Table of Contents

NEWBio Objectives .......................................................................................................................... 1

Project Administration .................................................................................................................. 2

Technical Thrusts

1 Human Systems in the Northeast Regional Bioeconomy ....................................................... 4
2 Feedstock Improvement for Perennial Energy Crops............................................................... 7
3 Harvest, Preprocessing, and Logistics of Integrated Biomass Supply Chains ....................... 16

Integrative Thrusts

4 System Performance and Sustainability Metrics ................................................................. 27
5 Safety and Health in Biomass Feedstock Production and Processing Operations ................. 33
6 Extension ................................................................................................................................. 35
7 Education ............................................................................................................................... 41
8 Leadership, Stakeholder Involvement, Knowledge-to-Action (K2A), and Program Evaluation ................................................................. 44

Table 1. Quantitative Analysis of Three Traits Measured in *S. purpurea* Field Trial .......... 9

Figure 1. *Salix purpurea* Association Trial at WVU Agronomy Farm .................................... 8
Figure 2. Height of Tallest Stem Averaged by Plot for WVU Trial .......................................... 9
Figure 3. Average Length of Five Internodes by Plot for WVU Trial ..................................... 9
Figure 4. Switchgrass Planted in Ithaca, NY ............................................................................. 12
Figure 5. Base Case for Willow Supply Chain .......................................................................... 19
Figure 6. Base Case for Switchgrass and Miscanthus Supply Chain ....................................... 20
Figure 7. Entity-Relationship Model, NEWBio Data Sampling and Mgmt ............................... 21
Figure 8. $^{15}$N Treatments at Rock Springs, PA Site ................................................................. 28

Appendices

A. NEWBio Task List and Timeline ......................................................................................... 48
B. NEWBio Project Team By Institution and By Thrust ............................................................. 51
Notice

This quarterly report was prepared by Penn State University and NEWBio research, extension and education partners from Cornell University, Delaware State University, Drexel University, Ohio State University, Rutgers University, SUNY College of Environmental Science and Forestry, University of Maine, University of Vermont, West Virginia University, USDA Eastern Regional Research Center, US DOE Idaho National Laboratory and US DOE Oak Ridge National Laboratory. This work was supported by Agriculture and Food Research Initiative Competitive Grant No. 2012-68005-19703 from the United States Department of Agriculture National Institute of Food and Agriculture (“USDA-NIFA”).
NEWBio Objectives

I. Understand the values, legacies, and motivations that drive perceptions and decisions about land management and business development for biomass energy systems to overcome barriers to development of perennial feedstocks.

II. Generate price-supply curves, facility siting and forward contracting tools to provide entrepreneur and investor confidence in biomass feedstock supply.

III. Develop and deploy as industry standards sustainable production practices for perennial grasses and short rotation woody crops to improve yield 25% and reduce costs by 20%.

IV. Commercialize the current pipeline of improved willow (*Salix spp*) and switchgrass varieties and develop genomic tools to accelerate breeding for marginal land.

V. Develop harvest, transport, storage and preprocessing systems that increase feedstock value as biomass moves through the supply chain toward advanced biofuel refineries.

VI. Create a culture of safety in the biomass production, transport and preprocessing sectors that addresses machinery hazards and environmental risks to protect workers.

VII. Transform standards of practice for biomass value chains to greatly improve carbon paybacks, net energy yields, soil and water quality, and other ecosystem services.

VIII. Deploy safe, efficient and integrated supply chains in four demonstration regions, each providing 500 to 1000 tons/day of high-quality low-cost sustainable biomass.

IX. Create learning communities of farmers, entrepreneurs, employees and investors informed about the best practices and emerging technologies in their bioenergy interest areas.

X. Provide business support services to generate at least 100 supply contracts and support over 50 new supply chain businesses to harvest, transport and preprocess biomass from short rotation woody crops and warm-season grasses.

XI. Educate students, citizens, landowners and policymakers to increase public understanding of biomass alternatives, including the social, economic, and environmental impacts of sustainable bioenergy systems in the Northeast.

XII. Create a culture of opportunity to support corporate commitments for two commercial-scale advanced biofuels facilities and encourage many more such commitments in the Northeast.
Project Administration

Project Organization and Governance Accomplishments

Project Director Tom Richard continues to lead the overall NEWBio effort, assisted by Associate Director Timothy Volk and Executive Committee members Larry Smart and Jingxin Wang. The committee is supported by Project Manager Barbara Kinne, who coordinates the day-to-day administrative operations.

- **Project Progress**
  
  Each thrust continues to show satisfactory progress in meeting task objectives and schedules.

- **Advisory Board**
  
  Members of the Advisory Board attended the NEWBio annual meeting on August 16-17. Industry partners Double A Willow, Primus Green Energy, Ernst Biomass and Praxair also participated as presenters for the meeting’s focus on recent progress made toward building a sustainable bioenergy sector in the Northeast U.S. The board also convened with the Executive Committee and the external evaluation team. Board Chair Ann Swanson, Executive Director of the Chesapeake Bay Commission, provided a report out to the project team following the meeting. Board recommendations for activities during NEWBio’s second year included focusing attention on bioenergy policy at the local, state and federal levels, investigating near-term markets, capitalizing on demonstration site opportunities, and strengthening stakeholder connections and involvement.

- **Communication and Collaboration**
  
  Monthly meetings remain a primary means of sharing results and updating project team members. The Executive Committee, Leadership team, and thrust teams held monthly teleconferences. Attendees at All Hands teleseminars heard about summer research from NEWBio Bioenergy Scholars in July, and previewed the base case logistics models for willow and grasses from the Harvest, Preprocessing and Logistics team in September. were treated to updates and results of efforts to-date by the Human Systems, Extension, Education and Safety/Health thrusts. Fully 63 project team members attended the August annual meeting, with another two participating remotely.

NEWBio published five issues of its online newsletter (eNEWS), highlighting upcoming events, news and recent presentations by the NEWBio team.
• **Financial Matters**
NEWBio submitted its annual progress report on July 18, 2013. This electronic filing supported the Year Two Continuation Application (submitted on May 20). We received requests from the USDA for additional information on the funding application on August 14 and again on September 4, both of which received prompt responses. Official notification of our funding renewal arrived on September 6th. NEWBio partners received notification of their awards by September 30th.

This timeline review will impact when NEWBio submits its annual progress report for year two. Our goal will be to submit this activities and accomplishments report as soon after June 1, 2014 as possible in order to avoid compromising program funding as one academic year ends and another begins.

• **Seed Grants**
NEWBio submitted Year One seed grant proposals utilizing USDA funds on July 11, 2013. The USDA notified Penn State that approval actions on these proposals would be processed in October, with FY2013 awards taking priority. We will seek to improve the timing for approval and dispersal of funds for year two by issuing the seed grant RFP early next quarter,

**Plans for Next Quarter**
- The NEWBio meeting schedule will be finalized for Spring and Summer 2014, and a project year calendar shared with the team. will submit its progress report to the new REEport system. Consideration will be given to altering our quarterly reporting template to better reflect the electronic report’s information needs.
- Year Two Seed Grant RFP will be issued on October 1, with an October 31 deadline for receipt of proposals. It is anticipated that funding decisions will be made by December 1st, and proposals seeking USDA funds submitted to Grants.gov prior to the end of the year.

**Publications, Presentations, Proposals Submitted**

**Research Presentations**

Thrust 1: Human Systems in the Northeast Regional Bioeconomy

Human Systems focuses on understanding the values, legacies, and motivations that drive perceptions and decisions about land management and business development for biomass energy systems. During the project’s first year, the team began to acquire and synthesize socio-economic data and develop a media library on the social acceptability of biomass. During year two, the team will a) project the economic availability of biomass feedstocks in the Northeast with an emphasis on dedicated feedstocks from mined lands and other economically marginal lands, b) complete the media analysis to identify key issues in proximate communities related to the biomass energy industry and state policy analysis related to bioenergy for NY and PA, and c) start interviews with biomass growers and potential growers in NY and PA, and initiate the scoping of communities near demonstration sites to identify key issues and key informants.

Task 1.1: Understanding social and economic constraints
Task 1.1.1: Economic availability

1. Planned Activities
   - Continued work on POLYSYS.

2. Accomplishments
   ✓ NE feedstocks supply and price projections from POLYSYS. Facilitated KDF data download and interpretation to NEWBio.
   ✓ PA abandoned mined data acquired and mapped.
   ✓ Agronomic assumptions established for dedicated feedstock production on mined lands.

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter
   - Continue to work on POLYSYS to evaluate feedstock supply and price.
   - Incorporate modeled yield data from within NEWBio and NE Sun Grant Initiative feedstock partnership.
Task 1.1.2: Social Acceptability

1. Planned Activities
   - Continued research tasks definition.
   - Continued media and policy analysis about social acceptability of biomass.
   - Assessed and synthesized data.
   - Produced summary reports of local newspaper review for the states of New York and Pennsylvania.
   - Defined scope of work for graduate assistants.

2. Accomplishments
   - ESF graduate student continued work on state policy and media analysis for NY State.
   - Two ESF undergraduate students engaged in media analysis and assisted with preparation for landowner interviews.
   - Penn State conducted qualitative content analysis of bioenergy-related news and opinion coverage in Lancaster Farming (Jan 2012-September 2013).
   - Hinrichs prepared for exploratory interviews late October/early November with five to six Aloterra growers in Ohio and western PA.

3. Explanation of Variance
   SUNY ESF PhD student who was recruited to start in Fall 2013 decided he could not attend, thus we are now working on hiring either another PhD student or a Postdoc for the position.

4. Plans for Next Quarter
   - Hold exploratory interviews late October/early November with five-to-six Aloterra growers in Ohio and western PA.
   - Continue media and policy analysis about social acceptability of biomass.
     - ESF graduate and undergraduate students will continue work on state policy and media analysis for NY State.
   - Two ESF undergraduate students will continue with media analysis and provide assistance with landowner interviews in New York State.
   - Assess and synthesize data.
   - Produce summary reports of local newspaper review for the states of New York and Pennsylvania.
- Define tasks for undergraduate research assistants to assist with human systems work at SUNY ESF.
- Collaborate with the Sustainability thrust to define appropriate indicators and systems for metadata storage for Human Systems.

**Task 1.2:** Assess demonstration sites as they pursue scale-up of biomass crop production and supply chain infrastructure

1. **Planned Activities**
   - Continue work on narrowing site selection.
   - Conduct targeted background and scoping interviews with stakeholders relevant to the demonstration sites.

2. **Accomplishments**
   - Media analysis is ongoing which is providing background on communities.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Build on media analysis, begin planning for community focus groups.
   - Begin identifying key interviews in communities near demonstration sites.

**Thrust 1:** Publications, Presentations and Proposals Submitted

**Research Presentations**

Thrust 2: Feedstock Improvement for Perennial Energy Crops

Feedstock Improvement’s goal is to deliver plant cultivars with improved performance across the wide range of marginal land types found throughout the Northeast. During the first year of the project, the willow team conducted more than 60 crosses, 27 of which were successful and produced over 4,600 seedling progeny. Switchgrass and willow yield trials and demonstration sites were established in NY, OH, PA and WV. During year two, the team will collect measurements of first season of growth in yield trials of new willow cultivars that will indicate their yield potential relative to existing commercial cultivars. We will also continue to generate novel hybrid willow progeny and establish new trials for trait mapping in willow. Evaluations of a new switchgrass trial will inform us about the impact of disease on yield and ongoing surveys of switchgrass breeding nurseries will lead us toward new cultivar selections.

Task 2.1: Breeding of non-invasive triploid hybrids of willow displaying hybrid vigor

1. Planned Activities
   - Monitor and maintain progeny from controlled crosses planted in nursery beds.
   - Score budbreak in the 2013 family selection trial and replant where necessary; monitor and maintain for weed competition and incidence of pests and diseases.
   - Continue phenotyping of S. purpurea association trials established by NE Sun Grant project.
   - Select a population for genotyping-by-sequencing analysis.

2. Accomplishments
   ✓ Progeny in nursery beds performed well in the warm, wet weather of the summer and most of the activity during this quarter involved implementing weed control measures. Weeds emerging within the rows at the base of willow plants were removed by hand. Periodic mowing was performed in alleys between rows to reduce weed growth. In August a no-drift ATV mounted herbicide applicator was used to burn down weeds with glyphosate in the alleys between rows. A tractor-mounted rotovator was then used to incorporate weed biomass and create a planting surface. An orchard-vineyard grass seed mix was then planted with a drop spreader. This uniform ground cover will be maintained with periodic mowing. Drip irrigation lines were removed from the rows, as irrigation will not be needed after the establishment year.
   ✓ In mid-July the 2013 family selection trial was scored for budbreak and over 99% of the initial cuttings were successful. Approximately 70 cuttings were replaced and monitored for budbreak. Periodic mowing was performed to control weeds.
Maintenance, including mowing was performed at all three *S. purpurea* association mapping sites to control weed populations. At the WVU trial, we have performed intensive weed control, including four different herbicide interventions and two rounds of mechanical and hand weeding. We also constructed an electric fence to protect the trial from deer browsing. Consequently, weed competition has been minimal, there is no visible deer damage, and growth has been strong (Figure 1). Fencing was not required at the other two sites (Portland and Geneva, NY), but mowing was done to control weeds.

Phenotyping of the three *S. purpurea* association trials continued at monthly intervals. We have measured length of the longest stem in June, July, and August (Figure 2), as well as internode length (Figure 3) and chlorophyll content. Broad-sense heritability of these traits was moderate, ranging from 0.27 to 0.34. We have also measured length, width, area, petiole length, and petiole width for one leaf from each plot. We also determined dry weight of the same leaf to enable estimation of specific leaf area.

We have initiated Genotyping by Sequencing to generate markers across the genomes of the accessions in the *S. purpurea* association population. This will enable identification of genomic segments underlying quantitative traits, and marker-aided selection. Thus far over 10,000 loci have been scored for 95 genotypes, and we are currently in the process of merging these markers with markers that we have already mapped in a controlled cross. These mapped markers will then be used to characterize the genetic structure of the *S. purpurea* collection, and to perform initial screens for phenotypic associations.
Table 1.
Quantitative analysis of three traits measured in the S. purpurea field trial.

<table>
<thead>
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<th>Variance Components</th>
<th></th>
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<td></td>
<td>H&lt;sup&gt;2&lt;/sup&gt;</td>
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<td>Block</td>
<td>Error</td>
</tr>
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<td>29.24</td>
<td>1.76</td>
<td>77.99</td>
</tr>
</tbody>
</table>

Figure 2.
Height of the tallest stem, averaged by plot, for the WVU S. purpurea association trial.

Figure 3.
Average length of five internodes by plot in the WVU S. purpurea association trial.
3. **Explanation of Variance**
Most activities and accomplishments are on schedule. Based on analysis of GBS from the association trial, we will select at least one biparental family to subject to GBS for QTL mapping.

4. **Plans for Next Quarter**
- Continue to maintain diploid, triploid and tetraploid progeny planted in nursery beds.
- Conduct survival censuses in 2013 Family Selection Trial and cutback plants to ground level to promote coppice regrowth the following spring.
- Conduct end of growing season growth measurements in the *S. purpurea* association trials.
- Plan for 2014 crosses by making selections for potential parents.

**Task 2.2: Genetic basis for pest and disease resistance in willow and perennial grasses**

1. **Planned Activities**
   - Continue willow pest surveys in yield trials as pest populations emerge and monitor for the occurrence of rust.
   - Continue feeding assays as pest populations emerge.
   - Develop a protocol for quantifying willow rust prevalence using optical software.
   - Plant switchgrass cultivars for a fungicide trial at Rutgers. Continue switchgrass pest surveys in breeding nurseries and existing cultivar trials.

2. **Accomplishments**
   - Pest incidence protocols were disseminated to collaborators.
   - Willow surveys for potato leafhopper, beetles, and rust susceptibility were completed for the three *S. purpurea* association trials.
   - Choice and no-choices feeding assays involving six willow genotypes of known and unknown levels of susceptibility to pests were concluded and the results were presented at the NY State Ag Experiment Station summer scholars program poster session.
   - A large set of leaves (>14,000) has been collected from the *S. purpurea* association trials that will be used to refine a rust prevalence protocol and to provide quantitative data for mapping rust resistance genes. Samples are being digitally scanned for optical analysis.
   - Switchgrass cultivar trial was planted at Rutgers to evaluate the influence of anthracnose disease on biomass yield. The study included 16 cultivars with three replications and will be treated with and without a fungicide.
3. Explanation of Variance
Most activities and accomplishments are on schedule.

4. Plans for Next Quarter
- Continue to scan willow leaves and analyze for rust prevalence.
- Prepare a manuscript on anthracnose resistance in switchgrass germplasm.

Task 2.3: Breeding and selection of cultivars adapted for Northeast conditions

1. Planned Activities
- Survey pest and disease incidence in first-year post-coppice growth of 2012 trials.
- Maintain trials.
- Maintain switchgrass nurseries and document successful establishment.
- Survey and evaluate pest and disease incidence.

2. Accomplishments
- Pest and disease surveys were conducted in the 2012 willow yield trials that were established at Rock Springs, PA and Geneva, NY through the NE Sun Grant program.
- These two trials were maintained with periodic mowing in alleys and manual removal of woody weeds within rows.
- Replanting of unsuccessful cuttings in the 2013 Willsboro, NY willow yield trial was completed in mid-July, once excessive moisture conditions subsided. No concerns from weeds or pests occurred during this reporting period.
- In early July the 2013 side-by-side amended and unamended trials in Fredonia, NY were surveyed for budbreak. Both trials had 99% survival of initial cuttings. Unsuccessful cuttings were replaced.
- These trials were sprayed with post-emergence broadleaf and grass herbicides to control for annual weeds in early September.
- Results from the Cornell Soil Health soil tests have been received and are being compiled into a database for data sharing among task groups.
- The four replicated willow biochar trials located across WV and established with the first round of seed grants were visited for routine monitoring and weed control. The large demonstration willow and switchgrass site located near Rupert, WV was also visited for routine monitoring and weed control.
- The switchgrass nursery in Ithaca was cultivated and hoed to control weed pressure multiple times throughout the summer.
The switchgrass nursery in Ithaca was rated for vigor on August 19, 2013. Pest and disease incidence was at too low a level for evaluation.

The switchgrass nursery in Freehold, NJ (Rutgers) was rated for anthracnose disease in August, 2013.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Measure stem diameters and heights of first-year post-coppice growth of 2012 NE Sun Grant Yield Trials at Rock Springs, PA and Geneva, NY.
   - Conduct survival censuses in willow yield trials established in 2013 and cutback plants to ground level to promote coppice regrowth in spring.
   - Conduct survival censuses in the four replicated biochar trials in WV and cutback willow plants in these trials and at the large willow demonstration site near Rupert, WV.
   - Evaluate the need and availability of sites for 2014 yield trials.
   - Identify potential parents for 2014 breeding efforts based on field trial results.
   - Take notes on 2013 switchgrass nurseries.

**Figure 4.** Switchgrass planted in Ithaca, NY. Photo taken on September 9, 2013.
Task 2.4: Breeding and selection of willow and switchgrass yields on reclaimed mine land

1. Planned Activities
   - Continue to monitor willow trials for weed competition and incidence of pests and disease.
   - Data will be collected on surviving switchgrass plants, including plant height, vigor and pests (if evident).
   - Replace switchgrass lines that did not survive in RU accessions in Phillipsburg, PA.

2. Accomplishments
   ✓ Since its establishment in Mylan Park, Morgantown, in 2012, mortality has been high, and fewer than 10% of the original trees remain. Overall, growth has been poor for the few surviving trees. The causes of the low survival and growth are unclear, but it is likely a combination of establishment difficulties due to compacted and poorly-developed soil, extreme drought in 2012, and inadequate weed control. However, given that mortality has been continuous, other undetermined factors are likely implicated as well. We have therefore decided not to invest any further effort in this trial, and are currently considering whether replanting at this site is warranted, or if we should seek a new site.
   ✓ The 2013 willow yield trial at Philipsburg, PA has been monitored for weed and pest pressure and no concerns arose during this reporting period.
   ✓ Results from the Cornell Soil Health soil tests have been received and are being compiled into a database for data sharing among task groups.
   ✓ Survival notes on the NY germplasm at the Phillipsburg site were taken on August 16, 2013.
   ✓ Switchgrass lines from Rutgers that did not establish well at the Philipsburg site were replanted in late July, 2013.
   ✓ Survival notes on the RU germplasm at the Philipsburg site were taken on Sep. 25, 2013.

3. Explanation of Variance
   Activities and accomplishments are on schedule.

4. Plans for Next Quarter
   - Conduct survival census in 2013 Philipsburg willow yield trial and cutback plants to ground level to promote coppice regrowth the following spring.
   - Discuss the possibility of locating a site in WV to replace the 2012 willow yield trial.
• Develop switchgrass plans for 2014 based on 2013 results; Manage weeds in new plantings.

**Thrust 2 Publications, Presentations, Proposals**

**Research Presentations**


Krishnan, K., Serapiglia, M., Fabio, E., Smart, L. “Development of tools for rapid phenotyping of photosynthetic traits in shrub willow (Salix spp.) bioenergy crops.” Poster presentation at the 2013 NEWBio Bioenergy Symposium.

Proposals Funded
Smart, Reiners, and Ryan. “Improving the sustainable establishment and production of shrub willow bioenergy crops”, Approved for USDA Hatch Formula Funding, $75,000 direct costs. 10/1/13-9/30/16.

Proposals Submitted
Smart. “Yield and Disease Evaluations of New Shrub Willow Cultivars for Bioenergy in Northern New York”, Submitted to Northern NY Ag Development Program. $17,740 direct costs. 1/1/13-12/31/13.
Thrust 3: Harvest, Preprocessing, and Logistics of Integrated Biomass Supply Chains

For perennial crop systems like willow, miscanthus and switchgrass, harvesting and transportation can account for 40 to 60 percent of the delivered cost of biomass. Preprocessing of biomass through drying, size reduction, storage and compaction can increase transportation efficiency, reduce delivered costs, and improve conversion efficiency. During the first year of the project, the team designed willow and switchgrass harvesting protocols and collected time-motion data for various pieces of harvesting equipment, and developed base case models for these feedstock supply chains and models for optimizing biomass harvest and logistics scenarios. Year two efforts will include biomass harvest production and cost data analysis, further refinement of the supply chain optimization model, and biomass storage and dry biomass loss testing and analysis. Further tests will also be conducted on torrefaction, pelletization and pyrolysis. Techno-economic and life cycle analyses will be improved through more robust process modeling and data acquisition.

Task 3.1: Significantly reduce the harvesting cost per ton of biomass feedstocks from willow and perennial grasses

Task 3.1.1: Optimize the operation of the forage harvester

1. Planned Activities
   - Process time motion data from large-scale harvest.

2. Accomplishments
   ✓ Summarized the data that was collected during the time motion studies of the willow harvester.
   ✓ Developed estimates of harvester production and harvester efficiency.

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter
   - Perform detailed analysis of harvest data and commence final report and papers.

Task 3.1.2: Detailed time and motion data collection and fuel use analysis
1. **Planned Activities**
   - Develop harvesting plans for additional acreage in northern NY that will be harvested Fall 2013.

2. **Accomplishments**
   None to report this quarter.

3. **Explanation of Variance**
   Activities are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Analyze data from large-scale harvesting of willow and begin writing papers and reports.

**Task 3.1.3: Cost effective technologies for harvesting perennial grasses**

1. **Planned Activities**
   - Perform switchgrass harvesting infield utilization studies.
   - Perform cost analysis and modeling of switchgrass harvests.

2. **Accomplishments**
   ✓ Developed harvesting plan for Miscanthus on Aloterra’s field located in Jamestown, PA.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Continue data collection on switchgrass harvest

**Task 3.1.4: Optimize the operation of the perennial grass harvester**

1. **Planned Activities**
   - Continue development of dynamic strength testing device.
   - Continue processing data from previous data collection.
2. Accomplishments
   ✓ Tested both round bales and large square bales.

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter
   • Collect data on fall miscanthus harvests.

Task 3.1.5: Feedstock Logistics, supply chain and modeling optimization

1. Planned Activities
   • Modify base supply chain models to represent alternative feedstock supply chains.

2. Accomplishments
   ✓ Developed conceptual models for the material flow and supply chains for willow (Figure 1).
   ✓ Developed conceptual models for the material flow and supply chains for perennial grasses. (Figure 2).
   ✓ Began work on entity-relationship model that will be used to store and share information within and across the task. (Figure 3).
   ✓ Modified base optimization model to incorporate data from Idaho National Lab’s Biomass Logistics Model.

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter
   • Incorporate forage harvester data into modeling scenarios
Figure 5. Base case for the Willow supply chain.
Figure 6. Base case for the switchgrass and Miscanthus supply chain.
Figure 7. Entity-relationship model for NEWBio data sampling and management.
Task 3.2: Quantify the role of preprocessing for densification and storage on transportation efficacy and downstream fuel conversion

Task 3.2.1: Quantitative metrics of preprocessing parameters of biomass densification

1. **Planned Activities**
   - Conduct torrefaction tests and analysis on feedstocks.

2. **Accomplishments**
   - Completed basic physical characterization of torrefied feedstocks.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Continue torrefaction testing and analysis.

Task 3.2.2: Effects of preprocessing transportation and downstream fuel conversion

1. **Planned Activities**
   - Measure energy and fuel yield from torrefied biomass feedstock.

2. **Accomplishments**
   - Assembled preliminary analysis results.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Continue studies on energy and fuel yield from torrefied biomass feedstocks.

Task 3.2.3 Biomass densification

1. **Planned Activities**
   - Continue densification studies for switchgrass, miscanthus, and willow.
• Analyze densification impacts.

2. **Accomplishments**
   ✓ Assembled preliminary results on biomass quality, dry matter losses and efficiency of densification procedures.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   • Continue densification studies for switchgrass, miscanthus, and willow.
   • Continue analysis.

Task 3.3: **Assess the storage requirements and effects of long term storage on the quality of willow and perennial grasses**

Task 3.3.1: **Storage system development and assessments for perennial grasses**

1. **Planned Activities**
   • Continue long-term storage studies for switchgrass and miscanthus, including new entry for summer wet biomass harvests.
   • Analyze storage impacts.

2. **Accomplishments**
   ✓ Characterized ensiled switchgrass and shipped same for evaluation by Mascoma’s consolidated bioprocessing technology.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   • Continue long term studies.
   • Continue analysis.
Task 3.3.2: Storage system development and assessments for willow

1. Planned Activities
   - Continue long-term storage studies for willow.
   - Analyze impacts.

2. Accomplishments
   - Collected additional sets of samples from the large masses of willow chips that were established early in 2013.
   - Dried samples and initiated processing so further analysis (i.e. ash, energy content) of the samples can occur.
   - Characterized bench-scale trials of wet and dry stored willow for dry matter loss and composition changes.

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter
   - Complete processing and analysis of samples collected from willow chip pile.
   - Start analysis of data from chip pile samples.

Task 3.4: Techno-economic analysis, cost engineering, and life cycle analysis of densification, storage preprocessing and biorefinery integration

Task 3.4.1: Develop an integrated supply chain model

1. Planned Activities
   - Modify base model to represent alternative feedstock supply chains.

2. Accomplishments
   - Models have been developed that describe alternative integrated supply chains in conjunction with Task 3.1.5 (See Figures 5 and 6.)

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report.
4. **Plans for Next Quarter**
   - Integrate alternative harvest and storage scenarios,

**Task 3.4.2: Cost engineering models for satellite preprocessing and storage**

1. **Planned Activities**
   - Refine estimates of preprocessing facilities.

2. **Accomplishments**
   - Continued to assemble results on techno-economics of densification and collect data on processes.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Finalize estimates of costs and inputs for LCA and TEA studies of selected densified biomass products.

**Task 3.4.3: Life cycle analysis, techno-economic analysis, and model integration**

1. **Planned Activities**
   - Refined the SimaPro model based on the supply chains as depicted in Figures 5 and 6.

2. **Accomplishments**
   - Developed base model of LCA.
   - Collected data from other sources, including EcoInvent, Greet, NREL’s LCA database, and others.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Begin spatial-statistical LCA study for feedstock collection, transport densification in region.
Thrust 3: Publications, Presentations and Proposals Submitted

Research Presentations


Extension and Outreach Presentations

Thrust 4: System Performance and Sustainability Metrics

Sustainability will assess the overall system performance and sustainability of biomass to biofuel systems through a combination of detailed measurements at willow and perennial grass experimental sites, regional simulations using benchmark scenarios, and integration of the techno-economic analysis. During year one, the team defined benchmark locations for assessment monitoring and modeling, established cover crop experiments, and formed a data management working sub-group with representatives across NEWBio thrusts to coordinate data and metadata collection. Year two activities will focus on implementation of a data management plan for NEWBio that cross-cuts all thrust.

Task 4.1: Site- and crop-specific knowledge gaps
Task 4.1.1: Biomass production

1. Planned Activities
   - Establish a process for transforming soil data into files for use in simulation models.
   - Complete climate databases for all benchmark locations.
   - Continue yield gap analysis for all locations.

2. Accomplishments
   ✓ The team did a detailed assessment of access and reliability of various climate databases and selected Daymet, which is available online. However, during the assessment the team determined that east of lakes the database may overestimate radiation in spring during clear sky days. Therefore, radiation in Daymet might be substituted with radiation from NASA-Power, which has its own challenges but is fitting for our applications. Although this coupling of databases should work, access remains a concern since these are government databases and at risk during shutdowns.
   ✓ Growth and water use were modeled at reference locations. The team anticipates presenting data at the November 2013 Tri-Societies Meeting.
   ✓ Biomass (switchgrass and Miscanthus) was sampled in Ithaca in September; sampling will be later in State College as the feedstocks were still green. Continued characterization of stem/leaf partitioning will occur in State College.

3. Explanation of Variance
   Activities and accomplishments are on schedule with the exception of emerging challenges in defining effective rooting depths. No variance to report.
4. Plans for Next Quarter
   - Prepare white paper on simulation results and yield gap analysis.
   - Start installing a second eddy covariance tower.
   - Continue sampling of harvested biomass.

Task 4.1.2: Nitrogen demand and alternative supply

1. Planned Activities
   - Continue development of N demand through N dilution curves appropriate for NEWBio feedstocks (starting with a generic model for C3 (WW) and C4 (MS, SW)) and documentation of deviations from existing parameters.
   - Establish $^{15}$N experiment to track fate of applied N in willow.
   - Monitor response of bioenergy crops to different N sources.

2. Accomplishments
   ✔ Continue parameterization of N demand models; annual crop parameters are inadequate due to storage and remobilization of N. Miscanthus is yielding interesting results on the dynamics of N in roots, rhizomes, and aboveground biomass. Both our samples and literature data are being analyzed.
   ✔ Established $^{15}$N willow trial at Rock Springs, PA. Labeled 64 willow plants with $^{15}$N; monitoring continues.

![Figure 8. $^{15}$N Treatments](image)

Kristie Dennison, Penn State undergraduate, lifts a protective concrete block identifier to expose the buried fertilizer at the Rock Springs, PA experimental polyculture trial. Willow stems will be sampled to check N absorption; if necessary, fertilizer pots will be left in place for an additional season. Dennison set up the experiment, assisted by Bio-energy Scholar Brenna Stow, and Felipe Montes and Marvin Hall (both at Penn State).
3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Continue plans as in previous quarter.
   - Add one sampling of $^{15}$N trial to test that labeling is working.
   - Plan for the establishment of a $^{15}$N trial in NY.

**Task 4.1.3: Nitrous oxide emissions**

1. **Planned Activities**
   - Monitor NO$_3$ in benchmark experiments.
   - Track relevant non-NEWBio research.

2. **Accomplishments**
   ✓ Continued soil sampling of NO$_3$.
   ✓ Continued model development for N$_2$O.
   ✓ Implemented modifications to Cycles model to account for emissions from nitrification.
     Specific algorithm added to the code via interpretation of Zhu et al 2013 (PNAS vol. 110, 6328–6333).
   ✓ Met with the Feedstock thrust to clarify sampling experiments for long-term soil carbon storage (this pertains to both C and N in soil).

3. **Explanation of Variance**
   No variation to report on sampling.
   Model work was a welcome addition.

4. **Plans for Next Quarter**
   - Continue systematic sampling of soil N.
   - Continue polishing our formalized data sharing and storage strategy.

**Task 4.1.3: Carbon storage**

1. **Planned Activities**
   - Sample for soil carbon in selected benchmark locations.
• Continue installation or maintenance of CO₂ and H₂O monitoring stations (two closed-path and two open-path eddy covariance systems) at Rockview, PA.

2. Accomplishments
   ✓ Continued operation of eddy covariance tower monitoring CO₂ flux in willow.
   ✓ Stored long-term PA experiment samples.

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter
   • Maintain eddy system.
   • Process soil samples.
   • Obtain soil samples from NY locations for long-term storage (Fredonia, Mapping Trial).
   • Decide on addition of Meadville new site to long-term monitoring of soil C via archiving of soils samples.

Task 4.2: Benchmark scenarios

1. Planned Activities
   • Establish plantation management schedule for each model scenario.
   • Define input and output variables.
   • Establish stable database of inputs (soils, weather, management).
   • Determine simulation schedule.
   • Execute simulations.

2. Accomplishments
   ✓ Draft management schedules for willow and grasses have been prepared and continue to be circulated among team members.
   ✓ Weather database decided upon (as explained under Task 4.1 for yield modeling).
   ✓ Trial simulations executed with Cycles for willow and grasses.

3. Explanation of Variance
   Management schedules are on schedule. Simulations are started, but not completed as managements and soils are continually being refined.
4. Plans for Next Quarter

- Finish schedules and frameworks for willow and for Miscanthus/switchgrass management.
- Develop a stable set of simulations that includes comparative cropland when needed and that can be used by other thrusts to run regional assessments.

Task 4.3: Regional feedstock supply and environmental assessment

1. Planned Activities

- Define physical sites for extension and education demonstrations.
- Define virtual sites for education and regional simulation demonstrations.
- Establish water quality impacts and air quality impacts for industrial activity and emergent pollutants.
- Begin to evaluate land use change impact on biodiversity and landscape.
- Define harmonized database for LCA and non-market impacts
- Define data management for thrust and overall project.

2. Accomplishments

- Defined two demonstration sites, one located in PA/OH counties near Erie, PA and an existing Miscanthus BCAP, and the other in northern NY near an existing willow BCAP.
- Developed a strategy for handling isoprene impacts. Began a critical review of the extent to which bioenergy feedstock production may increase emissions of isoprene and other biogenic volatile organic carbon compounds, and how these compounds may reduce air quality.
- Contributed to material flow diagrams developed by the Harvest, Preprocessing and Logistics thrust and began coordination with the data management working group to use the same framework.

3. Explanation of Variance

- Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter

- Continue efforts on the following tasks:
  o Integrate, conceptually, biomass production modeling with landscape characterization.
Continue planning the coupling of biomass and water quality models (air quality is under way).

- Continue promoting data model development for each NEWBio thrust.
- Complete an initial internal draft review of the extent to which bioenergy feedstock production may increase emission of biogenic volatile organic carbon compounds, and how these compounds may reduce air quality.

**Task 4.4: Biomass to biofuel life cycle analysis and multi-criteria sustainability**

1. **Planned Activities**
   
   - Define system boundaries for NEWBio feedstocks re: preprocessing methods and end-use markets.
   - Perform peer review of proposed USDA National Agricultural Library data archiving methods for preparation of LCA data sets.

2. **Accomplishments**

   ✓ Reviewed ORNL sustainability matrix summary completed and presented internally. Began examination of GBEP and ORNL matrices to clarify commonalities and differences and distill into one matrix pertinent to NEWBio.

   ✓ Hired a student at Drexel to develop a data management plan for NEWBio and recruited a data ontology expert (Dr. Anu Pradhan) to advise on the development of the plan. This addition to the NEWbio project was made possible through a NEWBio Seed Grant.

3. **Explanation of Variance**

   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**

   - Continue data collection to compile techo-economic analysis (TEA) models.
   - Design feedstock measurement data structure that will populate the LCA model and continue the progress made on materials flow (HPL) and site (Sustainability).
   - Continue work on the NEWBio sustainability matrix.
   - Develop a data management plan for NEWBio that will interface with all thrusts.

**Thrust 4 Publications, Presentations, and Proposals Submitted**

None to report for this period.
Thrust 5: Safety and Health in Biomass Feedstock Production and Processing Operations

Safety and health aspects of the biomass product supply chain will be addressed from a holistic, systems perspective. During the project’s first year, the team conducted a literature search to review hazard and risk exposure and identified a framework for describing injury prevention opportunities and risk evaluations. Year two will focus on developing journal and extension publications and presentations that more precisely identify hazards, best safety practices, and opportunities for safety and health management plans.

Task 5.1: Biomass safety program development

1. Planned Activities
   - Continue literature searches.
   - Develop systematic search strategy.
   - Draft technical paper.

2. Accomplishments
   ✓ ASABE Paper #1620568 published and presented at 2013 ASABE International Conference.
   ✓ Breakout session on Biomass Safety Issues completed at 2013 North American Ag Safety Summit, September 25-27, 2013, Minneapolis, MN. Three presentations were made.

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter
   - A journal article from the presentations at the 2013 North American Ag Safety Summit will be developed & submitted to the Journal of Agromedicine.
   - An in-depth journal review article on biomass safety will be developed and submitted to the Journal of Agricultural Safety & Health.

Task 5.2: Safety and health hazard inventory

1. Planned Activities
   - No activity planned for the current reporting period.
2. Accomplishments
   No accomplishments to report for the current reporting period.

3. Explanation of Variance
   No variance to report.

4. Plans for Next Quarter
   No activity planned for the next reporting period.

Task 5.3: Develop, conduct and evaluate a comprehensive safety and health management program

5. Planned Activities
   - No activity planned for the current reporting period.

6. Accomplishments
   No accomplishments to report for the current reporting period.

7. Explanation of Variance
   No variance to report.

8. Plans for Next Quarter
   No activity planned for the next reporting period.

Thrust 5 Publications, Presentations, and Proposals Submitted

Research Presentations
Thrust 6  Extension

Extension will transfer NEWBio project knowledge and skills developed to support rapid deployment of willow- and warm-season grass-based bioenergy systems for economic, social and environmental benefits. During year one, the team identified potential field demonstration sites, forward-positioned a step planter with a corporate partner, held workshops and webinars, and developed fact sheets and various NEWBio display materials. In year two, the Extension team will consolidate activities at demonstration sites, fully develop the equipment leasing program, and create extension and eXtension materials on business models and other key issues facing the bioenergy sector.

Task 6.1:  Integrated demonstration sites

1. Planned Activities
   - Finalize demonstration site plans and objectives.
   - Continue to identify potential cooperators at demonstration sites
   - Develop protocol with Aloterra for on-farm research trials on herbicide effectiveness and fertility
   - Carry out field day and other events such as plantings at demonstration sites

2. Accomplishments
   ✓ Northwest PA/Northeast OH Demonstration Site:
     - Transplanted Miscanthus plants at the Crawford County Farm site; all three feedstocks now represented here;
     - Finalized MOU with Crawford County Commissioners;
     - Completed a survey of prevalent weeds in Miscanthus fields;
     - Controlled Miscanthus test plot weeds at the Ohio Agricultural Research and Development Center.
   ✓ NY Demonstration Site:
     - Held a Willow Field day near Pillar Point, NY in Jefferson County;
     - Planned a harvest field day, scheduled for October 17 as part of National Bioenergy Day.
   ✓ WV Demonstration Site:
     - Activities included site visits and weed control on demonstration sites near Rupert, WV for willow, Miscanthus, and switchgrass;
     - Planted a demonstration plot in cooperation with The Wilds in OH, with large switchgrass and miscanthus plots;
Planted four willow seed grant research plots near Rupert, Morgantown, Kingwood, and West Columbia (all in WV).

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Coordinate Aloterra’s cooperation with a field harvest trial; develop protocol with Aloterra for on-farm research trials on herbicide effectiveness and fertility.
   - At WV demonstration sites:
     - Cut willow on demonstration and replicated sites to enhance next-years sprouting and growth;
     - Prepare clippings to determine biomass yield and quality;
     - Collect soil samples.
   - Work with SUNY-ESF to fund a fulltime extension position to support the willow biomass crop expansion that is occurring in Northern NY as part of the USDA BCAP project.
   - Continue to identify potential cooperators at demonstration sites.

**Task 6.2: Biomass equipment access program**

1. **Planned Activities**
   - Develop schedule for equipment use.
   - Purchase harvester.

2. **Accomplishments**
   - Developed memorandums of agreement to acquire two harvesters:
     - A New Holland FR9090 two-row planter to be maintained by Celtic Energy Farm;
     - A Danish one-row planter to be maintained by Double A Willow.
   - Developed a leasing plan for the harvesters.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Develop schedule for equipment use.
Task 6.3: Small business and economic development

1. Planned Activities
   - Develop frameworks for business opportunities.
   - Prepare working paper on comparing supply chain models.
   - Video bioenergy businesses.
   - Examine price reporting systems.
   - Identify business models of bioenergy existing companies.
   - Identify markets for biomass and biorefinery byproducts.
   - Develop feedstock budgets.

2. Accomplishments
   ✓ Drafted a working paper on business models.
   ✓ Developed a framework for identifying business models of existing bioenergy companies.
   ✓ Collected preliminary literature and secondary data on potential markets.
   ✓ Began to make videos of successful bioenergy businesses.
   ✓ Initiated examination of biomass price reporting systems.

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter
   - Finish first set of bioenergy business videos.
   - Prepare biomass price reporting system summary.
   - Identify business models of bioenergy existing companies using the framework developed.
   - Develop working paper draft on alternative markets.
   - Complete feedstock enterprise budget fact sheets.

Task 6.4: Expand eXtension.org for willow and warm-season grasses

1. Planned Activities
   - Link NEWbio website to Farm Energy eXtension site.
   - Identify priority topics for publication.
2. **Accomplishments**
   ✓ Created website linkages.
   ✓ Began assembly of eXtension survey results to identify priority topics.
   ✓ Formed linkages to discuss mutual eXtension activities across CAPs.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Identify priority topics for publication.
   - Develop FAQs.

**Task 6.5: Interactive and innovative learning-lessons tools**

1. **Planned Activities**
   - Plan and execute NEWBio’s presence at Penn State’s Ag Progress Days in August 2013.
   - Hold the NEWBio Bioenergy Symposium in August 2013.
   - Develop and finalize the November 2013 Business of Biomass short course on Advanced Biofuels Conversion.
   - Create facts sheets on energy crop enterprise budgets and on weed control.
   - Populate website with publications.
   - Finish video series.

2. **Accomplishments**
   ✓ NEWBio activities at Penn State Ag Progress Days (August 13-15, 2013) included:
     - Exhibit booth and educational displays;
     - Field plot tours;
     - Presentations by multiple NEWBio project team members in a workshop setting.
   ✓ Exhibited at the Pennsylvania Forest Fest on September 15, 2013.
   ✓ Presented and exhibited at the USDA-NRCS Big Flats Plant Materials Center Biofeedstock Field Day, Big Flats, NY. July 31, 2013.
   ✓ Delivered two Biomass webinars:
✓ Continued website development and maintenance.
✓ Issued monthly NEWBio newsletters.
✓ Completed fact sheet on Miscanthus enterprise budget.
✓ Held several field days and tours at demonstration sites (see Task 6.1).
✓ Produced and published four videos on “Champions of Bioenergy”, profiles of successful biomass businesses:
  o Wood Crest Farm Switchgrass Pellets
  o East Lycoming High School Willow Heat
  o Energex Wood Pellet Plant
  o Penns Valley School Biomass Heat
✓ Displayed a willow exhibit at Empire Farm Days, Seneca Falls, NY Aug. 6-8, 2013.
✓ Updated the Willowpedia FAQ list.
✓ Displayed a Miscanthus exhibit at the Ashtabula County Fairground.
✓ Participated in the Education Thrust’s Bioenergy and Bioproducts Education Program for Secondary Educators in NY, PA and WV.

3. Explanation of Variance
Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter
✓ Continue delivery of bioenergy webinars.
✓ Continue to prepare fact sheets.
✓ Organize and deliver “Business of Biomass” workshops.
✓ Publish video series on successful biomass businesses.
✓ Continue to populate website.
✓ Continue monthly e-newsletter.

Thrust 6       Publications, Presentations, and Proposals Submitted

Non-refereed Publications

Research Presentations


Extension and Outreach Presentations

Penn State Ag Progress Days, “NEWBio: New Energy Crops and Markets for Farmers” workshop presentations
✓ Sarah Wurzbacher, “Miscanthus: An Opportunity for Farmers?”
✓ Tom Richard, “Introduction to NEWBio Program”
✓ Larry Smart, “Hybrid Willow: Shrubs as Field Crops.”

Michael Jacobson gave two presentations for Bioenergy and Bioproducts Education Programs (BBEP): NEWBio Teacher Workshop July 22-26, 2013 and Marvin Hall and Michael Jacobson led a field trip for the teachers.

Larry Smart. Willow Field Day presentation, USDA-NRCS Big Flats Plant Materials Center Biofeedstock Field Day, July 31, 2013

Webinars:
Thrust 7  Education

The NEWBio education program will develop critical human capital by preparing learners to understand, contribute to, and lead the Northeast US bioenergy industry via three coordinated, complimentary programs that inform, engage, and enable students at secondary, undergraduate, and graduate levels. The education team operationalized all three programs during year one, placing eight bioenergy scholars with mentors at NEWBio partnering institutions, conducting two secondary educator week-long workshops, and inaugurating the graduate distance education program with an online course on biomass energy systems. Year two will continue these efforts.

Task 7.1:  Secondary educator training

1. Planned Activities
   - Set up system to receive and collect applications,
   - Continue organizing training,
   - Set up, deliver, and evaluate workshops, and
   - Evaluate program.

2. Accomplishments
   ✓ Workshops conducted in Pennsylvania and West Virginia, and
   ✓ Annual planning meeting conducted, plans for Y2 made.

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter
   - Continue with system to receive and collect applications,
   - Recruit participants for summer 2014, and
   - Continue organizing training.

Task 7.2:  Regional Bioenergy Scholars

1. Planned Activities
   - Conclude training of scholars

2. Accomplishments
   ✓ Eight scholars completed their summer internships at host institutions,
Scholars presented research posters at summer research symposia, and
Annual program review and planning for Y2 conducted.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Market program
   - Receive applications
   - Recruit candidates

**Task 7.3:** Graduate distance education in bioenergy

1. **Planned Activities**
   - Continue to market program, and
   - Review applications and communicate decisions.

2. **Accomplishments**
   ✓ First round of scholarship recipients began ABE 888 – Bioenergy Systems,
   ✓ Marketing materials distributed for Spring 2014 scholarships, and
   ✓ Annual program review and plan for Y2 conducted.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Marketing of program,
   - delivery of courses, and
   - review of spring semester applications, and communication of decisions.

**Thrust 7 Publications, Presentations, and Proposals Submitted.**

**Research Presentations**
Undergraduate bioenergy scholars presented posters on their projects at the NEWBio Symposium in August 2013:
Aponte, Rachel. Delaware State University. Bioenergy Feedstock Production: Challenges and Opportunities.

Buhain, Jeremy. New Jersey Institute of Technology. Production of Biodiesel from Fresh Vegetable Oil and Waste Frying Oil.


Hennessey, Shannon M. Rutgers University. Genetic Approaches to Increase Anthracnose Resistance in Switchgrass.


Martino, David G. Penn State University. Biomass Preprocessing and Pretreatment for Biofuels and Bioproducts.


Thrust 8  Leadership, Stakeholder Involvement, Knowledge-to-Action (K2A) and Program Evaluation

The primary focus here is to link stakeholder involvement to all NEWBio activities through demonstrated transdisciplinary collaborations, research that is closely aligned with stakeholder needs, and effective and efficient dissemination of scientific knowledge to support the expansion of perennial energy crops in the Northeast U.S.

Task 8.1:  Executive and thrust conference calls

1. Planned Activities
   - Continue monthly teleconferences for Executive Committee and Leadership teams.
   - Target bi-monthly teleconferences for each Thrust Team.

2. Accomplishments
   ✓ Held Executive Committee teleconferences on July 16 and September 5.
   ✓ Held Leadership teleconferences on July 23 and September 12.
   ✓ Held a total of nine thrust and working group teleconferences to address such subjects as communications, data management, feedstock budgets, online bioenergy course offerings and scholarship procedures, and farm operations.

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report.

4. Plans for Next Quarter
   - Continue present monthly scheduling for Executive Committee and Leadership team meetings.

Task 8.2:  All Hands teleseminars and meetings

1. Planned Activities
   - Continue monthly teleseminar schedule to deliver project updates and share thrust progress toward goals and objectives.
   - Hold NEWBio Annual Meeting in conjunction with the NEWBio Bioenergy Symposium, August 16-17, 2013.

2. Accomplishments
Held All Hands teleseminars on July 25 and September 19 with these featured presentations:

- Hennessey, S. Bioenergy Scholar, SUNY-ESF. Genetic Approaches to Increase Anthracnose Resistance in Switchgrass.

Held the second NEWBio Annual Meeting on August 16-17, 2013, on Penn State’s University Park campus. Over 100 attended, including project team members, our Advisory Board, industry and federal/state agency representatives, and the public.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Continue monthly teleseminars.
   - Schedule NEWBio’s 2014 Annual Meeting.
   - Issue Year Two’s Seed Grant Request for Proposals.

**Task 8.3:** **External Advisory Board meetings and strategic planning**

1. **Planned Activities**
   - Invite advisory board members to participate in the NEWBio Bioenergy Symposium and Annual Meeting on August 16-17, 2013.
   - Continue to invite advisory board members to monthly All Hands teleseminars.
   - Develop an overall NEWBio sample collection, characterization, and evaluation framework for each feedstock. This will assure smooth and consistent sample hand-offs and minimize redundant analyses. This framework will provide a foundation for both the data management plan and model parameterization.
• Continue developing the data management plan and interfaces with the DOE Oak Ridge National Lab (ORNL) Bioenergy Knowledge Discovery Framework and the DOE Idaho National Lab (INL) Biomass Resource Library. Both ORNL and INL are NEWBio subcontracting organizations.
• Develop an annual schedule of scientific product deliverables for each technical thrust.

2. Accomplishments
   ✓ Advisory board members are routinely invited to monthly All Hands teleseminars.
   ✓ Advisory board members attended the NEWBio Symposium (several as presenters) and held a board meeting with invited industry representatives, and NEWBio’s Executive Committee and Evaluation team.
   ✓ The Advisory Board issued a report to the project team that recommended year two activities including attention to bioenergy policy at the local, state and federal levels, near-term markets and demonstration site opportunities, and strengthening stakeholder connections and involvement.

3. Explanation of Variance
   Activities and accomplishments are on schedule. No variance to report

4. Plans for Next Quarter
   • Advisory board input will be sought as part of the year two seed grant review and approval process.

Task 8.4: Task and project evaluation

1. Planned Activities
   • Participate in Management and All Team teleconferences.
   • Observe team interactions.
   • Develop interview protocol to conduct interviews with team members and leadership.
   • Develop and deliver technical report based on survey data.
   • Work with Extension Team and other NEWBio teams to implement collaborative evaluation strategies developed.

2. Accomplishments
   ✓ Conducted project team interviews.
   ✓ Ongoing participation in Management and All Team teleconferences
   ✓ Conducted ongoing observation of team interactions at the NEWBio Annual Meeting.
✓ Coordinated evaluation efforts with Extension and other NEWBio teams at the Annual Meeting.

3. **Explanation of Variance**
   Activities and accomplishments are on schedule. No variance to report.

4. **Plans for Next Quarter**
   - Participate in Management and All Team teleconferences.
   - Observe team interactions.
   - Complete a draft of the Year One evaluation by November.
   - Provide feedback to the project team at the December 21, 2013 All Hands meeting.

**Thrust 8 Publications, Presentations, and Proposals Submitted**
None to report for this period.
Appendix A

NEWBio Task List and Timeline
<table>
<thead>
<tr>
<th>Thrust 1</th>
<th>Human Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1.1</td>
<td>Understanding social and economic constraints</td>
</tr>
<tr>
<td>Task 1.2</td>
<td>Assess demonstration sites as they pursue scale up of biomass crop production and supply chain infrastructure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thrust 2</th>
<th>Feedstock Improvement for Perennial Energy Crops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 2.1</td>
<td>Breeding of non-invasive triploid hybrids of willow displaying hybrid vigor</td>
</tr>
<tr>
<td>Task 2.2</td>
<td>Genetic basis for pest and disease resistance in willow and perennial grasses</td>
</tr>
<tr>
<td>Task 2.3</td>
<td>Breeding and selection of cultivars adapted for NE conditions</td>
</tr>
<tr>
<td>Task 2.4</td>
<td>Breeding and selection of willow and switchgrass yields on reclaimed mine lands</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thrust 3</th>
<th>Harvest, Preprocessing, and Logistics of Integrated Biomass Supply Chains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 3.1</td>
<td>Significantly reduce the harvesting cost per ton of biomass feedstocks from will and perennial grasses in the NE</td>
</tr>
<tr>
<td>Task 3.2</td>
<td>Quantify the role of preprocessing for densification and storage on transportation efficiency and downstream fuel</td>
</tr>
<tr>
<td>Task 3.3</td>
<td>Assess the storage requirements and effects of long term storage on the quality of willow and perennial grasses</td>
</tr>
<tr>
<td>Task 3.4</td>
<td>Techno-economic analysis, cost engineering, and LCA of densification, storage, preprocessing, and biorefinery integration</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thrust 4</th>
<th>System Performance and Sustainability Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 4.1</td>
<td>Site- and crop-specific knowledge gaps</td>
</tr>
<tr>
<td>Task 4.2</td>
<td>Benchmark Scenarios</td>
</tr>
<tr>
<td>Task 4.3</td>
<td>Regional feedstock supply and environmental assessment</td>
</tr>
<tr>
<td>Task 4.4</td>
<td>Biomass to biofuel LCA and multi-criteria assessments</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thrust 5</th>
<th>Safety and Health in Biomass Feedstock Production and Processing Operations</th>
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*See table legend on next page.*
## NEWBio Task List and Timeline

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| Thrust 7 Education | |
|-------------------|------|------|------|------|------|------|
| Task 7.1 Secondary educator training | | | | | | |
| Task 7.2 Regional Bioenergy Scholars | | | | | | |
| Task 7.3 Graduate distance education in bioenergy | | | | | | |

| Thrust 8 Leadership, Stakeholder Involvement, and Program Evaluation | |
|-------------------|------|------|------|------|------|------|
| Task 8.1 Leadership, management and thrust team conference calls | | | | | | |
| Task 8.2 All-Hands teleseminars and meetings | | | | | | |
| Task 8.3 External advisory board meetings and strategic planning | | | | | | |
| Task 8.4 Task and project evaluation | X | X | X | X | X | X |
| Task 8.5 Administrative program evaluation | X | X | X | X | X | X |
| Task 8.6 Final evaluation and program report | X | X | |

### Key Deliverables
- **Project Milestones**: O
- **Fact Sheets, Reports, Articles, Videos**: X

### Activity Level
- **Low Activity**
- **High Activity**
## Appendix B

NEWBio Project Team Listing – By Institutional Affiliation

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### Project Team Listing – By Thrust (continued)

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