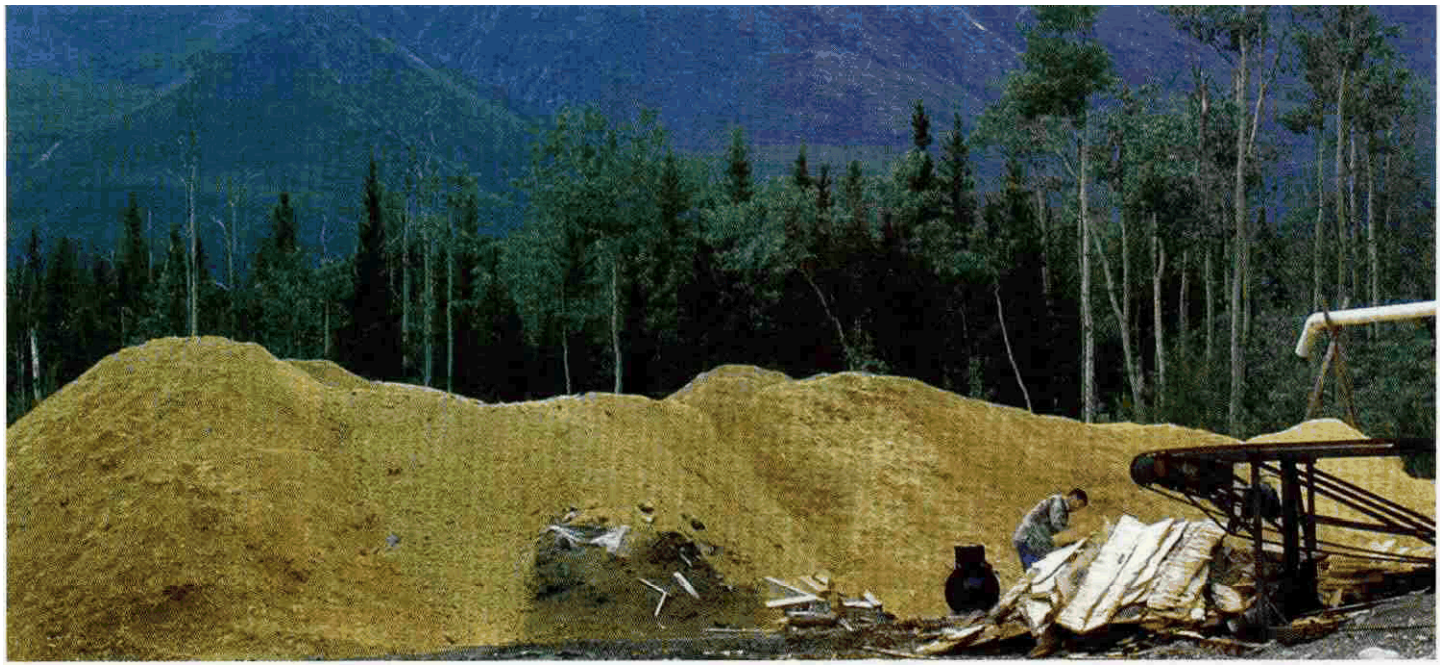

Wood residuals include a mixture of chips and sawdust when they are used to bulk up fish residuals compost.

EVALUATION OF OPPORTUNITIES

WOOD AND FISH RESIDUALS COMPOSTING IN ALASKA

The unique climates and industrial mix in southeast and south central Alaska are challenges being met by the region's organics recyclers.

David Nicholls, Thomas Richard and Jesse A. Micales

COMPOSTING wood residuals in Alaska has become increasingly important in recent years as wood processors and other industrial waste managers search for environmentally sound and profitable outlets. Traditionally, Alaska's sawmills have had dependable markets – supplying area pulp mills with high quality chips. However, the recent closure of two major pulp facilities in southeast Alaska has greatly reduced demand for the region's wood residuals. Further north, the Kenai Peninsula of Alaska has experienced a recent spruce bark beetle epidemic – leaving large volumes of standing dead timber. Meanwhile, the Alaskan fisheries industry also could benefit from environmentally sound methods of managing processing wastes, while creating useful by-products.

Research in the area of wood and fish composting often has focused on the need for reduction of fish residuals, with wood being used primarily as a bulking agent. While typical sawmill facilities in Alaska generate close to one-half of their incoming timber volume as waste materials, fish processing wastes tend to be even more abundant. It is estimated that fish residues can account for 30 to 85 percent of the total harvest for finfish, crab and shrimp. Since there are limited uses for unamended fish residuals (especially for land application), wood residuals can be used as bulking agents to improve pile porosity and facilitate decomposition. Other benefits of cocomposting with wood include moisture absorbency, odor filtration and desirable thermal properties. Optimal ratios of wood to fish can vary considerably, depending on the specific application. For example, ratios of about one part fish residuals to three parts wood residuals by volume, or three parts fish residuals to one part wood residuals by weight are often used for desirable carbon:nitrogen (C:N) properties. Ideally, wood residuals should include a mixture of chips and sawdust for aerabon and carbon availability. The use of aged wood is generally not a negative factor when cornposting with fish residuals, which decompose much more quickly than wood.

SOUTHEAST ALASKA VS. SOUTH CENTRAL ALASKA

The unique climates and industrial mix in Alaska creates both challenges and opportunities for fish and wood residuals composting. Most of the industrial opportunities are in southeast and south central Alaska. However, there are several important differences between these two regions. In Southeast Alaska, rainfall is an important consideration influencing many aspects of the composting process and therefore the quality of finished product. Few places on earth face more challenges in this regard than southeast Alaska, a temperate rainforest where more than ten inches of rainfall a month is not uncommon, making moisture

the biggest composting challenge. The greatest threats to composting in this region is excess moisture – even the biological drying potential of composting can be overwhelmed by these precipitation rates. High rainfall, possibly compounded by high levels of fishy residuals, can saturate composting piles and dramatically reduce oxygen movement, leading to anerobic conditions and ultimately to odor problems.

Because of these factors, covered storage of bulking materials is recommended in the southeast to reduce moisture addition to feedstocks, while active composting and curing piles need covers to keep out excess rain. Covered systems could include either gas-permeable tarps or open-air pole buildings. Large wood chips and other coarse bulking amendments also can help maintain adequate porosity for good air movement, although leachate draining through uncovered piles could threated water quality. Optimum pile size and geometry are also important considerations with regard to compost aeration. smaller and flatter piles have the potential to become saturated from rainfall more quickly than larger piles having steeper slopes, which would not only absorb less moisture per unit volume, but also may shed more water down the sides. Conical piles up to eight or ten feet tall should be appropriate for most mixtures, although larger piles will need to be monitored closely for high temperature.

MATCHING FEEDSTOCKS

Matching sources of wood and fish residuals would be another important consideration for many regions of southeast Alaska that do not have well-developed road systems. A successful wood and fish composting site might find it necessary to barge one of the residuals materials from a neighboring community or island. One scenario that might work well for southeast Alaska would be for wood residuals to be transported by ship in relatively large quantities to a fish processing site. Wood residuals could then age on-site before being composted with fish residuals. The more perishable fish residuals could be processed and handled on a local basis. Under this scenario, wood residuals already would have been partially composted before being mixed and further composted with fish residuals. There are several sawmills and fish processing facilities in southeast Alaska that could become suitable partners for this type of arrangement.

In south central Alaska, abundant wood residuals can be found. Large volumes of beetle-killed timber are readily available throughout much of south central Alaska, including the Kenai Peninsula and throughout the Anchorage area. Recent estimates indicate the spread of the spruce bark beetle in the Kenai Peninsula to more thatn 2.3 million acres, with a timber loss of more than two billion board feet, according to a report by the kenai Peninsula Spruce Bark Beetle Task Force. Much of the timber processing is expected to focus on logging bettle-killed spruce stands in the future.

Retail market opportunities for composted fish and wood residuals compost include high quality soil amendments and potting mixes.

In comparison to conditions in southeast Alaska, much of the timber from the south central region is lower in initial moisture content, and would likely experience less water absorption during composting from rainfall. Rainfall in coastal south central Alaska is still substantial (but generally less than regions in southeast Alaska). Wood residuals include sawmill manufacturing residuals such as sawdust or hog-fuel, and chipped wood obtained directly from bettle-killed trees. Abundant fish residuals are readily available during the annual summer commercial and sport-fishing season — which nearly overwhelms small towns on the Kenai Peninsula and throughout the south-central coast. Current fish residuals management systems, including ocean discharge, are coming under increasing environmental and community scrutiny.

Retail market opportunities for fish and wood residuals compost include high quality compost for potting soil and fertilizer. The Anchorage metropolitan area represnets a major market in south central Alaska, and several area facilities are already making compost products for local niche markets.

COMPOSTING PROJECTS

Many different composting projects in Alaska have either been proposed or are in various stages of development. In southeast Alaska, a pilot facility in Sitka was established in cooperation with Sitka Tribal Enterprises to demonstrate the technical feasibility of composting under local conditions, which can include periods of heavy rainfall. The project has long-term objectives of providing a nutrient rich, organic compost, while creating local employment opportunities. The project successfully demonstrated that wood and fish residuals could be composted to reduce waste volumes whise producing a valuable soil amendment.

The project involved construction of an actively aerated pile using 37 cubic yards of fish residuals and 140 cubic yards of wood residuals. Windrows were created and maintained with a front-end loader, which thoroughly mixed feedstocks to qa uniform consistency. Perforated pipes at the base of the pile facilitated air movement, and blower fans helped create negative pressure (or suction) through the pile. The process air then was treated through a biofilter. Although odor control is often a concern when composting fish residuals, especially early in the composting cycle, the Sitka project experienced few problems in this area. Finished compost was made available to local gardeners, who responded very favorably.

In metropolitan Anchorage, a commercial firm operating near the Anchorage International Airport composts a variety of organic residuals, including horse manure, and lawn and garden trimmings. The facility — Environmental Recycling owned by John Dean — includes a 100,000 square foot composting pad. Compost products include

mulches and potting soil. Contractors bringing wood residuals are charged $60/ton. At the municipal landfill, the charge is only $45, but the in-town transfer station requires the wood to be cut to three-foot lengths. Dean accepts wood waste of larger sizes, then cuts and grinds it to the sizes he need and composts it. Overall, Environmental Recycling collects 3,000 to 4,000 tons of wood, fish residuals and other waste materials annually. But with Anchorage's total compostable waste stream topping 75,000 tons, Dean points out that there are plenty of opportunities to expand. He adds that with 150,000 sacks of potting soil and other garden products imported into Anchorage annually, locally produced compost has a ready market.

Other facilities in Alaska have developed techniques for composting wood residuals with peat moss for high quality soil amendments and potting mixes. Achor Point Greenhouses produces Fishy Peat, a potting soil mixed with compost. The secret behind the product, greenhouse owner Al Poindexter says, is active microorganisms that help plants thrive. "If you have the right combination and they colonize the plant roots, you don't need any fertilizer," he says. Poindexter created Fishy Peat from fish meal, seaweed and peat dug from bogs. Poindexter said he started off using crab and raw fish waste in the soil amendment, which resulted in a product even richer than what he sells today. At another time, he used herring, also with superior results. However, he found it much easier to work with the fishmeal and had fewer problems with flies and complaints from neighbors. He does use fresh seaweed. "The reason we use seaweed is for the mirconutrients," he explains. He tries to harvest equal amounts of red, green and brown seaweed for their differing properties.

The University of Alaska at Fairbanks has reviewed a number of other composting projects. On Alaska's North Slope, Prudhoe Bay has been considered for composting facility in which solid waste would be processed in an enclosed vessel to provide soil amendments for former oil drilling sites. In Fairbanks, biosolids are mixed with wood chips and composted in 12-foot high piles. Composting there has worked well even at temperatures as low as —35° F. The finished product is used by gardeners and landscapers as a soil amendment. Also in Fairbanks, the potential for composting dog wastes with sawdust has been considered, particularly for kennel owners.

ALASKA'S COMPOSTING FUTURE

Two workshops wereheld in April 2001 to consider wood and fish residuals composting applications for Alaska. Topics included composting practices, appropriate technologies for composting facilities marketing considerations, and case studies of local wood and fish residuals composting facilities. The target audience for the workshops included small businesses that were either already actively composting, or were considering starting composting facilities. One of the primary objectives of the wo4rkshops was to identify people with a strong interest in starting composting facilities, who needed additional information or training.

Workshops were held in both southeast Alaska (Ketchikan) and south central Alaska (Anchorage), with over 70 people attending the sessions. Considerable interest was generated, with several atendees seriously interested in developing a commercial composting facility. There was much enthusiasm for building on these connections between composting entrepreneurs and industrial partners. ■

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