



IMPACT. SCIENCE. SOLUTIONS.

Adapting, Improving, and Creating Maine's New Forest Economy

University of Maine

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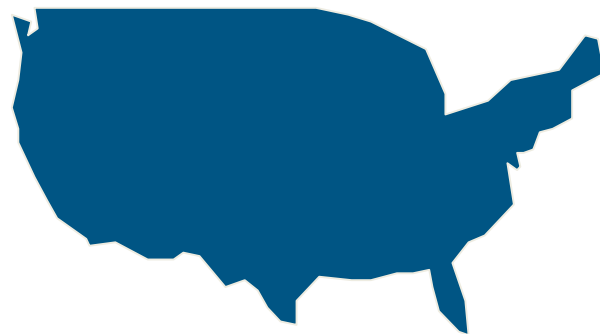
OCTOBER, 23, 2019



A Big Footprint in North America



- 33 Member companies
- 81 Mills
- ~40% of P&P manufacturing
- ~40% of wood products manufacturing
- ~92 Million hectares of forests (227 Million acres)



- 103 Member companies
- 335 Mills
- ~80% of P&P manufacturing
- ~35% of pellet production
- 33 Million acres of forests



- 3 New Zealand Mills + Forestland

NCASI = Solutions

Solving problems, saving our Members time and money for 76 years. Our technical expertise encompasses all environmental aspects of the forest products industry.

- Regulations
- Wood products
- Sustainable Manufacturing
- Climate, Carbon & GHGs
- Forest management
- Air quality
- Water quality & Aquatic biology
- Chemical management





What Led You Here?

- Forest Products Industry (FPI) manufacturing or R&D
- Researcher, including students
- Forester, logger
- Ecology, wildlife
- Policy, business development, economist
- Curious outsider to FPI



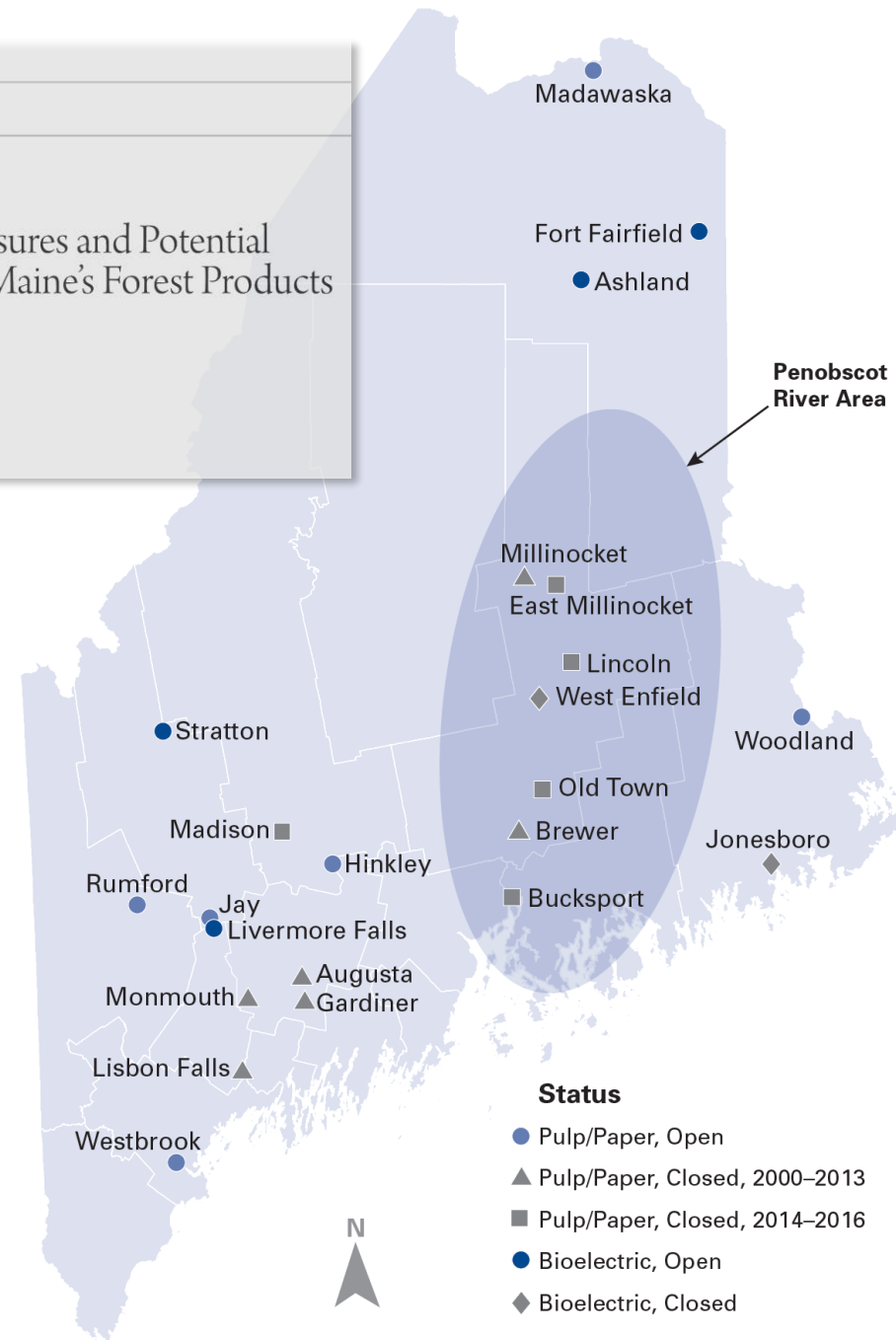
How did we go from this:



To this:



FIGURE 2: **Map of Maine Pulp/Paper and Bioelectric Mills by Operational Status**



What happened?!

- Change in market demand
- Great recession
- Environmental regulations
- Lagging infrastructure upgrades
- High energy prices
- Labor costs...

Maine Policy Review

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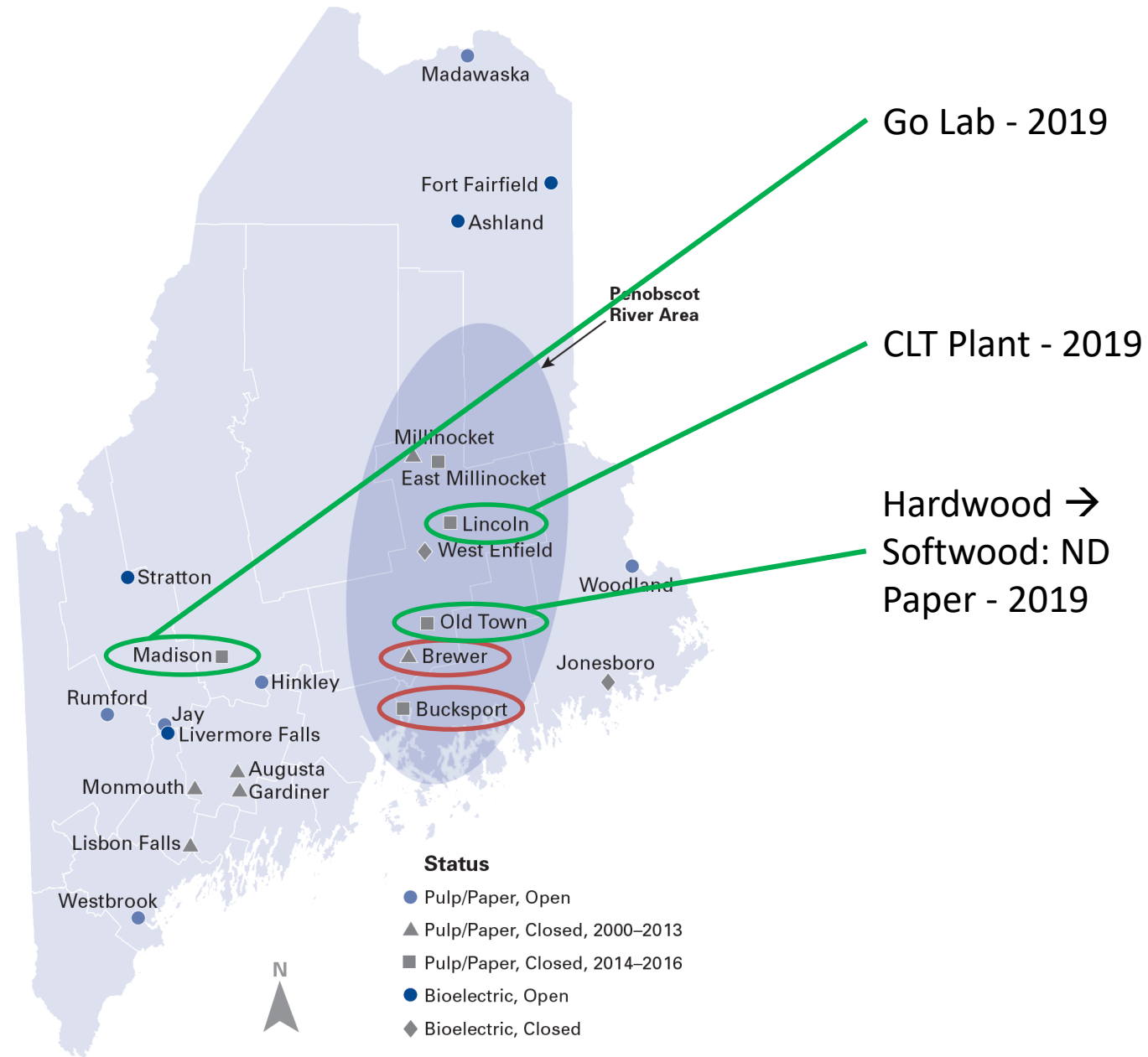
Impacts of Recent Mill Closures and Potential Biofuels Development on Maine's Forest Products Industry

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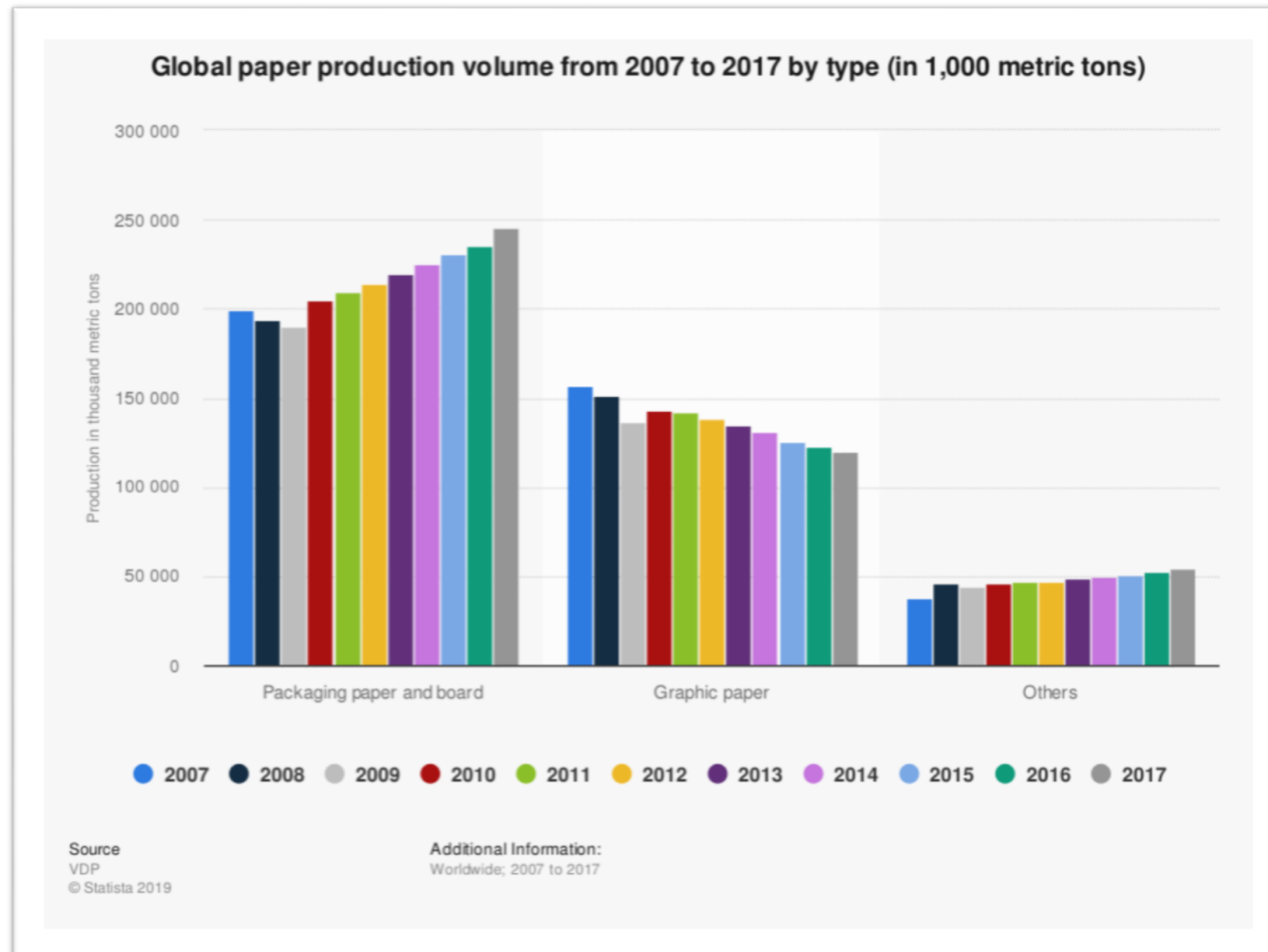
Maine's Next-Gen Forest Economy

FIGURE 2: **Map of Maine Pulp/Paper and Bioelectric Mills by Operational Status**



- **Adapting** to changing markets
- **Improving** on working models
- **Creating** novel products & solutions

Value of FPI in U.S. \$284 Billion



↑ Packaging

↓ Graphic Paper

↑ Specialty

Androscoggin: Verso



Rumford: ND Paper



Skowhegan: Sappi



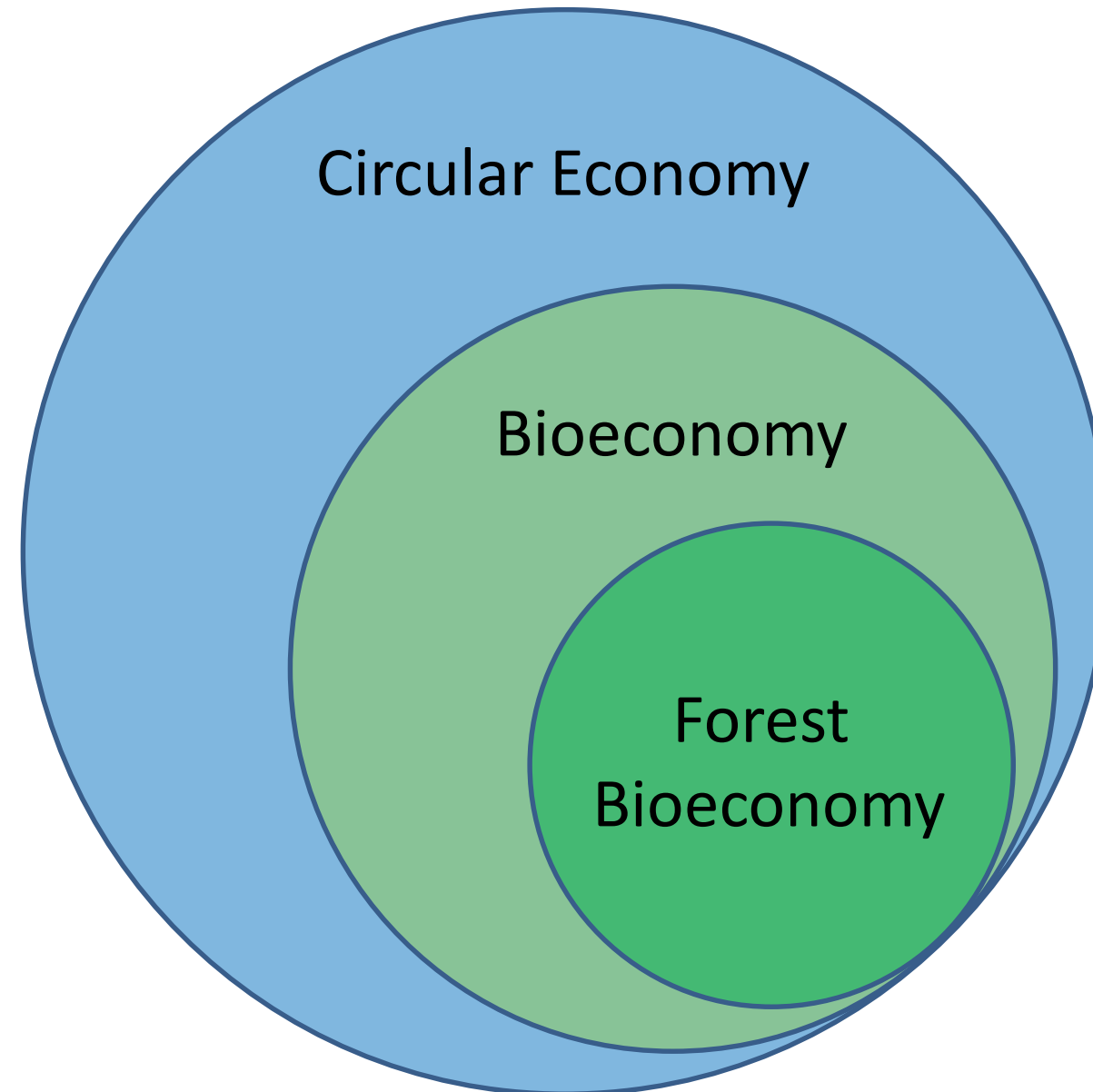
Good → Better



Circular Economy: A Growing Mindset



Circular/Bio/Forest Economy



Forest Bioeconomy

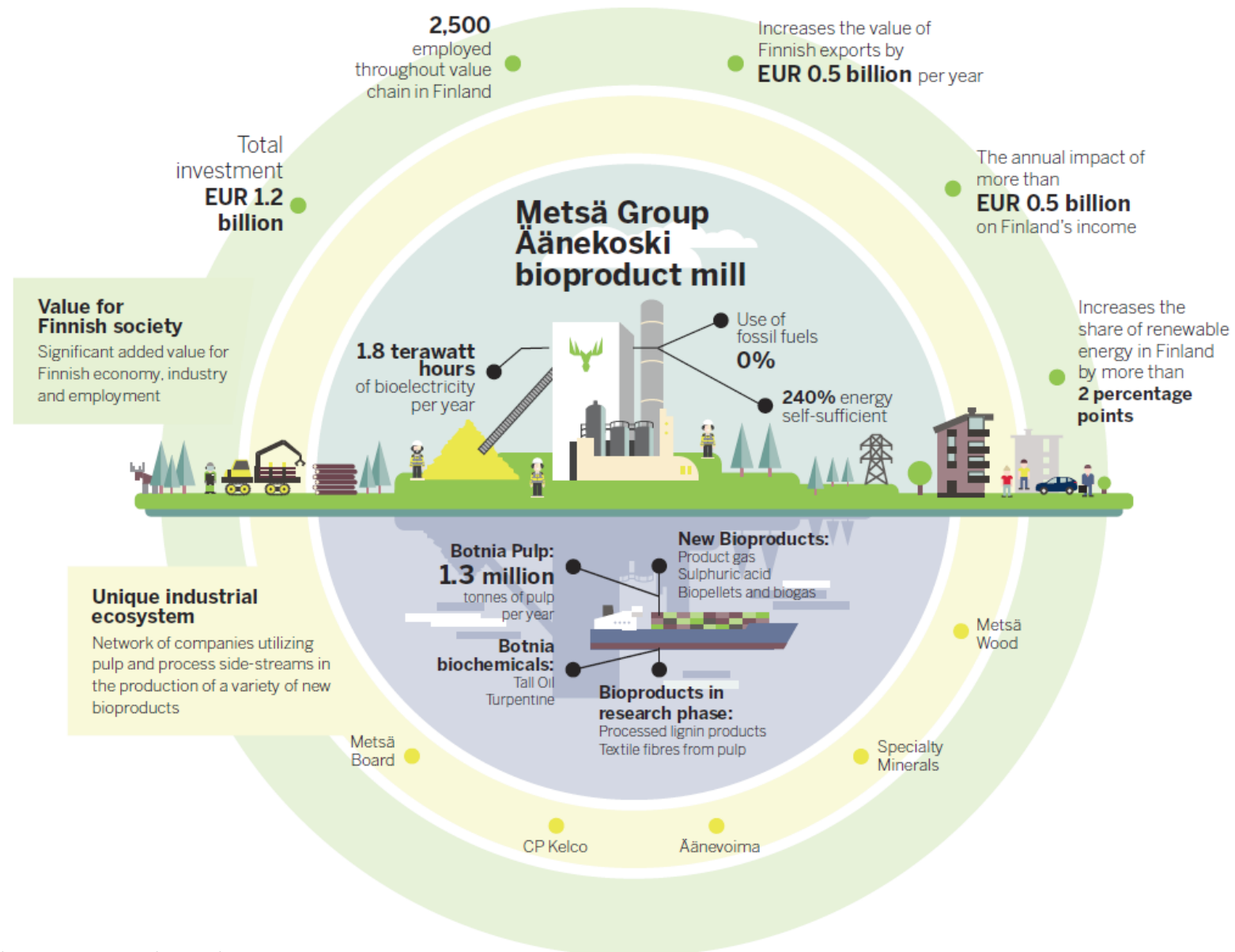


FPI Will Lead the Next-gen Bio-based Economy

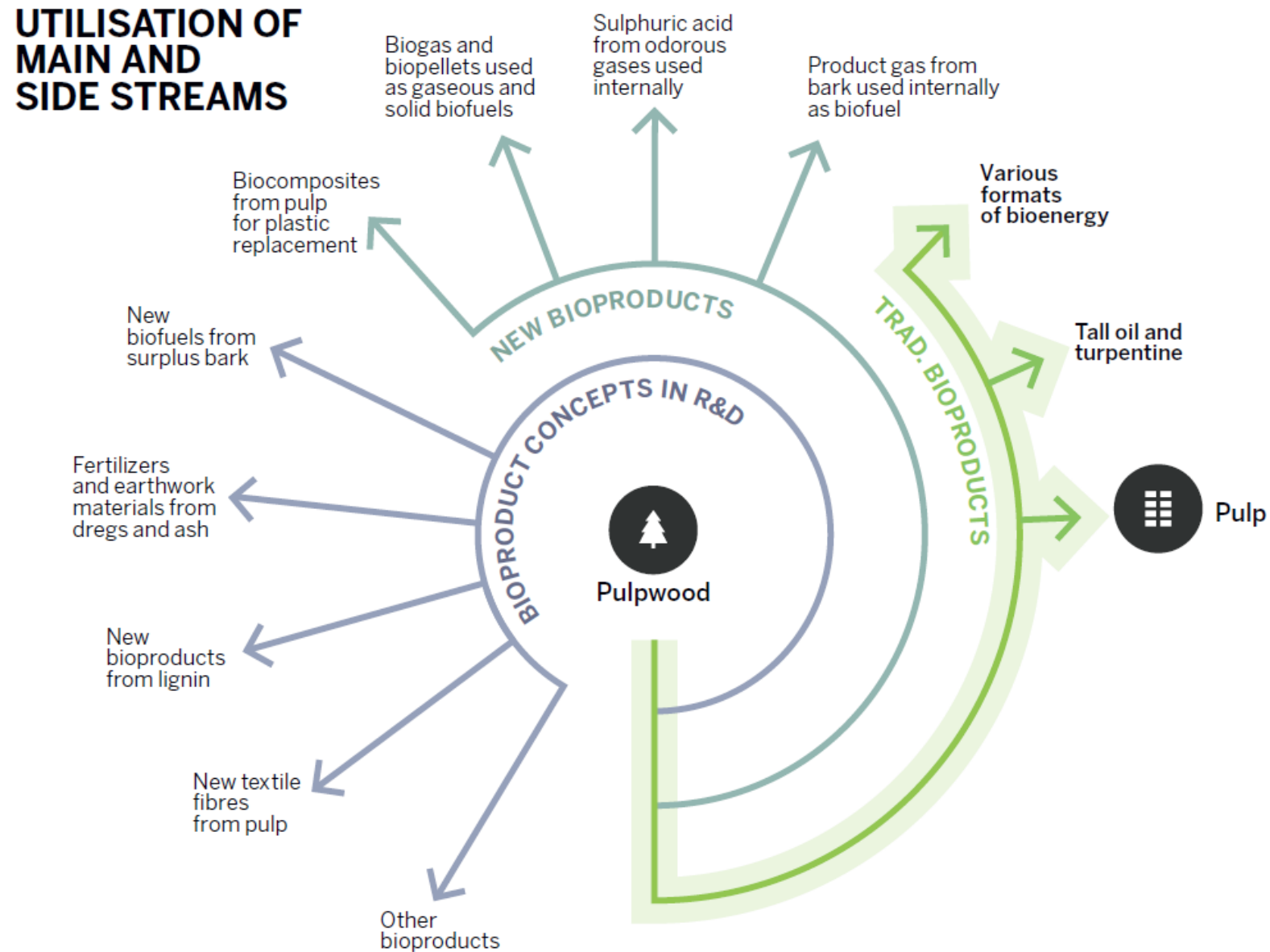
- Advanced fibers
- Cellulosic sugars
- Thermochemical fuels
- Lignin
- Extractives
- Cellulose nanocrystals (CNC)
- Cellulose nanofibers (CNF)
- Biocomposites
- Microfibrillated cellulose
- Biochar
- Wood fiber insulation
- Polylactic acid (PLA)



Collaborate With Experience



Collaborate With Experience



Setting up for Success



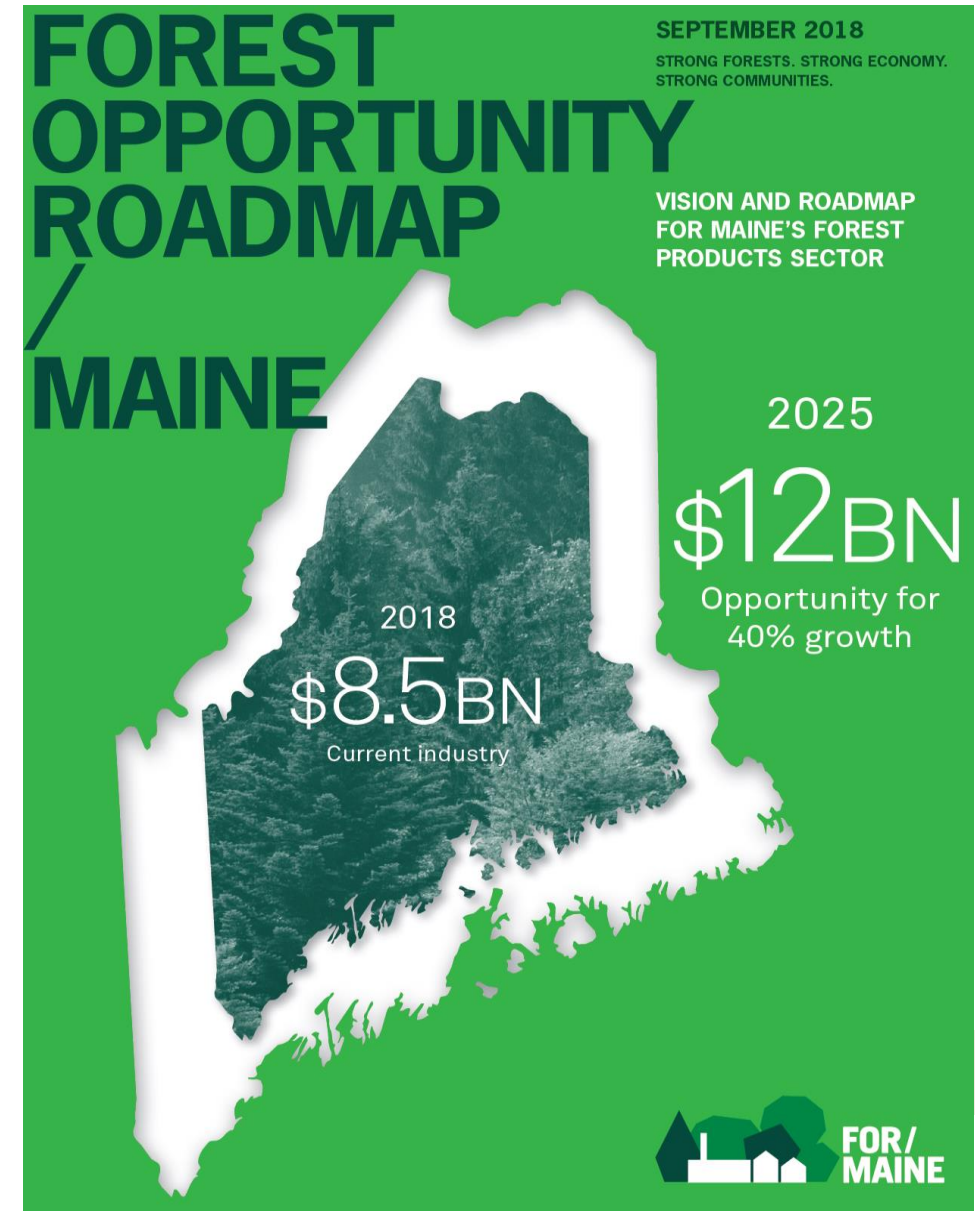
“Today, our forest products industry is experiencing a remarkable revitalization driven by world-class innovation. With the signing of this MOU, **Maine will partner closely with Finland** to share expertise, leverage resources, and implement best practices to grow our economies and ensure that our forests play as integral role in our future as they have in our past.”

Janet Mills - Governor of Maine

Creating The Future Forest Economy – VIDEO ATTACHED



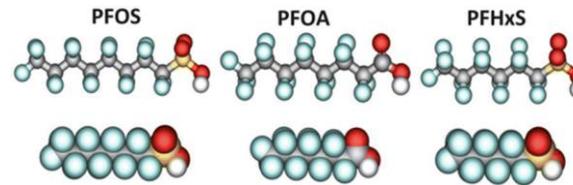
Truly Novel = High Risk / High Reward





- Many players
- Tight IP control
- Tougher env. regulations
- Trade & tariffs
- Low unemployment
- Aging of expertise
- Fiber costs
- Competing products
- Forest health
- Supply chain...

Emerging Issue: PFAS



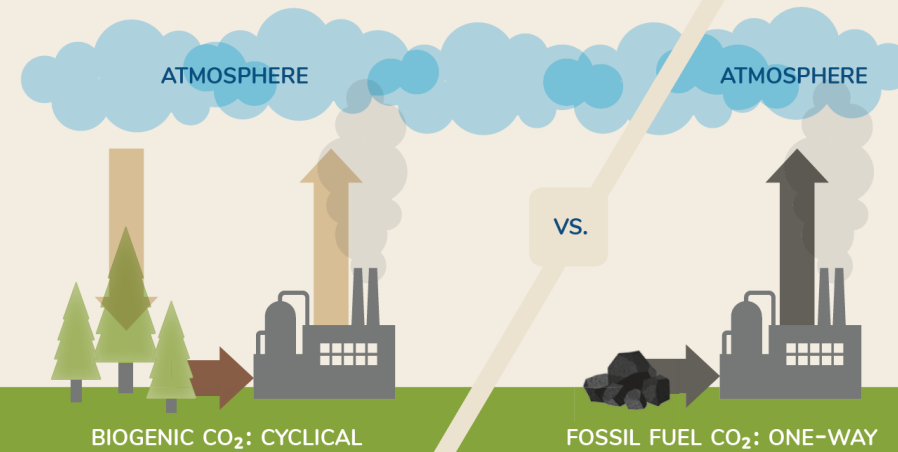
- Compiling and evaluating industry data
- Guidance on laboratory contracting and data auditing
- Supporting mill sampling activities
- In-house PFAS analysis (LC-MS/MS)
- Developing threshold values of regulatory interest for effluents, residuals, and products
- PFAS Analysis – Sample Collection Instructions for Wastewater
 - ncasi.org/resource/ncasi-general-pfas-sampling-guidance
- PFAS in the Environment – Review of the science and navigating regulatory activity
 - ncasi.org/events/pfas-in-the-environment
- PFAS: Recent Developments and Analytical Considerations
 - ncasi.org/resource/cc-18-005-per-and-polyfluoroalkyl-substances-pfas-recent-developments-and-analytical-considerations

Sustainable Fiber Source & Much More

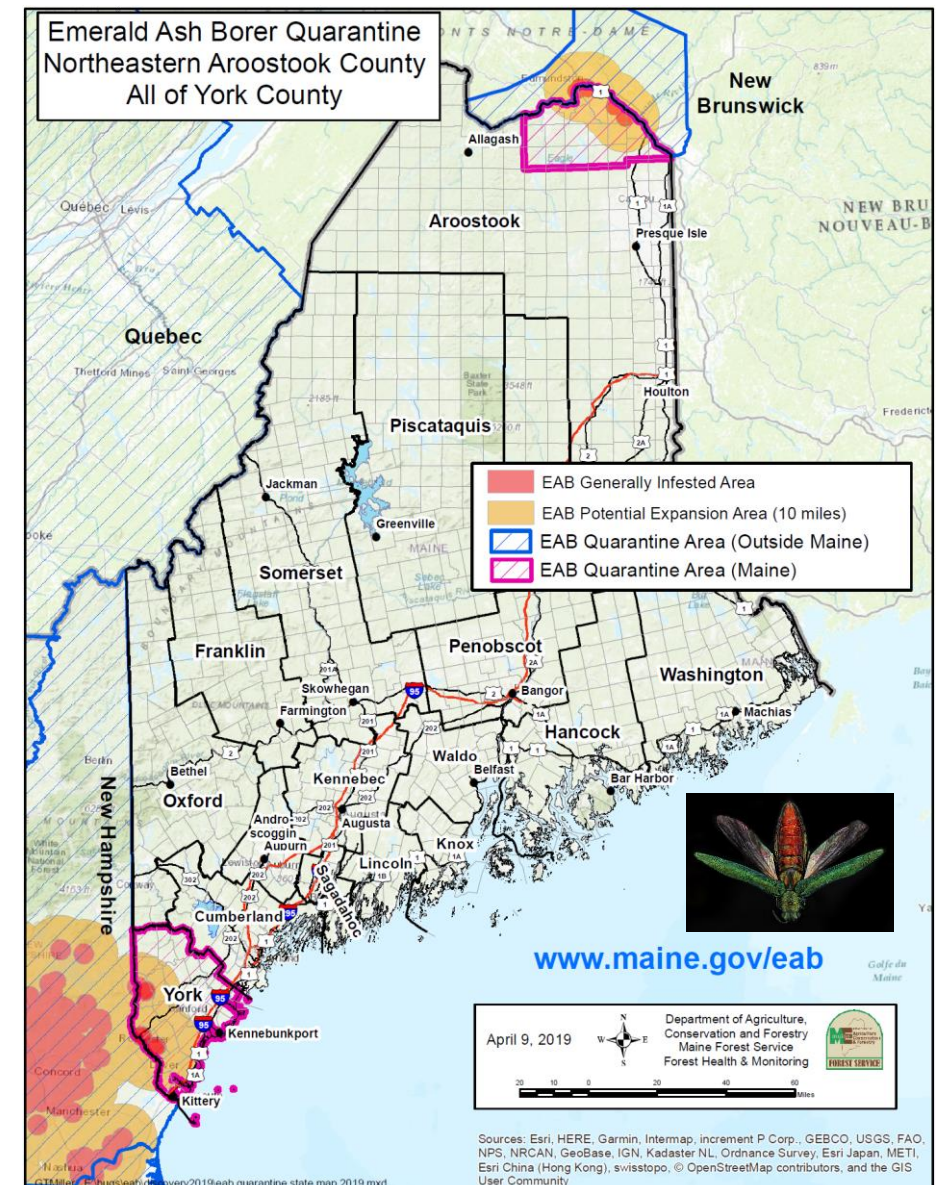
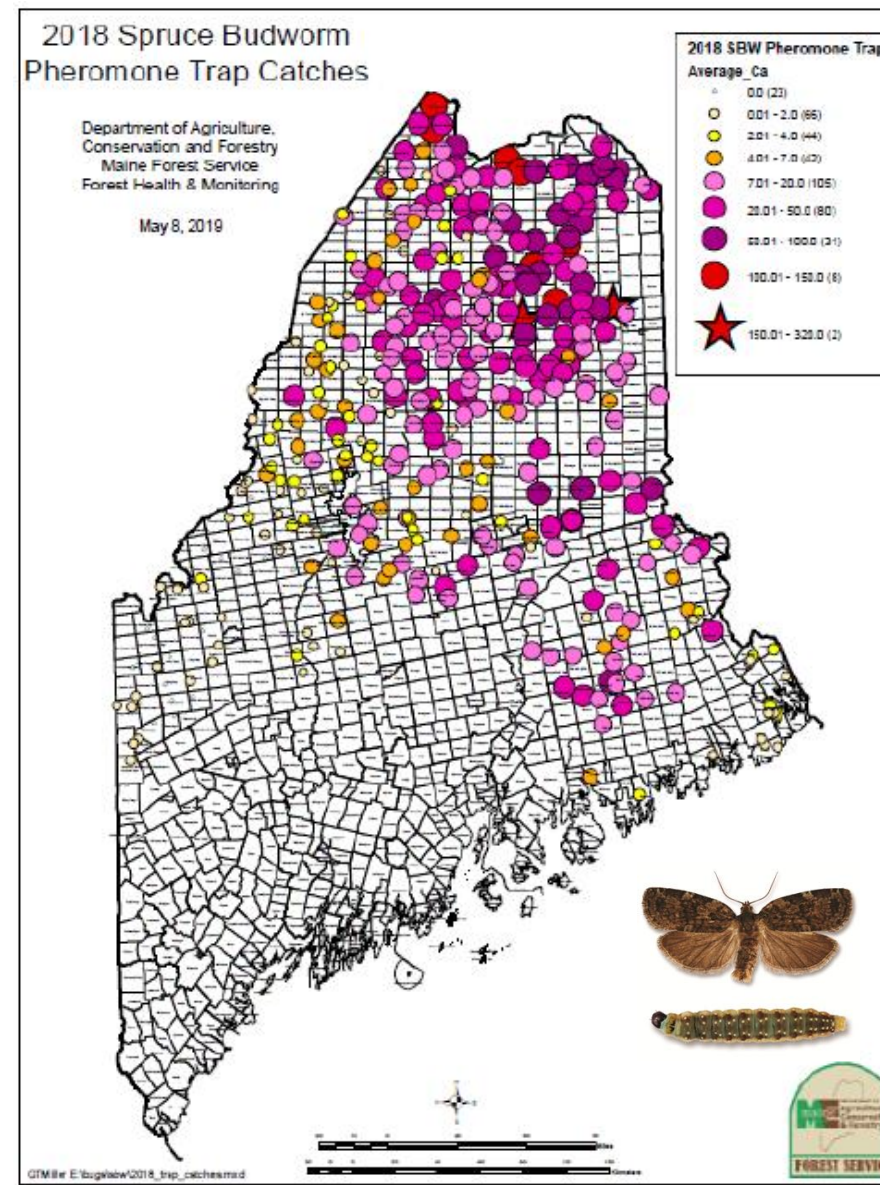
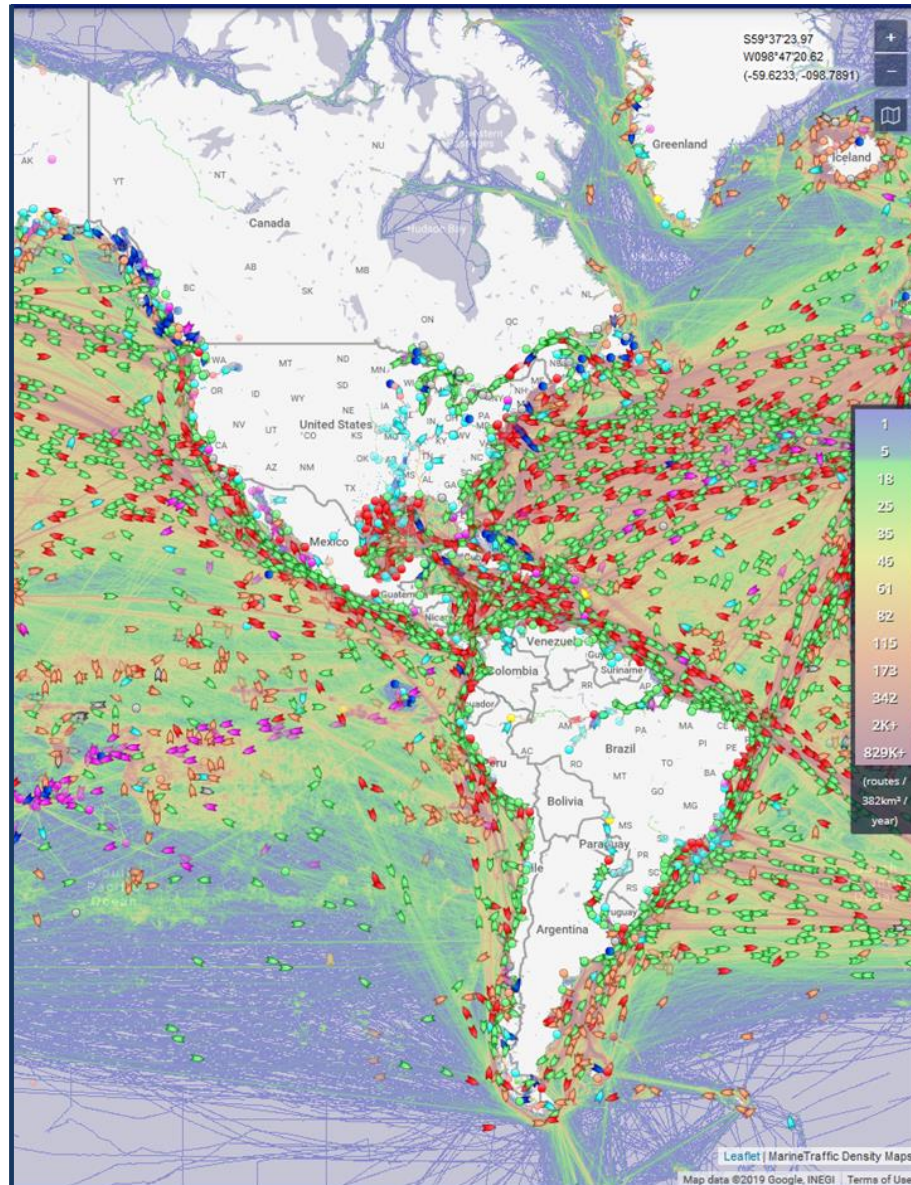


BIOGENIC VS. FOSSIL CARBON

If the biogenic carbon cycle is in balance, atmospheric CO₂ levels do not change over time. Fossil carbon emissions always increase atmospheric CO₂.



Pests Are Here – More Will Come



A broken metal chain is shown against a dark background. The chain is composed of several interlocking links, but it is broken in the middle, with several links and pieces of wood scattered around. The text is overlaid on the image.

Labor, Wages & Ages

Next-gen
Products

**Logging
Supply**

Wood &
Pellet Mills

P&P Mills

Goal 5: Stay Organized, Focused, and Persistent...


Need tactics for:

- Being nimble
- Partnering
- Using experts in and outside Maine
- Incorporating the risk of inaction
- Missteps and improvement
- Beyond \$12 Billion (and not just \$)

“ Strategy without tactics is the slowest route to victory. Tactics without Strategy is the noise before defeat. ”

- Sun Tzu



A high-angle, first-person perspective shot of a wooden roller coaster track. The track is made of dark wood and curves through a dense forest of trees with vibrant autumn foliage in shades of green, yellow, and orange. The track leads down a steep drop, flanked by wooden railings. In the background, a large wooden building is visible on the right side of the track.

**If you don't have a firetruck,
build one on the way to the fire.**
– *Carlton Owen, US Endowment*

Let's Keep Talking!

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