NATIONAL WILDLIFE FEDERATION

INSPIRING AMERICANS TO PROTECT WILDLIFE FOR OUR CHILDREN'S FUTURE.

Fact Sheet

CONFRONTING GLOBAL WARMING

Sustainable Biomass Sources

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Sustainable Biomass is a Balancing Act

According to the Intergovernmental Panel on Climate Change, we must reduce our global warming pollution by a minimum of 2% per year over the next several decades to avoid the worst effects of global warming. To do this, we must reduce our overall energy use, transition away from reliance on fossil fuels, and increase carbon stored in forests, wetlands, and grasslands. Bioenergy has the potential to be part of the solution. However, in order to create a truly clean energy future, energy must be produced in a way that has long-term economic viability, helps address climate change, and protects and enhances native habitats and ecosystems.

Sustainable Biomass Sources

Biomass comes from fields, forests, industry and food processing, garbage, sewage and animal manure. The best sources will make use of resources that are not otherwise useful for food or wildlife habitat. Truly sustainable biomass:

- Helps address global warming,
- Is economically viable,
- Protects native habitats and biodiversity,
- Has a level of sustainable harvest,
- Crops do not become invasive,
- Protects our waterways,
- Does not deplete water supplies, and
- Does not deplete soils.

Five general sources of biomass minimize the contribution of land use change to the life cycle greenhouse gas emissions of the fuel or energy, while also minimizing impacts to habitats and biodiversity:

- Food and wood wastes
- Algae, and other micro-crops
- Low intensity, managed harvesting of existing forest and grassland ecosystems
- Improved use of existing crop land for biomass feedstocks, without displacing food
- Biomass crops grown on degraded lands.

High diversity mixes of native grasses planted on degraded soils or integrated into the landscape of commodity cropland can produce high energy yields and make use of marginal land that cannot or should not be used to produce food crops.

Mixed prairie. Photo credit: Lynn Betts, NRCS

Unsustainable Sources

Fossil Fuel Impact

Under the right circumstances, the carbon dioxide released into the atmosphere when biomass is used for energy is balanced by the carbon dioxide taken in by the next biomass crop. However, under the wrong circumstances, biomass may not be an improvement over fossil fuels. Corn ethanol, for example, may use more fossil fuel to than the energy it produces.[1]

Land Use Impact

When grasslands are plowed and cultivated to grow corn ethanol, wildlife habitat is lost, carbon that was stored in the soil is released, and waterways are exposed to fertilizers and other chemical inputs that otherwise would not have been used. We must transition away from corn ethanol to cellulosic feedstocks that get more energy per acre on land currently in corn production, and have lower impacts on our soil and waterways.

Invasive Species

In recent years, a number of non-native and potentially invasive species have been cultivated or considered for use as bioenergy crops. In fact, some of the very characteristics that make a plant particularly useful as a source of biomass energy (e.g., rapid growth, competitiveness, tolerance of a range of climate conditions) are the same characteristics that make a plant a potentially highly invasive species.

For example, *Arundo donax*, or Giant reed, is a highly invasive biomass crop that threatens native ecosystems.[2] Giant reed is being used as a bioenergy crop in Florida and North Carolina, despite the fact that it has been known to invade important riparian ecosystems and displace habitat for native species in states across the southern half of the country. It is essential that the biomass industry avoids planting invasives for bioenergy, and that federal dollars do not support the establishment of invasive species.

Photos: (left) credit - John Mosesso. An example of an unsustainable source. Giant Reed takes over a riverbank in Big Bend, Texas, threatening native ecosystems. (right) credit – John Goolsby. Sustainable biomass example. Native grasses managed for nesting habitat.

[1] Patzek, Tad W. 2004. "Thermodynamics of the Corn-Ethanol Biofuel Cycle." *Critical Reviews in Plant Sciences*. 23:6; p519-567

[2] Giessow, J.,J, et al. 2011. *Arundo donax (Giant Reed): Distribution and Impact Report*. California Invasive Plant Council, Sacramento, CA.