



A native grass field border.

*Perspectives from the Association of Fish & Wildlife Agencies on Integrating Fish & Wildlife Conservation with Bioenergy Production*

## BEST MANAGEMENT GUIDELINES

These Best Management Guidelines (BMGs) reflect the viewpoint of state fish and wildlife agencies on how fish, wildlife, and native ecosystem sustainability needs can be integrated with bioenergy production. Use these BMGs as a template, and customize them to address the needs of your project and priority fish and wildlife with the help of your state fish and wildlife agency and other conservation partners.

### **NATIVE HABITATS**

Avoid the conversion of native habitats to establish energy crops. Harvest biomass so as to maintain as much as possible of the plant species and structural diversity of the native habitat.

When planting a bioenergy crop, try to use site-appropriate species that match the native habitat, like prairie or forest. Avoid introducing, or prevent the escape of, aggressive plant species that could become invasive. Non-native, hybrid, or genetically modified plants that become invasive can have significant and costly impacts on ecosystems. Work with your state fish and wildlife agency and other experts to develop a containment plan.

### **BIOENERGY PLANTINGS**

Using native plants as bioenergy crops will generally provide better wildlife habitat than non-native plants. Allow native plants to grow between rows of bioenergy crops (such as short-rotation woody

plantings). Mixed species plantings, especially those with wildflowers and non-invasive legumes, provide better habitat than monocultures. Breaking up expansive single-species plantings into a polyculture with smaller blocks of diversified crops can offer more for wildlife. Aggressive, potentially invasive bioenergy crops should not be planted next to native habitats. Buffers or other safeguards can be used to reduce risk of escape.

### **WATER QUALITY & QUANTITY**

Minimize the use of water for bioenergy production so we can meet the needs for drinking water, other agriculture, and aquatic species. Select bioenergy crops that use water efficiently.



### Residual Cover

After bioenergy or other crops have been harvested, wildlife – like the Greater Prairie-Chicken, above – can be left exposed, vulnerable to predators and harsh weather. Leaving some crop stubble on the field and planting native field borders can help reduce the impact.



### Riparian Buffers

Aquatic habitats are often impacted by invasive plant species; and invasive plants can be spread by the flowing waters of rivers and streams. Establishing buffers of native plants between bioenergy crops and aquatic habitats can reduce the risks.

To protect water quality, use containment measures to prevent migration of sediments, nutrients, pesticides, herbicides, or seed or other vegetative materials into aquatic ecosystems. Minimize fertilizer, herbicide, and pesticide inputs, and avoid spraying near streams or water bodies. Separate energy crop plantings from streams and other bodies of water with wide vegetative buffers of native plants.

Wetlands, rivers, streams, or other natural aquatic habitats should not be used for production of bioenergy crops such as algae or other cultured or cultivated aquatic organisms. Only produce algal biomass with containment and backup measures in place to prevent escape of aggressive algal strains to areas outside the production area.

Avoid introduction of invasive or aggressive species into aquatic habitats. Harvest invasive aquatic plants as a bioenergy crop only when harvest helps reduce or eliminate the invasive species.

### HARVEST GUIDELINES

Harvest bioenergy crops in late summer or fall to protect ground-nesting species and the fawns and calves of large herbivores. At the same time, consider harvesting early enough in the fall to allow regrowth of cover – ideally 10-12 inches for native grasses. Consider leaving a portion of the bioenergy crop unharvested each year

to provide winter cover and spring nesting habitat. Stiff species like switchgrass that resist bending under snow make good winter cover.

Harvesting in blocks rather than strips lessens the risk from predators for species nesting in unharvested areas. Planting native field borders helps wildlife to move through harvested areas to suitable cover. Avoid placing corridors so they connect to local roadways to help reduce wildlife/auto collisions.

Develop and enforce a sanitation and containment protocol that ensures that transportation of bioenergy crops and movement of harvesting equipment does not spread potentially invasive species offsite.

**Contact your state fish and wildlife agency to customize these Best Management Guidelines to meet the needs of your bioenergy project and priority fish and wildlife species in your area.**

Learn more at:

**[bit.ly/FishWildlifeBioenergy](http://bit.ly/FishWildlifeBioenergy)**

### Reference:

Bill McGuire. 2012. Assessment of the Bioenergy Provisions in the 2008 Farm Bill. Association of Fish and Wildlife Agencies, Washington, D.C., pages 17-23.

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