to join us to talk about the statistics and Challenge Study
  - Texas
    - Would allow us to have a meeting during the winter months (November)
- Possible meeting time for next year
  - Late May or Early June
  - Preferred month May or September/October
  - Need to time the meeting after the manual comes out and the peer review is finished
    - April or May would probably be the earliest we would have the comments for review
- Possible Future topics of discussion
  - Federal Register comments on the new Manual
  - Challenge Study
  - Functional Assessment
    - Look at all functions that vegetation may impact
    - Steve Eggers volunteers in assisting/leading this topic
      - MN version incorporates vegetation into other functions
    - Mary will send EPA HGM information to Paul
    - Could also discuss floristic quality index and how might one use consistently and how can we incorporate into delineations
    - If this is a topic of interest, we can invite Paul Adam to the next meeting to provide input (He is also located in Corvallis,OR)
  - Mitigation banks and vegetation standards