2014 Northeast Pasture Consortium Annual Conference & Meeting Minutes held at the Ramada Conference Center, State College, PA, February 4 - 5

We had an all-time high of 90 people registered for the 2014 Northeast Pasture Consortium Annual Conference and Meeting. Again, we had to suffer through some winter snow and ice, but nearly all of the people preregistered did make it to the conference and meeting even if it turned about to be later than they originally planned. A snow storm hit Pennsylvania on Monday, February 3, making travel most difficult for those coming in from the east or south. The snow was heavy especially in southeastern PA. A second storm hit Tuesday evening, February 4 and early Wednesday, February 5, making roads either icy or snow packed depending on direction of travel from State College. A few of us who drove to State College stayed over Wednesday night so that road crews could get the roads free of ice and/or snow.

The Ramada Conference Center hosted the Conference as they did in 2011. The Executive Committee of the Consortium had to do an extensive search to find a low-cost host this year as we no longer receive funding through Agriculture Research Service due to federal budget cuts. We did receive some funding from a Natural Resources Conservation Service (NRCS) Conservation Innovation Grant through the University of Vermont's Vermont Pasture Network to pay for farmer member hotel bills.

The high turn-out was due in large part to the first technical session, *Managing Pastures in Riparian Areas for Water Quality and Forage Utilization*. The Chesapeake Bay Program that seeks to reduce nitrogen, phosphorus, and sediment loading to the Bay and its tributary streams has caused some state agencies to call for livestock exclusion from stream bed and banks in pastures. This would impact many livestock farmers in the Bay Watershed that pasture their livestock in bottomland areas and small valleys. Most often the fencing required is a permanent fence that is prone to flood damage since the setback requirements seek to minimize loss of pasture area in an effort to reduce the impact on the farmer's use of his land. However, this is still a worrisome issue for most farmers that would have build a fence on both sides of the stream, most often provide at least one constructed stream crossing, and then be faced with maintenance issues every time the stream went out of bank. Permanent fencing costs can be expensive especially when fencing off a long and narrow and usually meandering stream corridor. The NRCS and Soil & Water Conservation Districts (SWCD's) need to formulate alternatives to stream-side livestock exclusion. There are other more cost-effective and water quality effective alternatives. Pennsylvania NRCS employees turned out in large numbers for this first session.

Farmer attendance was down sharply. Due to the loss of funding support, the Executive Committee charged a nominal $50.00 conference registration fee to farmer members this year for the first time. However, with the unsettled weather that mirrored what took place in New Hampshire in 2013, the weather may have played more of a role in the low farmer turnout this year. Some of our charter farmer members are also aging and find it more difficult to travel or leave the farm if short of help.

Fifteen poster papers were formally submitted this year, another all-time high. Four poster papers dealt with horse pastures, 3 papers were on factors that affect forage growth in pastures, 2 papers were on inventory and monitoring pasture conditions, 2 other papers dealt with livestock agricultural impact on the region's environment and economy, 2 more papers delved into the nutritional quality changes of milk when on pasture versus fed in confinement (there are differences in fatty acid profiles), and the last 2 papers were on ruminant nutrition on pastures. Two 45-minute poster paper sessions were held.

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After a round of introductions of all people present at the conference at 8:00 AM on Tuesday, February 4, the first session, *Managing Pastures in Riparian Areas for Water Quality and Forage Utilization* began. Dr. Les Vough, UMD Forage Crops Extension Specialist Emeritus, was the moderator. Dr. David Butler, Assistant Professor of Organic, Sustainable, and Alternative Crop Production, University of Tennessee, was the first presenter. The title of his presentation was *Ground Cover Impacts on Nitrogen, Sediment, and Phosphorus Export from Simulated Rotational Grazing in Riparian Areas*. With pasture at the stubble height of 4 inches (10 cm.) and canopy cover of 65 percent or higher, he found runoff losses of nitrogen (N), phosphorus (P), and sediment (S) to be very low in the small runoff plots over a 6-month period with 2 applications of feces and urine (to mimic 4 cows per hectare per year application rate) and 4 rainfall simulations at 70 mm (2.8 in.) per hour for 1 hour. Nitrate losses were 2 kilograms/hectare (kg/ha), P export was 0.5 kg/ha or less, and sediment loss was 10.5 kg/ha or less on a 10% slope. On a simulated heavy use area that can develop for real under shade in pastures, the ground was essentially bare and the soil heavily compacted, the losses of N, P, and S were much higher. Heavy use areas are likely to occur along the exclusionary fence where streams are fenced off from pasturing livestock and brush and trees invade to replace the grass in the exclusion area. Once the trees reach pole-size diameters, they cast shade and livestock will be attracted to the shade to avoid the intense sun of mid-day. In these simulated heavy use areas, total nitrogen export was 33 kg/ha versus less than 5 in the grassy plots, total phosphorus was 3.5 kg/ha versus 0.5, and total sediment export was 215 kg/ha versus between 5 and 10.5 kg/ha on the grassy plots. Since the exclusion area is often kept to a minimum to avoid loss of significant pasture ground, the heavy use area will be within a few feet of the water's edge of the stream with little to no ground cover to filter out any of the 3 pollutants studied by Dr. Butler and targeted by the Chesapeake Bay Program for reductions to restore Bay waters. The unintended consequences could be much worse than an occasional direct deposit of dung or urine directly into the stream by livestock getting a drink or crossing the stream. It all depends on the amount of time livestock spend within the stream and its immediate banks and whether or not the pasture is actively managed by the farm operator to provide a protective ground cover and adequate residual stubble heights of 3 or more inches.

Dr. Butler conclusions were:

- Cattle feces and urine in riparian areas can contribute nutrients to surface waters, but good cover can minimize impact.
- 45% ground cover (~65% canopy cover) is similar to 70% & 95% ground cover for reducing nutrient export from cattle feces and urine in well-drained soils.
- Timing of rainfall in relation to manure deposition is an important factor.
  - Greater export of dissolved reactive P and ammonia-N immediately after deposition
  - Runoff nitrate is less affected by timing
- Lounging or heavy use areas in the riparian zone can export significant amounts of sediment & nutrients.
- Maintaining cover can help minimize impact of riparian grazing to surface waters.
  - Rotational grazing systems which minimize livestock time near surface waters and maintain cover may be an effective management strategy.
- **More work is needed to evaluate management of these systems at the farm-scale for stream water quality impacts.**

Dwight Dotterer, Nutrient Management Program Administrator for the Maryland Department of Agriculture (MDA) was the next presenter. The title of his presentation was *NEW Nutrient Management Regulations Relating to Setbacks for Streams*. MDA in May of 2012 issued new nutrient management regulations that gave stream setbacks to be adhered to on both cropland and pastureland. These regulations became effective January 1 of 2014. Pastures and hayfields are subject to a 10-foot setback. This would require some type of fencing, either permanent or portable, temporary fences. Nutrients may not be applied mechanically within the setback. Livestock shall be excluded from the setback to prevent direct deposition of nutrients within the setback. However, as an alternative to fencing livestock from the setback area, a person shall work with the soil conservation district to develop and implement a Soil Conservation and Water Quality Plan for their farm with the local soil and water conservation district office with (BMPs) such as stream crossings, alternative watering facilities, grazing management plan, or other MDA-approved BMPs. This plan must be documented and followed in order to be in compliance. As another alternative to a nutrient application setback, MDA may approve other BMPs that it finds equally protective of water quality and stream health. MDA will work with USDA-NRCS, University of Maryland, or other land grant universities to establish the effectiveness of these practices. When livestock must access pasture on both sides of the stream, stream crossings must be designed and constructed to prevent erosion and sediment loss. In the practical application of the Maryland nutrient regulations,

- Flash grazing might be an alternative. MDA will be discussing this option as a component of a grazing management program for a farm.
- Fencing - MDA does not require permanent fencing; temporary electric is fine.
- Alternative BMPs? MDA suggests you consult the local SCD. Any BMP that the farmer and the SCD agree could work can be installed. But, it must work. If alternative BMPs do not prevent animal access, fencing may still be required.

MDA has had a memorandum of understanding with the MD Department of the Environment (MDE) since 2000 to provide joint inspections of farms when a citizen complaint alleging a water quality violation is received by MDE. This is a complaint driven process - this will probably be MDA's biggest priority, we are obligated to respond. However, checking will also occur during random Implementation Reviews, MDA and MDE may end up walking streams. They will be anxious to evaluate alternative BMP's for effectiveness.

To assist farmers with complying to the new nutrient management regulations, the Maryland Agricultural Cost-Share Program does provide funding that can cover up to 87.5% of the cost to install certain agricultural BMP's including stream fencing, stream crossings, watering troughs, spring developments and water wells to exclude animals from streams. Beginning July 1, 2013, a newly funded practice was announced that provides up to 87.5% of the cost to establish a pasture to be used within a management intensive grazing system or to convert or renovate a pasture previously used for continuous grazing. The maximum allowed for this practice is $50,000 per farm.

Patricia Engler, State Resource Conservationist, USDA-NRCS, from Annapolis, MD was the last speaker for this session. Her topic was *Cost-Share and Technical Assistance Programs to Help*

Maryland Farmers Implement New Pasture Nutrient Management Regulations in Riparian Areas. NRCS structural conservation practices, such as fencing, require a 20-year life span to receive cost-share assistance from NRCS financial assistance programs. However, with the Prescribed Grazing practice, a nonstructural conservation practice that may have several components with shorter estimated lifespans (e.g., portable electric fences and water troughs), it can be cost-shared through NRCS. It is a management practice rather than a structural practice. In order for it to continue to be effective, the operator must constantly monitor and make decisions to provide proper forage allocations to the livestock, provide water, and on when to move livestock to the next paddock allocation of forage so as to keep the forage resource thriving (minimum residual stubble height after grazing event) given the circumstances of weather, time of season, and forage species present.

After 15-minute scheduled refreshment break, the second session began, *Northeast Region Pasture-Based Research & On-Farm Demonstration Update*. Dr. Andre Brito, UNH Assistant Professor of Organic Dairy Management, moderated the session. This perennial session highlights current activities in pasture research and demonstration. Dr. Howard Skinner was the first presenter filling in for Dr. Sarah Goslee who had unexpected conflict. The title of the presentation was *Northeast Ryegrass Cultivar Trials*. This was a thought provoking presentation and a needed departure from typical forage agronomics of looking mainly at yield comparisons among cultivars of a grass species under limited stress. Six perennial ryegrass cultivars were compared in greenhouse trials: Kilrea, Barutti, Mara, Remington, Barelan, and Barnhem. The cultivars were grown for 63 days, clipped to simulate grazing, and sampled at 1 week and 4 weeks after clipping. The cultivars were grown under 4 conditions: Well-watered, high nitrogen; Drought stress, high nitrogen; Well-watered, low nitrogen; and Drought stress, low nitrogen. For this 10-minute presentation, Dr. Skinner presented just the plant size (root + shoot mass) of three-month-old plants, 1 month after clipping. From these root and shoot mass findings, the take-home message was:

- Cultivars differ in size.
- Cultivars respond differently to nitrogen levels and to drought stress.
- High performance (yield) under good conditions does not correlate with stress tolerance.

Kilrea was the cultivar that performed best under both drought and low nitrogen stress, but was the lowest producer under well-watered and high nitrogen than the other 5 cultivars. Two cultivars, Mara and Barnhem, that performed well under well-watered, high nitrogen conditions, yielded significantly less under drought and low nitrogen conditions than Kilrea. Barutti, Remington, and Barelan were intermediate between Kilrea and the 2 cultivars, Mara and Barnhem. In a pasture setting that is usually nitrogen-limited and suffers from drought conditions from time to time, Kilrea may be a better choice as it will perform better under stress. Nitrogen fertilizer is costly and sparingly used on pastures. A high yielding cultivar under optimal fertilizer and soil water may not survive in the pasture setting. A dead or struggling plant does not live up to its research test plot promise when pampered during testing.

Ms. Alison Grantham, doctoral candidate from Penn State University, gave the second presentation of this session, *Nitrogen Availability, Retention, and Loss in Annual and Perennial Organic Pastures in PA*. It focused on a comparison of nitrogen dynamics in annual (sorghum sudangrass [SSG] + red clover [RC]) and perennial (orchardgrass [OG] + red clover) pastures on organic farms. Certified

organic pasture has increased in acreage dramatically since the Pasture Rule for organic dairy farms was adopted by the National Organic Program. New York, Vermont, and Pennsylvania lead the Northeast Region in pastureland acreage growth. At the same time, due to global climate change, there has been an increase in extreme rainfall events during the Fall season over the past 63 years. Managing nitrogen in grazed organic systems in a region with increasing extreme rainfall events is challenging. Having enough nitrogen to grow forage can be especially challenging in organic systems since synthetic chemical fertilizers cannot be used. Grazing complicates nitrogen provisioning by creating areas with too little and those with too much due to spot placement of urine and dung. Manure and urine spots in the pasture may run as high as 700 pounds of N/acre while the rest of the pasture may have little to no pounds of N/acre. The distribution of the manure and urine is often very uneven being highest near water troughs, hay feeders, and shade and lightly scattered in the rest of the pasture. The experiment simulated grazing by clipping. It looked at nitrogen dynamics where manure or no manure was applied to the SSG-RC annual pasture and the OG-RC perennial pasture and with or without 3 extreme rainfall events per year of 3 inches in 24 hours in late summer to fall over a 2-year period. High ammonium (NH_4+) levels and/or rapid ammonification of organic N occurs in a warm, moist environment from manure lying on the soil surface, immediately after application. It is highest in warm summer weather; lower in cooler fall. Extreme precipitation stops ammonia (NH3) loss. Higher SSG+RC NH_4+ uptake in summer may result in lower NH3 loss from them in summer, BUT higher NH3 loss later in the fall. Less N is lost as nitrous oxide (N_2O), but even small losses have global importance since N_2O is a powerful greenhouse gas. N_2O emissions peak after rain when soil N is high. Primarily N_2O emissions come from denitrification of soil N under low soil oxygen conditions, but also occur when NH_4+ is converted to nitrate in the soil. It takes 1-2 weeks for N_2O peak fluxes to occur. They are highest in warm summer weather; lower in cooler fall. N_2O emissions account for <5% of N applied. Soil N uptake occurs after dung applications. Preliminary comparisons show lower N_2O emissions from organic pastures than from row crop feed production fields.

Ms. Denyse Schrenker, Penn State Graduate Student, was the next presenter. Her presentation was *Evaluation of Warm Season Grasses for Annual Pastures*, allied research to the Grantham presentation. She described why research was being done on warm season grasses for annual pastures for organic dairy farms:

- Cool-season pasture summer slump (warm seasons grow well when cool seasons go dormant)
- Slow establishment (also low stand density) and lower quality of perennial warm-season grasses
- Warm-season annual grasses rapidly establish and have good quality.

To be used effectively on dairy farms, annual warm season grasses need to be a part of the field crop rotation. Therefore, this study compared yield and quality of four annual warm-season pastures. Teff (T) + red clover (RC), T + brown midrib sorghum sudangrass (SSG), SSG + RC, and T + SSG + RC. It determined the affects on yield of corn silage following annual warm-season pastures in rotation. It compared yield and quality of annual warm-season pasture rotated to corn silage with 2 years of established cool-season perennial pasture. The cool season pastures were RC alone and RC + orchardgrass (OG). The crop rotations studied were warm-season pastures and established red clover monoculture rotated to corn silage and cool-season pasture (OG + RC) (seeding year and established pasture). Simulated grazing events were initiated based on plant maturity and weed pressure at first

harvest. Subsequent grazing events occurred at 30-day intervals. Nutrient application treatments were 50 lb/acre N applied as manure after 2nd simulated grazing event and 50 lb/acre N applied as manure prior to planting corn to mimic organic fertilizer additions. Of the annual warm season pastures, T + SSG had high yields while monocultures of T or SSG, and binary mix T + RC had moderate yields. SSG, SSG + RC, and SSG + T were of similar quality. They actually had higher digestibility than the cool-season pastures, RC and OG + RC. Although RC and OG + RC had higher CP and lower NDF than the warm season pastures used in the study. The warm-season pastures rotated to corn silage yielded similarly to the 2 years of cool-season pasture. Average annual warm-season pasture dry matter yield varied from 4800 lb/acre to 6200 lb/acre. Two-year total dry matter yields varied from 11,000 lb/acre to 15,200 lb/acre. Overall, SSG + T mixture offers the best yield (6200 lb/acre) of warm-season pastures tested and has high quality. The possible benefits of warm-season annual pastures are:

- Increase available grazing land by pasturing a portion of the field crop land
- Can be used in field crop rotation
- More flexibility for farmers using cover crops (using them as forage too, not plow-down only)
- Can be planted as a rescue crop.

Next, Dr. Aimee Hafla, USDA-ARS Animal Scientist, presented *Ultra-high Stocking Density Grazing for Dairies*. "Mob" or Ultra-high stocking density (UHSD) grazing on western US rangeland is of short duration, with high stocking densities - up to 560,425 kg/ha of livestock, "small" paddocks, and long rest periods (up to 125 days). These rangeland beef producers anecdotally cite greater carrying capacity, improved animal production, improved soil quality, improved forage quality, and minimal fixed cost investments (fencing, land, and water). The objective of this study was to characterize management practices and forage and soil quality on dairy farms using self-described UHSD grazing in PA and NY. Four case studies were done on 4 dairy farms using their version of UHSD for dairy cattle in a more well-watered environment. One sample pasture was selected on each farm (of known size). Data was collected each time the pasture was grazed from June to November 2012 and from April to June 2013. At each farm visit - information on the number of cows grazing, pre- and post- grazed forage height, canopy stratification, and plant tissue samples for forage quality analysis was collected. In May 2013 – soil samples were taken from each pasture. Each farm varied in their approach to UHSD. One farm moved cows to another paddock only once a day while another moved twice a day and the other two, one moved cows 2-5 times daily and the other 2-3 times daily. The grazing cycle employed was more uniform varying from 28-35 days among 3 of the farms while the other farm was nonspecific "when rested". In a rainier environment and on cool season dairy pasture, the rest period has to be considerably shorter than on warm season grass rangeland. Forage quality would decline and be inadequate for lactating dairy cows. The other variable was the amount of forage left after grazing this ranged from a low of 30% remaining to as high as 50%. Supplemental feeding of the cows while on pasture varied considerably from dry hay to silage or hay and silage, or silage and balage. Three of the farms also fed molasses to the cows while the fourth farm fed only salt and mineral. Observed self-described UHSD grazing practices on these dairy farms are:

- Stocking density ranged from 49,421 to 377,912 kg/ha versus rangeland beef UHSD = up to 560,425 kg/ha
- 30 to 49 days between grazing versus rangeland beef UHSD = 90 to 180 days and dairy rotational = 21 day cycle

- Plant height at grazing = 29 cm versus dairy rotational = 15 to 20 cm
- Forage utilization = 45% of total available, similar to dairy rotational, but taller overall residual
- Most of forage consumption was from the upper plant canopy.

The grazing dairies observed in this study:

- Have taken a modified approach to current UHSD definitions used in rangeland beef stocking.
- Grazing slightly more mature forages compared to typical dairy intensive rotational stocking.
- Slightly longer rotations than typical dairy intensive rotational stocking
- Unlikely that self-described UHSD grazing occurring on dairies in NY and PA is a superior grazing management technique compared to dairy intensive rotational stocking.
- UHSD is a modification of rotational grazing that has been successful on these farms – all of whom are long-time graziers with high levels of management.

Further research is needed to examine effects of transitioning to UHSD.

Dr. Les Vough rounded out this session as a speaker. His presentation was *Bermudagrass Moving North With Lots to Offer*. Bermudagrass in the Mid-Atlantic today has utility in heavy use areas (HUA) and in hay and pasture production. It has the beneficial attributes:

- Warm-season, sod-forming perennial grass to provide grazable grass during summer heat
- Persists under close grazing -- 1-2 inches
- Has ability to heal damaged or bare areas (rhizomes & stolons)
- Much more competitive against weeds during hot, dry periods than orchardgrass, tall fescue, and other cool season grasses, and
- Superior species for using nitrogen and phosphorus.

Vegetatively propagated bermudagrass varieties have performed better than seeded varieties. Early efforts with Quickstand for heavy use areas showed promise. However, drawback is the lack of local sources of sprigs (rhizomes and stolons) and sprig planters. Seeded varieties generally have not over-wintered and tend to be less productive. Due to its ability to persist under close-grazing and heavy use areas, it makes a good choice as horse pasture where farm or stable have little pasture acreage. Current suggested varieties are:

- HUA = Quickstand, Patriot (?), Tufcote (?) (Question mark denotes untested promising variety.)
- Hay/pasture = Ozark & Tifton 44 south of I-70, Quickstand (?)

Two techniques for planting sprigs is the use of a no-till sprigger or a standard rear beater manure spreader. The no-till sprigger opens up a slot at intervals, places sprigs in the slot, and then closes the slot over the sprigs. To use a manure spreader, the soil must be tilled first. The manure spreader spreads the sprigs over the prepared soil bed in a series of passes across the field. The sprigs are disced in with a disc harrow and ideally followed by a culti-packer or rolling basket to improve soil to sprig contact. Irrigating a sprigged field enhances rooting establishment of the sprigs and increases sprig survival. Since bermudagrass can send out both underground (rhizomes) and above ground (stolons) horizontal stems, stands that start out thin can eventually cover all the ground it was planted in.

Dr. Andre Brito was to be the last speaker, but this session ran over in time and had to be ended with Dr. Vough. Here is a brief synopsis of Dr. Brito's presentation, *Effect of Feeding Pasture Supplemented with Ground Flaxseed on Milk Production and Composition in Organic Dairy Cows*. The goal of this

research is to find out if feeding ground flaxseed to lactating pastured and wintered dairy cows can increase omega-3 fatty acid and conjugated linoleic acid (CLA) in their milk thus providing a milk price premium for organic milk producers while providing beneficial effects on animal health and reproductive efficiency and of lower methane emissions (potent greenhouse gas) from the cows. Two experiments were conducted:

Experiment 1:

Twenty lactating organic Jersey cows received (% of diet dry matter [DM]): 0, 5, 10, or 15% of ground flaxseed during the winter season.

Experiment 2:

Twenty lactating organic Jersey cows received (% of diet DM): 0 or 10% of flaxseed during the grazing season.

Unfortunately for the wintered cows fed flaxseed, milk production declined from 47 lb/day to 44.5 lb/day from 0 % to 15% of diet DM. However, CLA increased in milk as the diet received more ground flaxseed. Also, milk omega-6 decreased and milk omega-3 fatty acids increased linearly as the diet received more flaxseed improving the the 6:3 ratio making it more healthful to consuming humans. Meanwhile, methane emissions reduced linearly as well in organic dairy cows fed increased dietary levels of flaxseed during Winter. During the grazing season, 65% of the total diet was forages - 40% pasture and 25% balage of total diet. The 0% flaxseed diet was rounded out with 1.9% molasses and 33.1% organic grain meal. The 10% flaxseed diet was rounded out with 1.0% molasses, 10% flaxseed, and 24% organic grain meal. Milk production was reduced in organic dairy cows fed ground flaxseed and was affected by month during the grazing season. On average, milk production declined from 40.1 lb/day with no flaxseed in the pasture diet to 39 lb/day with 10% flaxseed in the diet. Total mixed ration diet declined from 23.9 lb/day with 0% flaxseed in the diet to 23.1 lb/day with 10% flaxseed. Milk fat content in the milk and milk fat yield did not change significantly with the addition of flaxseed in the diet (0% Flax diet = 1.68 lb/day; 10% Flax diet = 1.65 lb/day). Milk fat yield did vary on a month to month basis, however. Milk protein content, too, was similar between diets but it was affected by month during the grazing season (0% Flax diet = 3.43%; 10% Flax diet = 3.47%). Methane emissions were unaffected by level of flaxseed used in the pasture diet. Take home messaged was:

- Increasing ground flaxseed (i.e., from 0 to 15% of diet DM) reduced milk production and yields and contents of milk fat and milk protein during the winter season.
- However, more dietary flaxseed improved milk fatty acid profile (i.e., more omega-3 and CLA) and reduced methane emissions during the winter season.
- In general, supplementing pasture with ground flaxseed (i.e., 10% of diet DM) did not negatively affect milk yield and composition but did not mitigate methane emissions.

The Producer Session and Public Session that both looked at research needs were shortened to about a half hour. Each session had a recorder. The following are the Private (Stakeholder) sector views.

Private (Stakeholder) Sector Research Priorities:

In order of priority, with statements in bold of specific items that need to be addressed. Any research project undertaken will include a cost analysis of implementation for farmers.

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1. Exploring and explaining the impacts of stream and stream-bank exclusion. This priority is an immediate need and is based on problems in the Chesapeake Bay watershed, especially in Maryland. State regulations are coming out due to EPA's regulations on total maximum daily loading of pollutants in streams and water bodies.

There is not a clear scientific-based answer as to the impacts of careful grazing management on streambanks and water quality. Therefore, the regulations are not based in science but in perception.

Research is needed (or existing research compiled and directed to the proper agencies) on the impacts of grazing riparian areas under different management regimes.

2. More focus is needed on parasite issues for small ruminants, especially given climate change and possibly a longer grazing season.

a. Efficacy of botanical wormers? Are products on the market worth the money?
b. Effects of organic management and conventional co-grazing?

3. How to improve land with low inputs (especially land with C+ slopes) and silvopasture. This is a primary concern, especially given losing moderate quality land to corn production and pushing marginal land into production for grazing.

4. Evaluate and promote forage species, improved varieties and species combinations under grazing management and changing climatic and soil conditions with emphasis on extending the grazing season.

Research problems with orchardgrass persistence.
Specifically why is orchardgrass dying?
What is being done with this 2012 priority?

5. Determine the management strategies and costs of transition or conversion from row crops, forestry and idle ground to productive and sustainable grazing lands and soils.

How do you start the soil biological community when transitioning from row crop, forests, and idle ground to grazing lands?

6. Quantify the economics of whole-farm systems including the effects of breed selection, livestock diversification, and grazing management on animals and pasture health to promote safe, healthy, and secure local community food systems.

Summarize CLA and human nutritional benefits present in grass-fed products.

7. Determine the environmental impacts and profitability of alternative supplemental feeding strategies for animals on high quality pastures.

What is the effect of stock density as it pertains to soil health and animal health?
How do you manage energy in a high quality pasture?

8. Identify and address the limiting factors and marketing opportunities in dairy and livestock pasture-based production systems.

Produce summaries that are accessible to Extension Education, non-profits and health professionals.

9. Explore new alternatives for transfer of knowledge and information to increase adoption of research findings with the agriculture community such as mentoring, case studies, and creative use of technology in promotional materials.

Produce summaries that are accessible to Extension Education, non-profits, and health professionals.

Public sector priorities followed a similar pattern of concerns. More time was spent on the issues of orchardgrass die-off and milk quality and fatty acid content as affected by dairy cow rations being fed, pastured cows (live forage) versus confinement fed cows (conserved forage). However, the impact of restricting grazing in riparian areas was the central issue at the outset of the public sector session.

After lunch break, the next session starting at 1:30 PM was *Pastureland National Resource Inventory - Description of Data Collection & Its Goals* moderated by Mr. Rob DeClue, Area Grazing Lands Management Specialist, Chenango Co. Soil & Water Conservation District, NY. Mr. Sid Brantly, the new Natural Resources Conservation Service National Range and Grazing Land Ecologist, was the first presenter. He presented the *National Perspective of Pastureland NRI, Objectives & Anticipated Results*. He described the National Resource Inventory (NRI) as a snapshot in time of our agricultural land resources and condition. It gives soil loss estimates, agricultural landuse conversions - such as loss to development, and for rangeland and pastureland the NRI also measures their ecological status. Rangeland, grazed forestland, and pastureland national acreage has been on a slow decline from 1982 to 2007, declining from 614,838,000 acres to 583,858 acres. We have been doing a very much upgraded pastureland NRI since 2009. Testing a new set of protocols to measure the plant community present in our permanent pastures. Plant species composition is determined in random plots selected on pastureland and several measurements are done to determine biomass, canopy height, legume content, among other datum. NRCS is getting ready for 2014 pastureland NRI. On February 6, 2014 start up teleconferences will be held for each of the 3 NRCS regions of the US, East, Central, and West. February 18-20, 2014, protocol webinars will be held for each of the 3 regions. National NRI Grazing Land Training sessions are planned on February 24-28, 2014, in Tucson, AZ; March 31-April 4, 2014, in Auburn, AL; and April 28-May 2, near Des Moines, IA. Several modifications to the pastureland data gathering protocols are planned that will make the pastureland inventory unique from rangeland. Both are grazing lands, but they have dissimilar plant communities and productivity that need to measured with a different, but complimentary set of protocols.

Mr. Kevin Ogles, USDA-NRCS East National Technology Support Center Grazing Specialist, gave his presentation, *NRI On Pasture - Regional Overview*, remotely over the conference room phone line. His presentation was displayed while he narrated it. In an overview, he said NRI Grazing Land on-site data has been collected on rangeland since 2003. NRI pasture pilots on cooperator farms were conducted in 2009-2011. No data collection on pasture in 2012 due to the lack of funds. NRI grazing land on-site survey data using NRI sample segments is collected on pastureland starting in 2013. The 2014 non-federal pasture sample will be a part of the 2014 photo-interpreted NRI. It will be conducted in 48

states using NRI sample segments. NRCS will collect data for the first two eligible points (non-federal pastureland) found in the randomly selected sample segments upon verifying in the field that the GPS located points are actually in pastureland. NRI grazing land data collection time-line will be based on the USDA Plant Hardiness Zones map. For pastureland in the East Region, data must be collected in the Southern Zones by July 15th and in the Northern Zones by September 1st. All data review needs to be completed within 2 weeks of data collection. Time-lines will be tweaked in 2014 as needed to keep data collection time-line as tight as possible. For 2014, two measurements have been designated as optional (soil stability test) and not applicable (Species Composition by Weight [production]). With the latter, it can be handled by using Standing Biomass and the optional Dry Weight Rank (DWR) Method. The total aboveground biomass is simply multiplied by the percentage of the plant species found to be present by the DWR Method. In pastures, soil stability is generally high, at or near optimum. Each sample point has two transects radiating through them at right angles to each other, one runs NW-SE while the other runs NE-SW. Much of the data collected is along these two transects. Plant species data is also collected in each of the 4 quadrants formed by the transects, such as the presence of woody species and infrequent herbaceous species present. Data is recorded on a NRI Grazing Land Survey Instrument. It is a web-based computer assisted survey instrument, CASI for short, developed at Iowa State University. It can download and upload sample segments (PSU's). It is used to enter and edit data. Some recorders find it easier in some situations to use clipboard, paper, and pen to make some entries before entering it into the CASI. NRI On-Site Survey Progress Reporting Status is on-line. This provides status of sample segment data collection by survey year and state. Technical leaders at state, regional, and national levels can see how data collection of points is progressing by state. Training videos of grazing land transect protocols are on Transect Layout, Documenting the Plot with Photographs, Ecological Site Determination (range), Canopy Gap (range), Line Point Intercept, Soil Stability, and Production. These videos are produced by NMSU, ARS, and the Herrick Production Company. The web-based NRI Grazing Land Desktop CASI became available in 2010. It supports on-site surveys beginning in 2009 so none of the older hand recorded data is lost. To ensure data collectors are proficient in NRI grazing land on-site study protocols before they begin collecting data, there is a formal authorization process for them. This formal authorization process standardizes training of data collectors. They must pass calibration exercises. There is a written post-training test. It also requires a performance-based post-training test during the data collection process. There are two levels of authorization:

Technical leader

Highest level of authorization
Must be proficient in all grazing land on-site study protocols
Each field crew must have at least one member authorized as a technical leader

Crew member

Lower level of authorization
May not be proficient in all grazing land on-site study protocols

All data collectors (NRCS or contract) are required to complete an annual training session to be authorized to collect NRI on-site data for the data collection year. Data collectors may attend the national training or a state or multi-state training. All data collectors (NRCS or contract) responsible for data are required to complete a confidentiality agreement. NRI data and points are protected from private and public viewing. To-date pastureland NRI has noted differences from anecdotal observation and measured results in these relevant topics:

- % Legumes
- Idled grasslands
- Diversity of Pasture VS. Range
- Amount Pasture in Poor Condition
- Amount of Pasture Lost to 'Other'

The amount of pasture lost to other can be subjective at times. Some fields that are visited and have not been grazed in the current season can appear to be no longer grazed (idled). It is best to err on the side that they may be grazed at some time later in the year. In other situations, it may be clearer that the land is reverting back to forest or is a rural home-site that has no livestock. Percent legume by weight is often over-estimated by eye since they have more leaf area but have thinner stems. Plant diversity in permanent pastures tends to be as high or higher than rangeland. All pastures naturalize with time and in so doing become more plant species diverse. Grazing causes enough disturbance to allow other species to germinate and grow in any slight gap in the canopy.

Ms. Susan Parry, USDA-NRCS State Grassland Conservationist for Pennsylvania, was last presenter at this session. Her presentation was *Pasture NRI Field Experience in PA*. She gave some background on the years when PA was one of the states to test the protocols for pasture NRI. PA began in 2007 with 4 other states, after several years of work with protocols nationwide for rangeland NRI. Fifteen PA farm locations representing a diversity of conditions, easy access and landowner permission were used that year to collect pasture NRI data. Maps identifying field boundaries, cultural features, and soil types were used. Digital latitude and longitude information also recorded. NRI staff at Iowa State University, Center for Survey Statistics and Methodology (CSSM) selected 10 out of the 15. PA NRCS staff performed the transect survey on two valid points within each segment location. PA continued to collect data in the following years except for 2012. Other states were added to the pilot test. In 2013 Statewide Pasture NRI pre-data collection required landowner access permissions, sample point locations, site maps, soils maps, confidentiality agreements, and training. PA pasture NRI training and calibration exercises were done to ensure data collectors perform protocols consistently for precise data results. This was achieved by:

- Performing protocols on same sets of transects
- Comparing data obtained by multiple teams
- Field team leader is present to observe
- Conducted during training session, and again
- Two additional calibrations during field season (one if fewer than 15 segments validated)

East Region 2013 pastureland NRI training was done at Troy, NY. Supplies and equipment needed are field PC (Trimble unit), digital camera, measuring tapes (2/150 ft.), survey pins and flags, clipboard, compass, and clinometer. For the PA 2013 Pasture NRI, we were assigned 14 segments (42 points) in 12 counties. However, 30 points were eliminated due to change in land use or ineligible for data collection, change in landowner and could not reach new landowner, and denied access on two. Therefore, only 12 points inventoried in 7 counties. Of the 12 points, 5 were grasslands. Others were "capable of being grazed" with some improvement, including infrastructure and plant condition. Teams consisted of a soil scientist, team leader, a regional grazing specialist, and student intern. Here are their assigned duties:

A= Soils staff person; B= Team Leader; C= Grazing specialist; D= Student Assistant

A does GPS with/or in CASI to locate point, B prepares dry erase board/signs for photos while assisting C (or D) who lays out tapes for transect.
A verifies soil at point and takes all photos and board (D could help here), while B & C begin Line Point Intercept and Canopy Gap protocols.
B does Disturbances, Resource Concerns, and Conservation Practices (D could help here) while A&C finish Line Point Intercept and Canopy Gap.
A & C do DWR, then PCS, WHILE
B does Standing Biomass clipping (D could help here).
ALL do Plant Census.
ALL three (or four) people gather to reach consensus on recorded PCS scores, disturbances, conservation practices, & resource concerns and get all protocols into the CASI (or finalize paper version).
PA 2013 Pasture NRI Schedule:

- Southeast counties were done in mid-June;
- Northeast (Bradford, Centre) early July;
- West (Allegheny, Crawford, Elk, Lawrence, & Washington) were done in second week of July.

Nationally in-field reviews require each Field Team Leader to visit at least 5% of the segments completed. The PA Field Team Leader and student assistant were part of the team for every point done in PA. Laying out the transects can be challenging at times. They can be in tall grass or mowed grass, center point in a fence line, center point in a yard, or center point in a crop field, and even in line with an obstruction such as a utility pole. This led Susan to say "NRI is like a box of chocolates- You never know what you're gonna get!" Some of the additional features of the CASI are the recording of resource concerns present in the pasture, yes or no; the presence of conservation practices, yes or no; and pasture condition score sheet factors to rate besides the vegetative data gathering. Post-Collection data review can identify anomalies/data entry errors of data posted daily during field season. The Team Leader/State Grasslands Conservationist review and resolve. Password-protected review tables are posted. It is done on-line (CASI website) within two weeks. NRI Grazing Land Images Website stores digital field photos (lots of them!) to a temporary database. Tag photos with identification and mask out confidential information before submitting to a permanent database. View tagged images and review and edit as needed. Lessons learned:

1. Support/Technical staff contact info – have it with you!
2. Paper copies on hand for every site (hand-held failures)
3. Bring Plastic bags for DW samples instead of paper…in case of rain!
4. Label all sheets and sample bags before going to the field
5. Keep all scrap paper until you figure out if it is "scrap!"
6. Don't forget your user name and password for the CASI website.

Looking forward to 2014 NRI…

The first poster paper break occurred between 3:00 PM and 3:45 PM. Poster paper abstracts are on a separate document as an attachment.

2014 Northeast Pasture Consortium Annual Conference & Meeting Minutes held at the Ramada Conference Center, State College, PA, February 4 - 5

The final session of Tuesday afternoon was *Birdsfoot Trefoil and Other Alternative Forages* moderated by Mr. Donald Wild, Wild Acres Family Farm and King's AgriSeeds, Inc. Dealer, Great Valley, NY.

Dr. Ed Rayburn, Extension Specialist-Agronomy, West Virginia University, presented *Birdsfoot Trefoil An Alternative Legume*. Dr. Rayburn started out with a disclaimer saying, "Birdsfoot trefoil is one of my favorite plants. We named our dairy goat herd "Trefoil Meadows". Birdsfoot trefoil is *Lotus corniculatus*, one of 100-176 Lotus species worldwide, many in Mediterranean region. Sixty Lotus species are native to North America's West Coast. Besides birdsfoot trefoil, two other species *Lotus uliginosus* (*L. pedunculatus*) – big trefoil and *Lotus tenuis* – narrow-leaf birdsfoot trefoil are used in agriculture. Birdsfoot trefoil has a deep yellow flower and the characteristic birdsfoot-shaped seed pod cluster at maturity. The second part of its name, trefoil, comes from the 3 leaflets at the end of each petiole. It also has 2 leaflets at the petiole base, a lumping with clovers/trifolium. It is indeterminate in the growth so that it can be still flowering and also have seedpods if left unharvested past first seed set. As the seedpods dry, the pods twist open popping out the seeds. A delay in harvest by haying or grazing to allow this to occur will prolong stand longevity as new plants will replace older plants that die as a result of insect root feeding/fungal root rot. Trefoil seeds are smaller than alfalfa so a pound of trefoil seed per acre will leave 9 seeds per square foot versus 5 for alfalfa. Consequently, its seeding rate is usually 6-8 pounds per acre versus 8-12 pounds per acre for alfalfa using a drill on a firm seedbed. Pasture type birdsfoot trefoil is procumbent, lying somewhat flat to the ground with a runner appearance. Hay types are more upright for ease of mowing. Birdsfoot trefoil advantages are:

- Fix N from air (special rhizobia, Rhizobium loti)
- Tolerates low pH, 85% of maximum yield at a soil pH of 5.0
- Tolerates poor soil drainage
- Tolerates excessively drained soils
- Tap root
- All growth types do well under rotational grazing
- Low bloat potential
- Tannins in some varieties, which confers
  - By pass protein to ruminants
  - Parasite control/tolerance
- Stands long lived through seedlings
- Thick stand can produce 400 lbs seed/acre
- Seed viable in soil for over 20 years

Birdsfoot trefoil weaknesses are:

- Low seedling vigor
- Slow establishment
- Plants short-lived, due to insect root feeding/root rot complex
- Needs adequate rest interval
- Hay types not tolerant to set stocking
- Need to allow seed to mature and set occasionally.

Birdsfoot trefoil needs a 4-inch stubble height and be harvested at full bloom to get the best stand vigor unlike alfalfa. It should also be harvested no later than late August so fewer cuttings are possible to maintain the best stand vigor. A harvest interval of 6 weeks after first cutting will have the plant at full

bloom and give optimal yields. Rotational grazing gives the most days of grazing per season, over 220 days versus between 182 and 198 days under continuous grazing. Average daily gain was nearly identical for the two stocking methods, but 20-40 more days of grazing under rotational stocking. Pasture forage yield of birdsfoot trefoil was 3.33 tons/acre for Viking, an upright trefoil, and 2.81 tons/acre for Empire, a recumbent trefoil. Hay yields were 4.18 tons/acre for Viking and 3.59 tons/acre for Empire. Dr. Rayburn went on to describe the pasture pharmacology of birdsfoot trefoil. Trefoil produces condensed tannins (CT). CT complex with soluble protein in the rumen which reduces protein/bloat foam so bloating on it does not occur as it does on other legumes. This reduces protein digestion in the rumen which allows protein digestion in the lower gastrointestinal tract. This provides high quality amino acids directly to the animal. CT are polymers of flavanols. CT accumulate in the vacuole of the epidermal and sub-epidermal layers of the leaves (also fruits, bark, seeds, roots). CT are produced by dicotyledonous plants so grasses being monocotyledons do not make them. CT are a chemical defense mechanism in plants (decreases herbivore intake). CT concentration in plants is affected by genotype, plant development, environment/season, and herbivory. CT can also affect the development of infective helminth larvae (worms) in the feces host animals. CT may enable livestock to resist helminth parasites by providing bypass protein as well. In summary, birdsfoot trefoil tannins provide low bloat potential, bypass protein, and parasite inhibition/tolerance. It just needs some attention to detail in keeping it thriving in our pastures and not be treated the same as other legumes.

Mr. Don Wild was the second and last presenter of the afternoon on birdsfoot trefoil (BTF) and other alternative forages. He gave a *History of Birdsfoot Trefoil Production in the Champlain Valley of New York and Vermont*. It originated in Europe, Asia, Mediterranean Region. It was introduced into the US in the early 1900's. It is a long-lived, deep rooted legume suitable for hay and pasture in areas with drainage problems or low soil pH. It will not out-yield alfalfa on better drained soils with high water-holding capacity and an optimal pH of 6.5 to 7.0. He listed many of the same characteristics as Dr. Rayburn did, but included that BTF has nutritive value equal to or greater than alfalfa. As the plants mature, forage quality is maintained better. Regrowth of BTF occurs on the lower stems/leaves whereas alfalfa occurs from the crown. If harvested too short (<5-6 inches), regrowth will be retarded. Another difference is when BTF is harvested, the nitrogen-fixing root nodules die. This further retards regrowth. Seed rate is 4-6 lb/acre at ¼ to ½ inch deep; compact soil with a culti-packer type drill. Ten to 15 seeds are borne in long cylindrical pods which turn brown to black at maturity. Average 5-6 pods (1-1.5 inches long) arranged at right angles to the flower stem that radiate out from the stem, thus giving the appearance of a bird's foot. A very narrow seed harvest window exists as seedpods shatter easily on any impact. BFT has many well branched stems arising from a single crown. Stems may reach a height of 25-35 inches and are smaller in diameter, and less rigid, than alfalfa. Varieties:

- Empire – Viking – Norcen – Pardee – Leo – Exact
- Empire: Low growing, often for pasture.
- Viking: Upright growth, suggested for hay production.
- Norcen: Often considered a hybrid for multiple use.
- Pardee: Variety developed by Bill Pardee (Cornell) and released in 2003. A high yielding and persistent trefoil variety that is resistant to Fusarium Wilt.

Fusarium Wilt is a soil borne disease resulting in the rapid wilting, root discoloration, and plant death in seeding year stands of Birdsfoot Trefoil. The direct result of the decline of the once thriving trefoil

seed industry in the Lake Champlain Valley of New York and Vermont in the late 1970s and early 1980s. This disease showed up in Erie and Wyoming Counties (Western NY) in the 1990s. It was not until 2009 when a Cornell plant pathologist determined the characteristics and biology of the fungus that produced these symptoms in trefoil. This unique biological strain of "Fusarium oxysporum" they named as form species "loti" to denote its pathogenicity to trefoil. Isolates collected from wilted birdsfoot trefoil plants caused severe wilting and root discoloration in greenhouse-grown BFT plants. A low level of disease occurs in some pea plants but no disease in alfalfa, red clover, dry bean, or soybean plants. Thus the trefoil wilt pathogen found in parts of NY and VT appears to be a unique biological strain with a limited host range. Movement of infested hay and soil will most likely occur in the future, resulting in spreading the pathogen to other regions.

The "Champlain Valley Seed Growers Cooperative" was incorporated on June 11, 1948 in Essex, New York. Their headquarters was located in Westport, NY, Essex County. Membership consisted of both dairy and field crop producers on both sides of Lake Champlain. Chairman for many years was Richard Sherman and advisor was Ray Bender from Cornell Coop. Extension and UVM. Plantings of certified small grains (soft and hard winter wheat and oats) and certified Birdsfoot Trefoil (BTF) were their main emphasis. They planted seed production fields with straight BTF or BTF with cool season grasses. First cutting was cured and harvested for hay; the second cutting was for seed production. Yields may reach 300 lbs. per acre if harvested timely. Common varieties were Viking, Empire and unnamed. Seed marketed through the Co-op or used on farm. Fusarium Wilt decreased production in the Valley by the late 1970's and early 1980's. With BTF not being able to survive past the seeding year, the cooperative disbanded in the early 1980's.

Mr. Wild's second presentation was *Alternative Forages for Grazing*. He gave these alternatives:

- Grazing Corn: Specifically developed for grazing. Begin strip grazing when tassels appear. Stagger plantings to prolong supply of grazable corn.
- Small Grains and Mixtures with Small Grains:
  - Oats – Wheat – Rye – Barley : For Grain or Grazing
  - Forage Oats
  - Triticale
  - Oats plus Peas
  - Oats and Annual Ryegrass
- Summer Annual Grasses (BMR, non BMR, gene 6, etc.)
  - Forage Sorghum
  - Sorghum-Sudan
  - Sudangrass
  - Grain Sorghum
  - Millet (Pearl, Japanese)
- Brassicas
  - Appin, Barkant, or Purple Top Turnips
  - Rape
  - Swede
  - Above seeded with oats, triticale, wheat, etc.

- Clovers
  - Crimson Clover
  - Common Medium Red
  - Others and combinations for cover crops or short term.
- Cover Crops and Specialty Items that can also be grazed.
  - Annual Ryegrass
  - Italian Ryegrass
  - Daikon Radish, Nitro-Radish
  - Hairy Vetch
  - Chicory

The Conference was adjourned at 5:00 PM for dinner before the evening session began at 7:00 PM.

The evening session was the *Producer Showcase*. This featured two pasture-based farm speakers.

Ms. Melanie Barkley, Maple Hollow Farm and Penn State Extension Educator, was the first presenter. She presented *Matching Sheep Genetics to On-Farm Pasture Resources*. Maple Hollow Farm has 3 livestock enterprises: Sheep - Aussie Dorsets, Tunis, Border Leicesters, Cattle - Feeder steers, and Chickens - pastured broilers, 100 raised twice yearly. However, the sheep enterprise is their main stay. Her Husband, Brian, and her like Aussie Dorsets because of their performance on pasture: They thrive on grass - a 60-day old lamb can weigh 95-97 pounds, their reproductive performance - 200% lamb crop, and carcass quality - loin eye size of 2.1 to 3.1 inches. They learned about them on Future Farmer of America trips to South Wales, Australia. They have 22 main pastures that they rotationally graze. The pasture soils range from flat and wet to steep, shallow, and shaley. Pasture forages are birdsfoot trefoil and Alice clover legumes and orchardgrass, perennial ryegrass, reed canarygrass on the flat and wet soils, and some bromegrass. They soil test regularly and lime fields to maintain a pH to grow legumes. They use high tensile wire fencing. Perimeter fencing is 5-6 strands. Subdivision fences are 2 strands of wire since they work off the farm during the day. Smaller subdivision fences are two strand polywire with tread-in posts. Streambank fencing is along all live streams and rock armored fenced stream crossings are their conservation practices. They utilize a variety of watering systems from concrete troughs to portable plastic troughs, gravity flow spring development water to well water, and even a solar powered water pump to pump water uphill - this waters the chickens, 100 drink a lot of water. Their pasture system consists of 4-5 days of grazing per section, clip following grazing, water provided in each pasture, residual grass height after grazing no shorter than 3 inches, 60-day rotation cycle, maintain soil pH, and use critters that work FOR you, not you for them.

Mr. Cliff Hawbaker, an organic pasture-base dairy farmer, was the last presenter of the evening session. He presented *A Dairy Farm's Transition to Organic*. He owns two dairy farms, Hamilton Heights and Emerald Valley. Hamilton Heights is patterned after a West Coast dairy farm as supplemental feed is brought in, not raised at the farm. He asked farmers that were going out of dairy to raise corn for him. He has 5 corn growers providing him grain corn. He has been pasturing cows since 1999. In 2000, he went to Switzerland. This inspired him to convert his Hamilton Heights to all pasture by 2005. The Emerald Valley farm was converted to hay and pasture. 770 acres of hay and pasture with 670 acres of it fenced. He then moved on to the organic certification process. He last used chemical fertilizer in

2009. The organic transition for him began in 2010. Anyone considering transitioning to organic milk production needs to find a market for the milk. He had a nearby independent organic milk processor that he chose out of two available choices. The person wanting to go organic must want to be a grass farmer, not a field crop producer. A transitioning organic dairy farmer should contact an organic certifying agency to get all the information required to understand the organic standards and time frames involved to get certified. It is a good idea to involve an already certified organic farmer willing to be a mentor so you can call to ask for advice when you are unsure about something. For both crops and livestock, pick a date when you will use the last non-organic product. This is important if there is a lingering problem with a crop fertility issue or pest problem or livestock health issue. You may be better off using a non-organic treatment measure that quickly solves the problem before going to organic products only. Sometimes the organic choices are few and less effective. For cropland, there is a 3-year transition before they can be declared organic. Livestock is only a 12-month period of organic practices only. Soil fertility is enhanced by plowing down high tonnage green manure crops and livestock manure. He uses brown midrib sorghum sudangrass as a green manure crop. He harvests the first crop and then discs in the second crop as a green manure crop. His pasture management involves rotational grazing, fall stockpiling, mob grazing, grazing tall, and summer fallow. He often hosts or attends Franklin County pasture walks to learn by sharing experiences. In southern PA 60% of the forage production occurs by the end of June. If grass production at that time of the year is lagging behind, begin culling cows by June 21st to avoid being short of pasture the rest of the grazing season and losing milk production. Once milk production falls to 5-10 lbs/day/cow, it is best to dry them off. He likes to make "sweet hay". Always seeking to make the best hay. Cannot afford to lose sugars in the grass by fermentation or respiration. He mows in the morning. He mows high; 48 hours later regrowth is 6-8 inches high. Four hours later, the morning mown hay is tedded. It takes 2 days to get the hay down to 20-25% moisture. He does not crimp the hay. He rakes the hay just ahead of the baler. Mr. Hawbaker discussed some livestock health and reproductive issues for an organic dairyman. For mastitis there is a topical treatment that is acceptable. If the cow has a chronic health issue, sell her. Artificial insemination is acceptable but if non-organic bull semen is used, the off-spring cannot be sold as an organic animal. He likes cows that weigh about 1100 pounds that have a deep chest and barrel as they have more rumen volume for eating grass. He uses cross breeding for hybrid vigor. Financial risk in transitioning to organic was the next issue brought up. Financial cash flow can be a challenge because changing from a conventional farming practice to an organic style has different cash flow expenses. The income can lag behind. The need for credit changes as farm transitions from a production cash flow and inputs system to a soil and livestock health and wellness system. Without some thought and planning, this can cause a negative net worth until performance catches up to your goal and plan. Be sure to right size the farm, livestock demand for forage has to be consistently matched with forage production throughout the year. He enjoys grass farming as wildlife is more plentiful, meadowlarks in particular. He also likes to get a premium price for doing what he likes best, growing grass. A question and answer period followed. Someone asked for more details about the pasture rotation system. He has 42 paddocks. The first rotation cycle ends May 1. Paddocks are halved between milkings. Springtime rotation cycle is 21 days; unused paddocks are hayed. Later on as grass growth slows down rotation cycle extends to 30 days, and during dry weather the rotation cycle is 42 days long. Some asked about feeding organic grain and its cost. Mr. Hawbaker responded that if you are going to feed organic grain, it would be better if you raised it yourself. Another person asked about clipping pastures after a grazing event. Mr. Hawbaker said he does not clip: he prunes

(mows high). He likes to finish pruning by 15-20 May.

On February 5 at 8:00 AM, the *Pasture-Based Farming Research Needs Discussion* session began, moderated by Mr. Joe Hatton, Private Sector Co-Chair of the Northeast Pasture Consortium. Mr. Hatton had led the Private Sector Research Needs breakout session on Tuesday. Two farmer members were spokesmen for two priority research needs, riparian area grazing management for water quality and forage production and the orchardgrass die-off problem in the Mid-Atlantic states. Mr. Lawrason Sayer, owner of Waffle Hill Farm, Churchville, MD, spoke about the dilemma he faced with having to fence off streams running through pastures on his farm. Permanent fencing is expensive and cost prohibitive if it involves several thousand feet of it. Meanwhile, the streams are not highly impacted by cattle when rotational grazing is used as has been done for several years on his farm. He felt that such a disincentive to graze grassy riparian areas could lead some farms to crop these fields instead of grazing them. He was not sure that the landuse conversion would make the streams less prone to nitrogen and phosphorus inputs from the adjacent new landuse. More likely, it would worsen sediment inputs even with a grass buffer setback. He feels that Maryland is the guinea pig to test the waters for excluding livestock from streams through the Chesapeake Bay Watershed. A review of recent literature is in order to see what is already been studied but not disseminated well. Even the ban of spreading manure from November to mid-March is untenable, where pastures are stockpiled for late fall and early winter grazing. We need a water quality validated riparian zone pasture management system. One person observed that you do not always the get the answer that you are looking for. However, so far, the research is in short supply for either side of the stream-side exclusion of livestock issue to be sure they have the correct take on the issue. Dr. Les Vough was pleased that the Consortium was able to get MDA and USDA-NRCS in Maryland together for the riparian grazing session. It got them communicating with each other and the people impacted by the Nutrient Management regulations. The listening audience suggested other problems with total exclusion of livestock along stream corridors. Some have seen invasive species such as multi-flora rose, thistles, autumn olive, and a host of other unwanted plants invade these narrow stream corridors since they are often not wide enough to allow access for mowing machinery or are dangerous terrain to traverse with a tractor. If left to naturalize, these stream corridors will eventually be tree-lined. This creates shady areas near the streams that would entice livestock to camp under the shade. If grazing management is long term continuous grazing, this eventually leads to compacted and bare soil areas adjacent to the stream that are often highly fertilized by dung and urine. This too creates a worse situation than a random urine or dung spot occasionally deposited in or within a few feet of a stream in an unfenced situation. The fencing practice alone without a good grazing management plan on the remaining riparian area pasture would not necessarily reduce inflows of nitrogen and phosphorus to the stream either. Repeated, close grazing with little or no ungrazed grass buffer between the stream and the remaining pastureland is unlikely to cause a change for the better. The other issue of permanent fencing is that in floodplain situations, the fence will be a constant maintenance headache. If not maintained, it is no more effective than a grazing management plan that is not faithfully followed. Enforcement of either practice is difficult. Putting up a "permanent" fence gives a false sense of security to environmental agencies. One flood or a down tree limb(s) on the fence could render it useless. Is there a plan to investigate every stream-side fence after every flood event? Is it easier to check the fence than checking the grazing management of a pasture? Not really, especially once the fence disappears from road view. If a stream crossing is constructed, but not gated, livestock still have access to the stream, just at a more concentrated spot. Is

this a water quality improvement? Not if access to the stream is still 24-7. How often is the operation of this "improvement" going to be checked for compliance? Realistically, not often or at all. There are priorities and personnel and time constraints. Structural practices are often seen as complete and walk-away practices. Job done. This is incorrect. Nothing lasts forever, and without maintenance and follow-up checking, no surer to be there than a management practice.

Mr. Don Wild was the spokesman for the orchardgrass die-off issue. He said that orchardgrass is one of our most productive pasture grasses in the Northeast, particularly for dairy farmers. It is the foundation of a pasture mixture. He was worried that this problem of whole stand loss in the Mid-Atlantic states could progress northward into New York and New England. The grass is highly adapted to the climate and soils in the Northeast. As a seed dealer, he felt that research needs to be done immediately to see what the underlying cause is. The audience responded by agreeing that it has become a serious problem in the southern part of the Northeast. One person thought it might be related to a soil fertility or soil compaction issue. There is anecdotal evidence of this from farmer interviews. Another mentioned that Virginia Tech University had one researcher working on the problem and recently has a graduate student working with him on this issue. They have found that the bluegrass and hunting bill-bugs are apparently to blame for a lot of orchardgrass die-off in northern Virginia. The VT graduate student is going to conduct on-farm survey later this year to investigate the cause of orchardgrass loss. It was suggested that a Virginia Tech speaker be invited to our next conference. There also is a Mid-Atlantic Task Force looking into orchardgrass die-off. Don also mentioned that the cereal rust and mites have been a problem on timothy as well. He knows of 5-6 farmers having this forage problem. Variety improvement of bermudagrass to make it more winter-hardy was suggested since our native warm season grasses have not performed well under agronomic management and have some nutritional drawbacks as well.

The second poster paper break session was held from 9:15 AM to 10:00 AM. This allowed people to visit poster papers that they did not have time to view yesterday afternoon.

At 10:00 AM, the last technical session *Control of Parasites in Pastured Small Ruminant Livestock through Integrated Use of Pasture Management, Botanicals, and Pharmaceuticals* began. Ms. Diane Schivera, Maine Organic Farmers and Gardeners Association, was the moderator. Dr. Tatiana Stanton, Cornell Small Ruminant Extension Specialist, and Dr. Katherine Petersson, University of Rhode Island Assistant Professor of Animal and Veterinary Science, were the two speakers. They rotated their presentations by topic. Ms. Schivera gave out 2 handouts, *Oregano oil for internal parasite control in sheep, goats, and beef cattle* (acts an ionophore or coccidiostat), and *Vermi-Tox Study*, a herbal dewormer containing condensed tannins.

Dr. Katherine Petersson started out the session with a presentation called *War of the Worms*. Worms in small ruminants are not a new problem. In the 1920's, drenches that included carbon tetrachloride and copper sulfate/nicotine, were used to kill intestinal worms. Gastrointestinal (GI) nematodes biggest health problem east of the Rockies. ALL GRAZING ANIMALS HAVE WORMS!!!!!!!!! The most important is the barber pole worm, *Haemonchus contortus*. It is an abomasal (stomach) parasite, exploiting many environments and management practices. Typically, it is a warm weather worm but survives everywhere with adequate moisture. In summer, it is the predominant stomach worm even in

Vermont. It is a blood-sucking parasite. A heavy burden of these worms can result in anemia and bottle jaw, a swelling of the lower jaw, and weakness. They consume a ½ cup or more of blood per day. They do not cause diarrhea usually. Subclinical losses are possible. Decreased gains and growth are typical. Related parasites also contribute to problems and can cause diarrhea are brown stomach worm (*Ostertagia,Teladorsagia*) and *Trichostrongylus*. The others are less important. The brown stomach worm (*Ostertagia spp.*) used to be considered the most serious parasite of sheep in cool climates. The worm develops in gastric glands of stomach (abomasum) and destroys the glands as they grow. It decreases s appetite, digestion, and nutrient utilization. Clinical signs of infestation of this worm are diarrhea, reduced appetite, and weight loss. GI nematodes (worms) have a life cycle that goes from an egg to worm stage. Eggs are in the dung of ruminants. When they are deposited on the ground, it takes from 5-7 days to hatch in warm weather. Once the worms hatch, they climb up on grass blades and can swim in dew or rain drops adhering to the leaves. The ruminant eats the grass and thus gets infected. These infective worms may live for 17-21 days. The worms while in the open environment are encased in a protective sheath. Once they are in the ruminant's rumen, they shed their sheath chemically. While they are in the sheath, they can't eat once they reach the infective stage. Once metabolic reserves are used up, they die. The hotter it is, the faster they wiggle, the quicker they die. Under cool, moist conditions, they can live for months. Freezing kills some species, including *Haemonchus*. In the winter, on pasture as eggs or larvae, only some species can make it through the winter. As larvae in the host in a dormant state (arrested or hypobiotic), they can survive the winter. There is no sign of disease and no eggs found in the feces. Goal is to manage the worms, not to eradicate the worms. Goal is to keep worms at a level that doesn't have detrimental health effects. Climatic effects on worm abundance and presence are: Warm, wet grazing seasons perfect for *Haemonchus* and with a short life cycle of about 3 weeks from infection to egg laying, milder, shorter winters extend transmission season. Vermont worm season is July-August. Virginia worm season is June-October, and in Florida worm season is all year long. Barber pole worm has become more important in the Northeast. Past wisdom--other worms more important, but today veterinarians and producer experience say it is the most important. Most numerous eggs found in project samples in New England. The increased importance is probably due to resistant worms and/or changing, lengthening grazing season. High density grazing on permanent pastures increases chances for infection. Since 1960's have had fantastic drugs for treatment of sheep and goat GI nematodes. They are highly effective against adults and larvae (>95%), safe, nonprescription, and CHEAP. However, the overuse of these drugs has caused drug resistance. Some worms with a genetic ability to resist a drug always exist at low levels because of random gene mutation. When the drug not present, the resistant worms have no advantage. Use of a drug gives those worms an advantage and gradually the number of resistant worms increases. Forty to 55 percent of NY and PA goat herds show severe resistance to Ivermectin and Fenbendazol, respectively. Fecal egg reduction rate study for each dewormer class in a New England showed only a 50% reduction for Benzimidoles, a 65% reduction for Macrolides, and a 75% for Nicotinics. Management practices that speed up development of drug resistance are:

- Frequent treatments
- Treating all the animals at once
- Under-dosing
- Treating and moving to clean pastures
- Treating when there aren't many worms on pasture (drought, end of winter).

All these decrease the REFUGIA on your farm. Refugia is the portion of the parasite population not exposed (=unselected) when a drug is administered. Worms on pasture, and in untreated animals, keeps susceptible worms in the population. This is a good thing. The higher the refugia, the greater the chance that there will be susceptible worms around to reduce the chances of 2 resistant worms mating. Goals of rational drug use are to prevent disease/loss and minimize rate of development of resistance so reduce treatments and maintain refugia. Sheep and goats metabolize drugs differently so the effective dose in goats is two times the sheep dose except for Levamisole (1.5x) and Moxidectin injectable—don't use it. Other ways to increase refugia are: (1) Don't deworm and immediately move animals to safe/clean pasture, only resistant worms will go to the new pasture. (2) Put back on old pasture for awhile to pick up susceptible worms or just treat some animals before move. Don't deworm all animals at the same time. New drugs keep coming out such as amino acetonitrile, Monepantel—Zolvix It is a different class of drugs, but it will select for resistant worms just as quickly. As an alternative to commercial dewormers are herbal dewormers. Several products are commercially available containing variety of plants, but are not regulated by the FDA. No requirement for studies to support efficacy or safety and no guarantee of consistency from bag to bag. Dewormer use in organic sheep operations guidelines are:

- Ivermectin, moxidectin and fenbendazole (prescription only) currently allowed for limited use
- Prohibited in slaughter stock sold as organic
- Allowed for emergency treatment of dairy and breeder stock when all else fails
- Milk or milk products cannot be labeled organic for 90 days following treatment
- If offspring to be sold as organic meat, cannot be used in last 1/3 of gestation or during lactation
- Must treat in humane situation

Parasite Control in Sustainable Systems should follow these guideposts. Parasite losses are a management disease. We have ways of controlling parasites. Each producer has to decide which control methods work best for him or her. An integrated parasite control program is a must. Sheep and goats develop a natural immunity to GI worms. This immunity controls parasites, but does not eliminate them. Immune animals will still have eggs in manure. This immunity is in place at maturity. Goats more susceptible than sheep to GI worms. In all flocks, some animals are more susceptible than others to worms. Animals with temporary high susceptibility to parasites are the young--before immunity develops, lactating ewes and does, and ewes at time of lambing are especially susceptible. Poor health or nutrition animals are also highly susceptible. Animals with an INHERITED high susceptibility to parasites should be culled. All other things equal, ~30% of the animals have 80% of the worms. Select for more parasite resistant breeding stock. Ask breeders if they have information on their breeding stock resistance to worms. Use fecal egg counts to assess problem in your flock. Anyone can make any group of any breed more parasite resistant with selective breeding. Sheep breeds with higher levels of resistance to parasites are St. Croix, Katahdin, and Gulf Coast/Florida Native. One has to keep selecting for parasite resistance even in more resistant breeds. There is less research on variation in resistance in goat breeds. Immunity can be used effectively by doing selective deworming programs. This concentrates dewormer use on animals that need it the most. Less dewormer is used. It slows development of resistance to dewormers. Treating the high 33% of the flock with a drug that causes a 99% fecal egg count reduction (FECR) reduces daily pasture contamination with eggs by 80%. Following treatment, > 95% of eggs are being shed by untreated goats = REFUGIA. To discover the highly susceptible sheep and goats to barber pole worm,

FAMACHA is a popular targeted (selective) deworming program. It matches color of sheep or goat ocular mucous membrane to a color chart. A #5 color indicates an anemic animal that is heavily wormy. It identifies which ones to treat, but it ONLY WORKS FOR BARBER POLE WORM. Another means to select susceptible animals is to identify wormiest animals by doing fecal egg counts.

Dr. Tatiana Stanton gave a presentation entitled *Basics of Pasture Management to Help Control Internal Parasites*. On Pasture, eggs in feces fall from animal to ground. Requires warmth (may be as cool as 50+F but lots of response by 60 F) and humidity to hatch into first stage larvae, L-1. This occurs in 1-6 days. L-1 eats bacteria in feces and grows, molts (sheds skin like a snake) and becomes L-2. L-2 also eats bacteria in feces and then molts. Direct sunlight can heat fecal pellet to 155 F and sterilize pellet – This is an excellent time to mow a pasture short to aid in drying the fecal pellet. Shade trees and tall, dense grass increase humidity and protect fecal pellets from the sun, increasing worm hatch and survival problem. L-2 molts to L-3. However, the cuticle (skin) is not shed, so the L-3 has 2 layers of cuticle (sheath). This makes the L-3 much more resistant to drying out. However, the L-3 cannot eat, because his mouth is covered. He must live off his stored reserves. Since he is cold-blooded, his metabolism speeds up when it is hot. He can only live about 30-60 days in hot weather or 120-240 days in cool weather. He can not survive freezing. Pasture becomes infective at this time. Most L3s do not get more than about 2 inches high on grass blade. The L-3 must escape from the fecal pellet to infect an animal. The L-3 can only live about a week or two inside a fecal pellet if it is hot and dry. Pellet must be broken up by rain (2 inches in a month's time), then the larvae scoots on a film of water (from rain or dew) and gets under fallen leaves or other debris, OR scoots on a film of water 2-3 inches up onto fresh forage. For the barber pole worm life cycle, maybe only 2-10% of eggs end up as L-3 larvae on forage. L-3 must be eaten by a goat or sheep to continue development. Cattle and horses can "vacuum up" L3 larvae from goat pastures and stop its life cycle. If available, use them to graze pastures in between rotational cycles of sheep or goats. Use clean or safe pastures – wise management decisions about pasture height, grazing duration and pasture rest - easy to say, difficult to implement for entire grazing cycle. Give priority to recently weaned young stock > lactating does/ewes > dry animals. Practice evasive by moving animals fast enough to prevent infection from feces deposited during current grazing period (autoinfection). Takes 3-5 days to hatch at 77-79˚F, 15-30 days to hatch at 50–52˚F. Often ~5 to 14 days from egg to L3. Play it safe with 4 day (wet, warm) to 7 day (cooler, drier) grazing duration. Move earlier if pasture getting too short – i.e. 3 inches. Allow a long enough rest period that there is substantial L3 die off before animals return to graze (60 – 105 days). Problem with this latter remark is pasture rest periods to control barber pole worm need to be longer than normal recommendations for either pasture health or nutritional value of the forage (42 days or less). Options for keeping pastures from getting too mature while avoiding barber pole worms are graze cattle or horses in between sheep or goats, clip pasture, or harvest hay crop. Rotational grazing in the spring appears to reduce the "barnyard effect" and delay the onset of summer parasite problems. Barnyards with grass or other good forage lead to high concentration of manure and internal parasites in grazing material and can contribute greatly to herd contamination with internal parasites. There may be a "barnyard effect" in pastures that border barn and are not rotationally grazed to keep higher grass stubble heights. Worm egg counts were much higher in kids in early spring that were on continuously grazed pasture versus rotationally grazed due to this barnyard effect. By late July egg counts were similar. Central graining and watering areas can also have a barnyard effect. Some options to help reduce barnyard effect is to lay down gravel, concrete, or herbicides, close off access to barnyard or

provide hay in barn at night when animals come in from pasture to cut down on night grazing in the barnyard, make barn yards small so that no grazing occurs, or put in lanes or leave animals out 24/7.

Dr. Peterssen did the next segment on *Evaluate the effects of vitamin E supplementation (10 IU/kg BW/day - VE 10) on lambs experimentally infected with Haemonchus contortus*. Elevated levels of vitamin E supplementation had a beneficial effect on the abomasal worm burden. VE 10 lambs tended to have a lower mean fecal egg count and higher eosinophil and globule leukocyte counts. Future studies will examine mechanistic effect of VE supplementation on GI nematode infections in lambs including direct effects on parasitic defense mechanism. Dr. Peterssen also briefly mentioned that cranberry leaves contain high levels of proanthocyanidin condensed (PAC) tannins. The leaves are by-product of harvest in Wisconsin and Massachusetts. The abstract is in a form of a powder and has anthelmintic properties. Cranberry leaf powder PAC exhibited anthelmintic activity against L1/L2 *H. contortus* after 48 hour incubation at a concentration of 1.25 µg/ml, larval development at a concentration of 600 µg/ml, and adult *H. contortus* after 48 hour incubation at a concentration of 1200 µg/ml. Cranberry leaf powder showed anthelmintic efficacy through fecal egg reduction at weeks 1 and 2 post treatment at a concentration of 75 µg/ml. Dr. Petersson made us aware of a OREI research grant, *USDA OREI Forage-based Parasite Control in Sheep and Goats in the Northeast U.S.* These universities are involved in the project: West Virginia University, Cornell University, University of Rhode Island, University of Wisconsin, and Virginia Tech. This project is evaluating of birdsfoot trefoil (BFT) cultivars – URI tested 7 conventional varieties (Empire, Leo, Bull, New York, Norcen, Pardee, Bruce). Also studied 51 high tannin varieties with limited seed availability (kept 20 most promising for multiplication of seed). There is an analysis of the condensed tannin profiles. There will be an assessment of the anthelmintic effect of BFT cultivars, and assess the effect of BFT on immune function. The project will also evaluate herd health and economic outcomes of BFT pasture mixes for GIN suppression.

Dr. Stanton followed up with *On-Farm BFT Studies*. Coordinating on-farm studies with participating farmers who will investigate how to best utilize BFT in the field. Want to work on-farm starting spring and fall 2014. Let tatiana know if interested! Researching these questions: Are there practical ways to incorporate BFT into grazing systems and control parasites? Variety differences in terms of effectiveness and suitability? Amount needed? Sustainability?

Dr. Stanton also covered *Copper Oxide Wire Particles for Barber Pole Worm Control in Goats and Sheep*. Sheep are ten times more susceptible to copper toxicity than cattle. When consumed over a long period of time, excess copper is stored in the liver. No damage occurs until a toxic level is reached. Then, a hemolytic crisis occurs with the destruction of red blood cells. Copper is closely related to molybdenum, and copper toxicity occurs when the dietary ratio of copper to molybdenum increases about 6-10:1. Affected animals suddenly go off feed and become weak. Mucous membranes and white skin turn yellowish brown color. Urine red-brown color due to hemoglobin in the urine. Copper oxide wire particles (COWP) were developed as a slow release source of copper for cattle on copper deficient soils. COWP particles are retained in the abomasum long enough to permit acid solubilization of the copper. This results in a gradual release of copper which reduces risk of copper toxicity to the sheep. COWP boluses (Copasure©) available commercially and already approved by organic certification associations because of their role in copper supplementation. 12.5 and 25 gram

boluses for calves and cows need to be repackaged into far smaller doses suitable for growing sheep and goats! Effective against Barber pole worm (*Haemonchus contortus*), but thought not to be effective against arrested worms. What time of year best to give? Not effective against Brown stomach worm (WHY?), and also not effective against tapeworms. .5-2 g dose for lamb or kid and 1-4 gram dose for ewe or doe. The lower dosages may be repeated a few times a year depending on soil and diet levels of Cu and Mo. Studies in SE US focus on looking for lowest dosages that can be used in combination with FAMACHA – give COWP to your vulnerable "3s" (lambs, kids, lactating or late pregnant females) rather than giving a commercial dewormer. The mechanism that cause COWP to work is unknown. It seems to work poorly in animals that are stressed or run down. It is also not effective in just weaned kids or lambs. When it works, it is quite effective, killing 75-95% of Barber pole worms. Cornell has a grant to develop guidelines on the use of Copper Oxide Wire Particles in the Northeast US. Boluses or capsules are injected into the throat and are swallowed. The capsules breakdown and wire particles of copper get dispersed into the stomach. The wire rods get trapped in the first 3 stomachs. The fourth stomach's acid slowly dissolves the wire particles. The copper gets absorbed form the intestine. A Cornell study with milking goats found COWP not as effective as a dewormer (assuming there is no resistance to the dewormer), but no discarding of milk was necessary. Two grams per head appeared to work as well as 1 gram per 22 lb. live weight and did not significantly increase the copper levels in milk. A study conducted on 3 sheep farms had these results. Fecal egg counts decreased at all farms after giving either .5 to 1 gram per head. Results were short term at two farms but lasted at least 42 days at the third farm. On lambs, .5 gram per head dosages appeared to be as effective as 1 gram per head dosages. We need more studies to identify why the effect at the three farms differed.

After lunch, the *Reports Session* began at 1:00 PM. Mr. Joe Hatton quickly reviewed the Private Sector research needs priorities. He highlighted some of the research needs not covered by the morning session. He mentioned that the parasite issues were nicely addressed during the previous technical session, but added the additional work is needed and supports the current efforts. Silvopasture, as used in the Northeast, needs to be improved to work seamlessly on Northeastern pasture-based farms. With the closing of the Beaver, WV ARS research unit, someone needs to pick up this research need at a land grant university or other ARS research unit. Birdsfoot trefoil culture needs further work to get more consistent stand establishment and retention, especially in the light of its nutritional and dewormer potential. The research need about conversion of cropland and forest to pasture also needs to include idle land that may be in some transition state between grassland and woodland. He also briefly reiterated the need expressed at the morning session about orchardgrass persistence. Is it possibly a soil fertility problem. We need to check with Virginia Tech to see what progress they have made on finding a reason for orchardgrass loss. We need to find the nutritional value of pasture fed beef and milk products. Consumers are driving grass fed markets. We need to look at how stock density and high quality grass interact. We need to maintain energy level. 40% of forages short on energy. We need to look at marketing opportunities in grass fed products. Finally, we need new alternatives to communicate research findings. Ken Miller added that we need more time in the Conference agenda to develop research needs.

Mr. Tom Akin, USDA-NRCS State Agronomist for Massachusetts and Public Sector Co-Chair for the NEPC, delivered the Public Sector report. Several research needs were brought up by the Public

Sector. They were:
1. Research on the effectiveness of grass riparian buffers vs. forested riparian buffers.
2. Research on agroforestry activities that could generate revenue within riparian areas.
3. Research on silvopasture issues in the Northeast.
4. Complete a research literature review on the implementation of riparian buffers (series of point-counterpoint arguments on living with the consequences of riparian buffers). Journal of the SWCS may be appropriate. Two previous publications for consideration: CAST Issue Paper #22, "Environmental Impacts of Livestock on U.S. Grazinglands" (William Krueger and Matt Sanderson, 2002); and the 2012 NRCS pastureland literature synthesis edited by Jerry Nelson.
5. Research needs of the equine community: vegetation suitable for heavy use areas; and evaluation of grass hay cultivars for lower sugar/fructan levels.
6. Research on the environmental impacts of swine on pastures (appropriate stocking rates on different quality pastures), and the interactions between swine and ruminants in mixed livestock grazing operations. Michigan State and WVU have publications.
7. Research on forages for small ruminants that contain condensed tannins that aid in parasite control. Ranking cultivars for tannin content and palatability. New cultivars of Serecia lespedeza being grown in are Maryland showing promise.
8. Research on biological fly control; soil nematode identified as a possible control in NY.
9. Research on grazing cover crop mixtures/cocktails for soil health benefits and season extension.
10. Research on extending the grazing season to maintain beneficial fatty acid ratios found in fresh forages.
11. Research on preserving health benefits of dairy products during processing. Can processing be adjusted to safely preserve the health benefits seen in raw milk?
12. Research on the economics of investing in feed ingredients (minerals) and soil amendments (micronutrients).
13. Research on providing free choice minerals cafeteria style (animals self-medicating).
14. Research on the benefits and economics of fodder crops. Do the labor and energy costs outweigh the benefits?

The Agricultural Research Report was given by Dr. Mark Boggess, Acting National Program Leader for Pasture, Range, and Forages. He is acting for the time being. It will be awhile before a decision will be made on whether or not to advertise the position. A search for National Program Leader came up empty. He thanked the Consortium for involving him in the Conference. He had found it to be very enlightening as it was his first opportunity to come. He then turned over the ARS report to Dr. Howard Skinner from University Park, PA to talk about the seven Climate Change Hubs. Dr. Skinner said that for the eastern US, the Durham, NH Forest Service office, the University Park and Ithaca, NY ARS research units, and the Greensboro, NC NRCS East National Technology Support Center were hubs. Dr. Peter Kleinman also reported on changes going on at University Park. They were contemplating setting up a work group to do a literature review of riparian area grazing management as suggested by the Consortium at this Conference. Ray Bryant was to take the lead on this effort.

Dr. James P. Dobrowolski, National Program Leader for Rangeland and Grassland Ecosystems, gave the National Institute of Food and Agriculture report remotely over the conference speaker phone. He narrated his PowerPoint presentation sent previously to the Executive Director. Major Challenge Areas

for Agricultural Research and Education are the Budget--but NIFA did OK in the 2014 budget, Management--New Farm Bill, and Societal Challenges—More with less. Secretary of Agriculture Vilsack's priority areas remain that agriculture must address:

1.Climate Change
2.Bioenergy
3.Food safety
4.Nutrition
5.International food security

NIFA has added a new challenge area - Water. A Request for Application (RFA) is under review (out this month?). It involves Coordinated Agricultural Projects that are integrated at large scales. NIFA is guide by 3 principles: Focus, Scale, and Impact. NIFA will focus resources on delivering bold results with great power to improve human and animal health and protect our environment. NIFA will work on large projects where we see great potential for breakthroughs on a scale never before seen or imagined. NIFA will award research where we know the impact on human health and wellbeing can be tangible and meaningful. Dr. Sonny Ramaswamy is the Director of NIFA. Meryl Broussard is the Deputy Director. We are a small agency with a big budget: ~$1.277 billion for fiscal year 2014. We are into the fourth year of the original Coordinated Agricultural Projects (CAPS) and standard grants (e.g., Corn CAP in Iowa; Wheat CAP in Washington). Budgets are reduced, so project budgets are reduced. We have funded large grants for wheat, conifers, dairy and rangeland beef. In FY2014 there are no Climate Change or Bioenergy CAPS. Agency Extramural Funding for Grazing Land Research, Education and Outreach AFRI Grant Program – Last year the Climate Change Challenge Area (rangeland and grassland commodity focus in 2012-13)

•Dairy in Wisconsin received $19 M.
•Beef in Oklahoma received $9 M.

AFRI for 2014: –Sustainable Food Systems to Improve Food Security Challenge Area (Standard Grants $6 M, up to $1.5 M per project)

Reduce crop and livestock losses in U.S. agricultural systems by developing and extending sustainable, integrated management strategies that reduce pre and post-harvest losses caused by diseases, insects, and weeds in crop and animal production systems, while maintaining or improving product quality and production efficiency.

AFRI Foundational for 2014 – Renewable Energy, Natural Resources and Environment (RENRE)--Connect biodiversity specifically as an ecosystem service to production system functionality, productivity, socioeconomic viability, sustainability and the production of other ecosystem services related to air, water, soil, habitat and land use.

– Managed Agroecosystems ($9 M, 2014 RFA released in December 2013)

Agroecosystem projects designed to develop management systems that significantly increase the output and/or value of at least three ecosystem services compared with the current management system for the region. This part of the AFRI Foundational appears to be a fruitful area for Consortium member land grants to apply for a grants that involve pasture.

– Critical Agricultural Research and Extension (CARE) ($5 M, 2014 RFA released in December 2013), Despite prior investments in basic and applied research, critical problems continue to impede the efficient production and protection of agriculturally-important plants and animals. These problems may be local, regional, or national, and may call for work focused on one or more scientific disciplines. However, all need immediate attention to meet producer needs. Finding and implementing solutions to

these critical problems require partnership and close coordination among researchers, extension experts, and producers. This too has some good ties to the Consortium but is capped rather low and is only a 3-year project.

Non-AFRI:

•National Integrated Water Quality Program—Funded pasture-related water quality and quantity efforts (e.g., Chesapeake Bay watershed ($4 M in 2014), RFA out in the Spring 2014.

•RREA National Focus Funds—Back to $300 K in 2014)

•Alfalfa and Forage Research Program—($1.35 M in 2014), RFA is under construction.

- •Research into alfalfa and forage holds the potential to increase forage yields, increase milk production, improve forage genetics to increase biomass for cellulosic ethanol.
- •Research should be directed to the improvement of yields, creation of new uses of alfalfa and forages for bioenergy and the development of new storage and harvest systems.

•Beginning Farmer and Rancher—currently back in the new farm bill ($20 M each year through 2018, provisional),

•Organic Agriculture Research and Extension Initiative (OREI)—currently in the new farm bill ($20 M each year through 2018, provisional)

•SARE—currently increased ($22.7 M)

•Hatch—raised to above FY2012 levels ($243 M)

Ms. Susan Parry gave the USDA-NRCS report for Mr. Sid Brantly that he prepared as he had to return to Washington, DC after the morning sessions. She started out with a list of vacancies for state grazinglands specialists: MD, KY, FL, GA, AK, NM and regional grazinglands specialists, 2 positions at the West NTSC, 1 at the East NTSC, and 3 Range Conservationists at the Central NTSC. Thank you for supporting NRCS capacity to provide technical assistance through trained personnel.

Pastureland NRI on-site study - Funding this year is the same as last year. Thank you for your support. 600 segments for 2014, same as 2013. Please continue to support this important work.

Forage Suitability Groups (FSG's) - We have a team that is moving forward to modify the Pastureland NRI data processing to assist in building FSG data tables. The relationship between ecological site descriptions is under review, as well as data housing and retrieval processes.

Ecological Site Descriptions (ESD's)used on rangeland and forestland was reported on first. The *Interagency ESD Manual* has been completed and is in place. An interagency agreement between the the US Forest Service, Bureau of Land Management, and NRCS is currently being routed around for signatures. An Interagency ESD Team, led by Dr. Joel Brown, is becoming operational at the Jornada Experimental Range in Las Cruces, NM. The *NRCS ESD Handbook* is complete and will be rolled out this month. The Interagency ESD Team responsible for the Interagency ESD Manual was recognized in December by Secretary Vilsack with a USDA Honor Award.

NRCS Management Practices - Job approval authority for NRCS management conservation practices is under review by a committee organized under Terrell Erickson, Ecological Science Division Director.

Brush Management & Herbaceous Weed Control - A waiver process for EQIP payments for Brush

Management and Herbaceous Weed Control has been established such that up to 3 years of payments can be made when needed for "hard to control" species and groups of plants.

At 3:45 PM the Business Meeting convened. Mr. Peter Miller of Organic Valley had asked to have and was granted a few minutes to alert Consortium members to their Farmers Advocating For Organics grant program. Its mission is to protect and promote organic farmers by investing in organic research, education & advocacy. CROPP Cooperative member-owners voluntarily provide the funds. Since 2007, $2.1 million dollars have been granted on Research, Education, and Advocacy. Grant applications are reviewed by Members, Staff, and Board of Directors. Sustaining Grants are multi-year. Initiative Category this year is: Focus on healthy soil & seed research. Deadlines for next funding cycle: Small Grants by March 1st & September 1st. Large Grants Letter of intent by September 1st. CONTACT: Kristine Salmi-Snowdeal
Kristine.snowdeal@organicvalley.coop
Office: 608-625-3541
For more information go to: www.organicvalley.coop left side of home page: cooperative giving page. Past Annual Reports; Criteria; Proposal format.

Dr. Ed Rayburn complimented Mr. James Cropper, Executive Director, for his hard work for setting up on the of the best Consortium Conferences. He then announced that he was stepping down as the Northeast Pasture Consortium Principal Investigator. He then reported that Dr. Sid Bosworth from the University of Vermont was the new Principal Investigator.

Mr. Ken Miller, the Private Sector Co-Chair, presiding over the Business Meeting asked for nominations of a Private Sector member-at-large for the Executive Committee. Mr. Clyde Bailey nominated Mr. Angus Johnson. Ms. Diane Schivera seconded. Nominations were closed and Mr. Angus Johnson was unanimously elected as the new Private Sector member-at-large. Dr. Andre Brito, the Public Sector Co-Chair, asked for nominations for the Public Sector member-at-large. Mr. Tom Akin nominated Ms. Susan Parry. Mr. James Cropper seconded. Nominations were closed and Ms. Susan Parry was unanimously elected.

Mr. Clyde Bailey invited the Northeast Pasture Consortium to hold their annual conference and meeting at Morgantown, WV on March 11 and 12, 2015. This will be just prior to the 2015 Appalachian Grazing Conference being held at the Waterfront Place Hotel and Conference Center on March 13 and 14, 2015.

Mr. James Cropper thanked Mr. Rob DeClue and Mr. Bob Richardson for their great work on the Executive Committee over the past 4 years as they had completed their tenure on the Committee. Mr. Cropper noted that Mr. DeClue had to work particularly hard to pull together the Pastureland NRI session this year with the change in leadership in Washington, DC and the lack of travel funds available to get Mr. Kevin Ogles at the Conference in person.

After thanking everyone for their participation and making it a great conference, Mr. Cropper adjourned the Conference and Business Meeting.