

# SAN JUAN COUNTY WOODY BIOMASS ASSESSMENT

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## ABSTRACT

San Juan County has more than 84,700 wooded acres in need of fuel reduction to increase forest health and decrease the expanding fire hazard in the region. These acres hold 899,785,579 board feet of excess biomass. Projections suggest that this excess biomass could grow to 1,512,129,015 board feet by 2040 if restoration practices are not conducted. Currently there are limited market channels for local wood products to economically incentivize fuel reduction—specifically for non-marketable timber and slash material. This assessment identifies the need for coordinated aggregation and distribution of wood products to retail markets to decrease barriers for retail purchase and sales. In addition, this assessment identifies two key emerging categories—biochar and boiler technologies—that illustrate significant potential to expand the market for small diameter woody biomass. A varied and coordinated approach to creating a network of market options for forest landowners presents an opportunity to address local forest health issues and decrease fire danger in the Washington archipelago.



A typically dense forest in San Juan County. Photo: Carson Sprenger

## SUPPLY AND DEMAND ANALYSIS

### SUPPLY

#### JUSTIFICATION

The 2012 San Juan County Fire Assessment found 84,716 acres in San Juan County in need of fuel reduction. This acreage was defined as having either moderate or high fire risk (SJC Fire Assessment, 2012). According to the United States Forest Service, the average wooded acre in the Puget Sound region contains 26,533 board feet timber (USFS: Washington's Forest Resources, 2002–2006 Five-Year Forest Inventory and Analysis Report), which is consistent with anecdotal forest inventories conducted across the San Juan Islands. A report analyzing local fuel reduction treatment in San Juan County found that restoration practices remove an average of 40% of a forest's total biomass (Turtleback Mountain Forest and Carbon Inventory, 2010). The same report models forest growth over the next 25 years and estimates a 68% increase in total biomass by the year 2040 if no thinning is conducted.



A dense San Juan stand. Photo: Carson Sprenger

#### FINDINGS

This forestry data suggests that currently San Juan County has 899,785,579 board feet (74,981,831 cubic feet) of excess biomass on acres in need of fuel reduction for fire prevention. Chipped, this biomass would produce 1,274,691 tons of dry wood (Ta Tools, 2017). Using growth rate modeling, in 25 years San Juan County will have 1,472,755,019 board feet (122,238,666 cubic feet) of excess biomass if all acreage receives a 40% fuel reduction treatment, and 1,512,129,015 board feet (125,506,708 cubic feet) if no fuel reduction is conducted.



## DEMAND

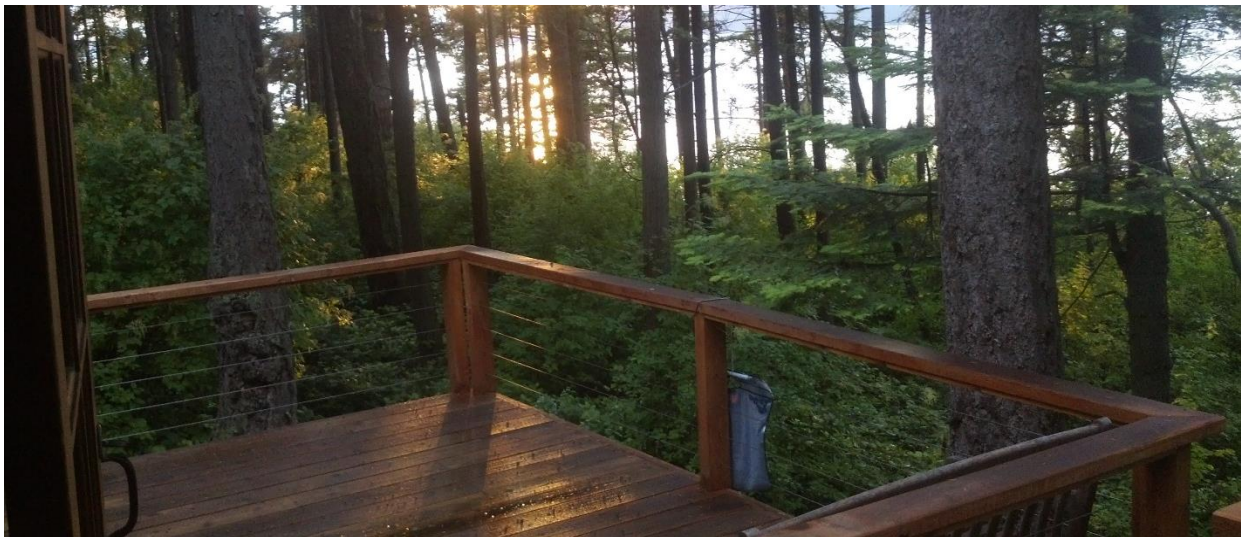
### STRATEGY OVERVIEW

The following market analysis was conducted from April through July of 2017 and examines different market channels and sales opportunities for local wood products in San Juan County. Staff at all major hardware stores on each of the three biggest islands (Orcas, San Juan, and Lopez) were interviewed, as well as four logging/ forestry companies, a landscaping supply store, and three specialty mills. Staff were asked about their company's personal sales and purchasing practices, as well as their analysis of the local market for wood products.

### FINDINGS OVERVIEW

The local wood economy in San Juan County currently operates outside of the commercial marketplace for the most part. The three major hardware stores in San Juan County (Island Supply on Orcas, Browns Lumber on San Juan, and Sunset Builders on Lopez) do not carry any local wood products. Each store cited the same barriers:

- The difficulty of reliably sourcing quantity from different local sources. Small-scale producers tend to not be able to predictably provide material, or even if they can, it requires a series of other reliable, small-scale producers to make it successful.
- Invoicing and paperwork are much more complicated with small-scale forest landowners. These stores can source their wood products along with all their other products from one distributor with one invoice. Each stated that the logistics of numerous invoices, the difficulties getting streamlined packaging, and the numerous distribution drop offs prohibit the purchasing of wood from small forests.



A deck on Waldron Island made from locally sourced wood. Photo: NNRG

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## EXISTING WOOD PRODUCT MARKETS

Interviews with forest owners, community members, and companies revealed existing local markets for several wood products and services:

### *Milling*

The largest demand in the local wood market is for specialty timber. Each island has 1-2 small mills, with several reporting an average milling rate of average of 50,000-100,000 board feet per year. These products are predominantly specialty dimensional lumber, flooring material, or slab production. In addition, several mills reported that there are a series of smaller Lucas Mills that forest landowners use for their own lumber production. These mills do appear to be hired, but there is no collective data source that can accurately report the amount of sales that occur.

### *Firewood*

Firewood sales occur at local gas stations and corner stores in small bundles that net the producer an average of \$450 per cord. The local purchase price for bulk firewood is \$270-300 per cord.

Harvey Logging offers firewood production for hire, using a Cord King Wood Processor that can cut 2 cords per hour at a charge to the forest landowner of \$75-100 per cord. Many of these forest landowners are selling these cords to other residents.



Island Climb, a forestry company, also sells firewood generated from their excess material. These businesses, along with the forestry company Rainshadow Consulting, all spoke of an “informal market” for firewood. Often forest landowners cut and stack wood in trailers with sale signs placed on roads. Some individuals also have long lasting purchasing relationships with forest landowners, with the average forest landowner providing 2 cords to 3-4 households per year.

Local firewood for sale. Photo: NNRG

### *Small Poles*

The only existing potential market for small poles this study found was for split cedar rails for fencing. All the local hardware stores carry or special-order cedar fencing, although none of

these are purchased from local sources. With Western Red Cedar as a predominant tree in San Juan County forests, potential exists for production. None of the hardware stores stated interest in selling small peeled poles for construction. The market for small poles will likely remain within an informal market or do-it-yourself item, as poles can be easily harvested and processed by the builder prior to or during construction.

### *Woodchips*

An interview with Cattle Point Rock and Topsoil, a landscaping supply company on San Juan Island, found they currently sell hardwood chips to landscaping companies at a rate of \$32 per cubic yard. Hog fuel is sold at \$12 per yard. Cattle Point said they sell all the local material they receive, and that they have difficulty sourcing all the material they need.



Woodchips. Photo: Wisewood

Cohesively, these existing markets do not provide sufficient economic incentive for forest owners to remove and process excess woody biomass from their woodlands. Without compelling market development to motivate thinning, forests are likely to grow even more dense and pose greater fire risk.

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## DEVELOPING MARKETS

Literature review and interviews with the San Juan County community revealed biochar and wood boilers to be two potentially lucrative development markets for Island forest owners:

### *Biochar*

The global biochar market size was estimated at 283.2 kilo tons for the year 2015, with North America as the dominant player, accounting for 162.8 kilo tons in that same year (Biochar Market Analysis 2012-2025). The market has, however, centered on boutique garden customers and not farmers. Expanding this market to reach both the wider gardener market and the agricultural community will require increased evidence of the return on investment for potential customers.

There is an increasing body of research that is building the case for biochar as a multi-faceted soil amendment that increases soil carbon, water retention, biota, and nutrients. In addition, there is evidence that these benefits may last in the soil over millennia, making biochar a one-time investment that could influence the food system for future generations. A 2015-2017 research team, comprised of the University of Washington, the on-farm research non-profit Forage, and local farmers, found significant differences between control soils and soils amended with biochar. These findings have been paired with other meta-analysis papers on biochar and published as a marketing tool for entrepreneurial biochar businesses at the website [restorechar.org](http://restorechar.org). Restore Char also provides marketing and branding materials to help small-scale producers label and package biochar



for sale. Restore Char aims to incubate 5 biochar businesses in San Juan County by 2018 to help generate a market for biochar produced locally from forest restoration material. The research team believes that the extended data gathered over 3 years in San Juan County will provide businesses and investors with the local evidence required to develop an expanding biochar market for gardens and small farms.



Biochar being manufactured (left) and used in agriculture as a soil amendment (right). Photos: Kai Hoffman-Krull

The mobility of biochar production allows for forest landowners to process material in remote locations and efficiently transport a significantly condensed and lower weight product to an urban center for sale. The Cylinder Burn Model, which uses a metal cylinder of equal height to diameter to manufacture biochar, can be transported with the use of a truck, tractor, or excavator into a forest setting. Biochar production can then eliminate between 97-99.4% of the total weight of woody biomass, providing increased ease for transport (Forage field data collection, 2016).

### *Wood Boilers*

Wood boilers are a developing technology that illustrates significant potential to convert non-marketable timber into an environmentally sustainable heat source. Used for both home and community heating systems, the process burns the volatile gases produced from wood combustion, generating increased heat while minimizing particulate air pollution. Utilizing hog fuel, these boilers can process chips from a large range of wood species and diameters.



Celebrating the installation of a new wood boiler system providing power to a community. Photo: Wisewood

The cost of natural gas heat can be double or triple the cost of heat from wood boilers. In San Juan County, where gas and fuel costs are higher because of ferry imports, utilizing local wood products for heat could potentially reduce energy costs for the community. Because the cost of biomass transport increases with distance from the boiler site, economic efficiency for boiler technologies would be maximized by using biomass surrounding urban centers for community heating systems. Further research should be conducted to understand costs of chipping, transport, and heating with wood boiler systems for each of the 3 major islands in San Juan County.



## DISCUSSION

With an estimated 899,785,579 board feet of excess biomass in San Juan County forests (Ta Tools, 2017), there is a significant need to develop market strategies for utilizing forest residues and economically incentivizing forest stewardship and restoration among forest landowners. The market for local wood products appears to be largely informal, with coordinated sourcing being a major obstacle to commercial retailers selling these products. Models such as the Washington Woodland Cooperative (<http://www.washingtonwoodland.coop/>) offer potential solutions to these challenges, as they aggregate products from small-scale producers and operate as larger distributors to retailers. The Washington Woodland Cooperative (WWC) currently has no forest landowners in San Juan County, and there may be a need to provide outreach to local landowners highlighting the benefits of cooperative membership. Collaboration with WWC would also provide San Juan County landowners with access to mainland markets in Whatcom County.

Biochar and boiler heating systems offer two new potential methods to convert significant quantities of forest biomass into key resources to meet the County's food and energy needs. Both biochar and boiler systems limit the need for imported fertilizers and fossil fuels, potentially creating increasingly closed-loop local systems. Biochar and boiler technologies also offer a potentially synergistic model for the most economical use of woody biomass transport, with community boiler systems utilizing forest residues from surrounding urban centers and biochar production occurring in more remote locations. This diversified approach to creating market channels for forest products appears to be the most robust model for addressing the County's biomass and fire hazards.



Biochar for sale (left) and a home boiler system (right). Photos: NNRG; bluXgraphics, Flickr CC



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Northwest Natural Resource Group exists because healthy working forests are essential to our world. Our mission is to use the marketplace to restore forests and local economies.

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