

Hemp-based Fiber Materials, Technology, and Commerce as Drivers for Northwest American Indian Tribal Economic Development

OVERALL GOAL: The manufacture of high-value biobased materials and products (BBMP) made from hemp and other natural fibers can become an economic development driver for Northwestern U.S. Native American tribes. We envision an intertribal consortium partnering with rural businesses, technology providers, colleges and universities, and federal laboratories to develop sustainable supply chains that link regional hemp production, materials processing, and biobased manufacturing to produce products made from natural fibers and biobased chemicals derived from hemp. As a result, new wealth and jobs can be created on reservations and surrounding rural communities that will contribute towards a lowered-carbon 21st Century biobased economy.

RATIONALE: Our nation faces complex environmental, economic, and social challenges due to past decisions that negatively affect the livelihoods of today's citizens. Great economic disparities have existed between rural and urban areas, especially so for Native Americans on reservations. This adversity has been compounded by the effects of systemic discrimination and limited access to resources and education. Due to reliance on fossil fuels and petroleum-based consumer products, our wastes pollute the land, atmosphere, and seas and are adversely altering our health and climate. However, tides have shifted across American landscapes from empowered tribal councils to government agencies to corporate boardrooms where new visions are shaping a more sustainable future. Significant policy changes in self-governance and land tenure now allow tribes to manage their reservation lands holistically as parts of their cultural, environmental, and economic heritage. With revenues generated by tribal-owned enterprises and private and government funding being made available for investments, many tribes



Figure 1. Northwest American Indian Intertribal Business Consortium (IBC) members and hemp fiber production and processing facilities and research sites. Tribes are shown in shaded green and production, processing, education, and research hub sites are lettered in red.

are pursuing new business ventures to express their sovereignty and generate more income for their members. With hemp recently made legal, opportunities exist to create new BBMP made from this new-old crop. The properties of hemp-derived materials have significant potential to replace extracted and mined hydrocarbons in the manufacture of high-performance textiles, cultural textiles, industrial textiles, nanofibers, polymer bio-composites, construction materials, and hard carbons for electronics.

SPECIFIC OBJECTIVES/DELIVERABLES: This project will provide tribal leaders, financial decision-makers, policy makers, federal agency service providers, and regulators the sound science- and business-based information needed to evaluate the technical, economic, environmental, and social merits of incorporating a hemp-based bioeconomy across the region. **Objective 1.** Enable tribal communities to develop a hemp-based bioeconomy through engagement and education. **DELIVERABLES:** Collaborative curricula promoting K-12 interest in STEM, agriculture, and management careers; Native American student internships and mentoring programs; presentations at tribal conferences on hemp economic development opportunities; and cultural competency and respectful relationship-building training for grant-affiliated personnel. **OBJECTIVE 2.** Support intertribal and regional hemp fiber production and value-added biomanufacturing and trading business networks. **DELIVERABLES:** Create an *Intertribal Hemp Fiber Consortium*; map supply chains to delineate key supply network members identifying tribal, surrounding rural, and technology providers



for each supply chain component; and identify assessment parameters needed and financial and policy instruments that can be used to reduce risks for investments. **OBJECTIVE 3.** Determine optimal materials characteristics, equipment, facilities, and technology providers needed for establishing sustainable BBMP manufacturing pipelines. **DELIVERABLES:** Analyses of equipment needs, options, and costs of fiber production, harvest, handling, and manufacturing systems; new materials discovered with understanding of physical-chemical characteristics and BBMP performance; creation of product production-safety-environmental guidelines. **OBJECTIVE 4.** Optimize BBMP quality and biomanufacturing systems efficiencies through hemp breeding, field production, harvest/handling, and processing. **DELIVERABLES:** Optimized materials production/harvest/handling systems for triple bottom line biomanufacturing outcomes; custom industrial genetic resources data system that uses artificial intelligence to identify genes correlated with uses for industrial purposes; qualitative and quantitative traits identified for optimizing fiber and other BBMP processing efficiencies; and genetic materials produced to meet quality standards, target price points, and end-product performance specifications.

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