TABLE OF CONTENTS

Tips for Construction in Residential Areas 3
Highway and Road Crossings 4
Temporary Wetland Crossings 5
  Wood Mats 7
  PVC and HDPE Pipe Mats or Plastic Road 8
  Corduroy 9
  Wood Aggregate 10
Wetland Fill 11
  Woody Debris 11
  Spoils 11
  Removal of Existing Poles 11
Stream and River Crossings 12
  Fords 14
  Bridges 19
Temporary Erosion Control 21
  Temporary Seeding 21
  Mulching 21
  HydroMulching 21
Common Erosion and Sediment Control BMPs 22
  Street Cleaning 22
  Truck Washing 23
  Preservation of Existing Vegetation 24
Perimeter Control 25
  Silt Fence 25
  Hay Bales 25
  Fiber Logs/Biorolls 26
  Sediment Trap 27
  Temporary Entrance/Exit for heavy access 28
  Temporary Entrance/Exit for lower traffic access 29
  Check Dams 30
  Dewatering 31
Winter Construction 32
Spill Response and Protocols 33
  Spill Response Reporting 34
Local Seed Vendors 35
Dairyland Power Cooperative (Dairyland) is a generation and transmission cooperative based in LaCrosse, Wisconsin that provides wholesale electrical energy to 25 member cooperatives and 16 municipalities who deliver the energy needs to over 500,000 people.\(^1\) Dairyland’s service area comprises 62 counties in Illinois, Iowa, Minnesota, and Wisconsin (Figure 1).

Dairyland is committed to the preservation and protection of precious natural resources. This field guide was created in acknowledgement of that commitment. The field guide summarizes erosion and sediment control BMPs for use by field crews. These practices, when properly implemented, will minimize or prevent erosion and sediment pollution from adversely impacting sensitive resources, such as, streams, ponds, lakes, wetlands, and natural vegetation. This guide must be periodically updated to reflect changes in BMPs.

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The purpose of the BMPs described in this field guide is to comply with regulations and prevent soil from entering waters and wetlands of the state and the U.S. The BMPs should be used as described in project-specific erosion control plans, and are not necessary around every structure if there is no risk of erosion.

Figure 1
Dairyland Power Cooperative Service Area
TIPS FOR CONSTRUCTION IN RESIDENTIAL AREAS

Construction near residential areas requires special precautions to minimize disturbance to residences and maximize safety considerations. Impacts to residences near construction will be minimized by implementing the following applicable mitigation measures:

- Strip and store, or replace topsoil with imported topsoil after construction.
- Install orange safety fence between the construction area and residences where necessary.
- Avoid removal of trees and landscape whenever possible or specified in an agreement.
- Maintain access to residences at all times during construction.
- Notify residences within 48 hours of start of construction and construction during nighttime hours. Review permits for additional requirements for nighttime construction.
- Restoration of residential areas should be completed shortly after construction is completed, as conditions and seasons dictate.

Don’t forget!

Erosion control is generally more cost effective than sediment control and requires less maintenance and repair.
HIGHWAY AND ROAD CROSSINGS

Roadway crossing and ROW access points must be identified before the start of construction to maintain safe and accessible conditions throughout construction.

Refer to Volume I of the BMP Manual for erosion control and sediment control as most if not all are applicable. A few that stand out follow and are detailed in the following section:

- Preservation of existing vegetation
- Mulch, blankets, and mats
- Silt fence or log rolls along perimeter of project area adjacent to roadway
- Construction entrance and exits
- Street cleaning
TEMPORARY WETLAND CROSSINGS

Temporary wetland crossing options include wood mats, wood panels, wood pallets, bridge decking, expanded metal grating, polyvinyl chloride (PVC) and high density polyethylene (HDPE) pipe mats or plastic road, tire mats, corduroy, pole rails, wood aggregate, and low ground pressure equipment. Temporary wetland crossings should be avoided unless absolutely necessary. Successful crossings are enhanced with a root or slash mat to provide additional support for equipment and geotextile to segregate the crossing from underlying soil and provide floatation.

Permitting requirements for temporary wetland impacts differ by state. Prior to starting construction, coordination with the appropriate state agencies is recommended to determine if notification or permitting is necessary for temporary wetland crossings.

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**State Specific**

**Wisconsin** - Temporary impacts to wetlands may require permits from the Wisconsin Department of Natural Resources. The approval process takes a minimum of 14 days and alternatives, avoidance and minimization measures will need to be documented. Note that updated permit requirements for transmission lines are in process in early 2013. Check the latest regulations and implementations at [http://dnr.wi.gov/topic/wetlands/](http://dnr.wi.gov/topic/wetlands/).

**Minnesota** - Temporary impacts associated with substation construction must be permitted through the joint local/state (Wetland Conservation Act) and US Army Corps of Engineers (USACE) permit process. For temporary impacts associated with transmission structures, these are exempt from the Wetland Conservation Act but may be subject to USACE permitting.

**Iowa** - The USACE generally does not require notification of temporary impacts to wetlands associated with transmission lines unless mechanical clearing of forested wetlands is involved, which does require a pre-construction notice.

**Illinois** - The USACE and Illinois Department of Natural Resources generally do not require notification of temporary impacts to wetlands associated with transmission lines with a possible exception of forested wetland clearing.

Temporary wetland crossing options will be discussed in further detail on the following pages.
**Wood Mats**

Individual cants, sawdense hardwood (oak), or round logs cabled together to make a single-layer crossing.

Wood mats provide a surface that protects wetlands during hauling or equipment moving operations.

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U.S. Department of Agriculture

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University of Minnesota

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All wood members are 4" x 4"

3/16" galvanized steel cable

Connect loops with 3/16" cable clamps

Direction of travel

2 ft 10 ft 2 ft

University of Minnesota
PVC and HDPE Pipe Mats or Plastic Road

A portable, reusable, lightweight corduroy-type crossing can be created with PVC or HDPE pipe mats.² Pipe mats work as a conduit and allow water to move through the crossing without further wetting the area. This can also be used for stream crossings.
**Corduroy**

Corduroy is a crossing made of brush, small logs cut from low value and noncommercial trees on site, or mill slabs that are laid perpendicular (most often) or parallel to the direction of travel. The greater the surface area of the corduroy the greater the floatation capability of the crossing. Placing geotextile provides additional support and segregation of brush, logs, or mill slabs from underlying soil.
**Wood Aggregate**

Use wood particles, varying in size, to fill soft soil areas. This is a popular method because the wood is relatively light in weight, which gives it better natural flotation than gravel. Wood, being a naturally biodegradable material, will allow water to flow freely through, causing no change to the natural hydrologic flows.
WETLAND FILL

Woody Debris
Woody vegetation in wetlands must be removed as required by Wisconsin state regulations. Minnesota, Illinois, and Iowa allow woody debris to remain in the wetland.

Spoils
Wetland spoils must be removed from wetlands promptly; wetlands may not be used to store excavated materials.

Removal of Existing Poles
When removing transmission poles in wetlands, it is recommended the poles be cut off at ground level to limit land disturbance to the area.
STREAM AND RIVER CROSSINGS

Temporary stream crossing is required to provide safe, erosion free access across a stream for construction equipment.\(^3\) Temporary stream crossings are fords, culverts, PVC and HDPE pipe bundles, and portable or on site constructed bridges.\(^2\) Unless it is absolutely necessary, stream crossing should be avoided. Use existing stream crossing locations if crossing is unavoidable and the existing crossing can withstand the weight. Properly designed, installed, and maintained temporary stream crossings can greatly reduce costs and help meet concerns of regulating agencies.\(^2\) If a stream crossing is needed, it should be limited to as few as possible and should be as short as possible. To correctly cross a stream, the crossing should be located on a straight segment of the stream channel that has low banks (except for bridge crossings where higher banks are preferred to support the abutments).\(^2\) Contact a local engineer or hydrologist to determine permitting needs for the stream crossings, if needed. IA, MN and IL require state and/or USACE permits for stream crossings that include work within the banks of the streams.

STREAM AND RIVER CROSSINGS (continued)

Temporary, clear-span bridges are allowed in IA, MN and IL under a general permit if the appropriate conditions are followed. WI requires permits for any type of stream crossing of any stream feature, even those that do not involve work within the banks, including temporary span bridges.

In Minnesota, Iowa and Illinois, streams are generally defined as a drainage feature that has distinct bed and banks. In Wisconsin, the DNR has mapped stream features, and any crossing of the mapped streams will require a permit and temporary crossing structure, even if no bed and banks are present in the field.

Road ditches may or may not be considered jurisdictional stream features. A general rule of thumb is that if a ditch adjacent to a road contains culverts or other connections that allow flow that will eventually reach a stream, these ditch features should be treated as streams.

Temporary stream crossing options will be discussed in further detail on the following pages.

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4Minnesota conditions can be found at: https://www.revisor.leg.state.mn.us/rules/?id=6115.0210
Illinois conditions can be found at: http://dnr.state.il.us/owr/ResmanStatewidePermits.htm
**Fords**

A ford utilizing the streambed is used when flows are consistently less than 600 mm (2 feet) deep, as part of the road or access trail, and is best for shortterm, limited traffic. Cable concrete fords (articulated concrete mats) are prefabricated mats of concrete that can be placed in dry or intermittent streambeds to more evenly distribute weight for stable crossing. These must be removed when the construction is complete.

- Fords should not be constructed or used during periods of fish spawning and migration.
- If the crossing location has a mucky or weak streambed a base must be constructed.
Fords - State Specifics


**Minnesota** - Areas with extensive wetlands or floodplains adjacent to the channel should be avoided. A DNR work permit is not required if all of the following are met:

- Stream bed is capable of supporting the ford crossing without special site preparation.
- Water depth does not exceed 2 feet under normal summer flow conditions.
- Crossing conforms to the natural cross section of the stream channel and does not restrict normal low-water flows.
- Original streambank at the site does not exceed 4 feet in height.
- Crossing is constructed of gravel, natural rock, steel matting or other durable inorganic material not exceeding 1 foot in thickness. Recycled asphalt or construction rubble is not allowed.
- The approach is graded to a finished slope not steeper than 5 to 1 horizontal to vertical, and all graded banks are seeded and mulched to prevent erosion and sedimentation.
- Crossing is not placed on an officially designated trout stream; on a wild, scenic, or recreational river; or on an officially designated canoe and boating route.
The MnDOT General Public Waters Permit stipulates that all equipment intended for use at a project site must be free of prohibited invasive plants prior to being transported into or within the state and placed into state waters. Equipment used in state waters known to contain aquatic invasive species that are designated as infested waters shall be inspected by MnDOT and/or its contractors and adequately be decontaminated prior to being transported.

**Wisconsin** - A general Permit or individual permit is required to install a ford in a navigable waterway. To qualify for this permit, the project may not be in an area of special natural resource interest (ASNRI) unless used for an agricultural use, or in a Public Rights Feature (PRF). General Permit eligibility can be obtained if conditions set by the Wisconsin DNR in the Ford General Permit are met; [http://dnr.wi.gov/waterways/permit_apps/GP_Ford_Attachment.pdf](http://dnr.wi.gov/waterways/permit_apps/GP_Ford_Attachment.pdf)

- All grading, excavation and land-disturbance activity will be confined to the minimum area necessary for the placement of the structure and will not exceed 10,000 square feet.
  - Note: If the project includes any grading, excavation or land-disturbance activity in excess of 10,000 square feet you will also need to receive approval under a Grading General or Individual Permit in addition to this permit
- Any excavated material must not be placed in a waterbody, wetland, or floodway
- The project meets or exceeds the stormwater management technical standards of s. NR 151.11 and 151.12, Wis. Adm. Code for stormwater discharges. Any area where topsoil...
is exposed during the placement, repair or removal of the structure will be immediately seeded and mulched to stabilize disturbed areas and prevent soils from being eroded and washed into the waterway.

- Unless part of a permanent stormwater management system, all temporary erosion and sediment control practices will be removed upon final site stabilization. All areas disturbed during removal of temporary erosion and sediment control practices will be restored.

- To minimize adverse impacts on fish movement, fish spawning, egg incubation periods and high stream flows, the project will not occur during the following time periods:
  - September 15th through May 15th for trout streams and perennial tributaries to those trout streams.
  - March 15th through May 15th for ALL waters located south of state highway 29.
  - April 1st through June 1st for ALL waters located north of state highway 29.

To stop the spread of invasive species from one public waterway to another public waterway, all equipment or portions of equipment used for constructing, operating, or maintaining the project will be washed for invasive species before and after use or prior to use within another public waterway.
**Culverts**

A culvert is a structure that conveys water under a road or access trail. Culverts are the most common methods of crossing intermittent and perennial streams. There are manufactured culverts that come in various shapes, lengths, and diameters. Manufactured culverts are made of corrugated steel, concrete, or polyethylene. Proper sizing with a minimum of a 375mm (15 inch) diameter and installation of culverts is crucial for a successful crossing. Other materials, such as steel piling, wooden box culverts, and hollow logs can be used as culverts as well.

Culvert installation must be in compliance with local codes and permitting requirements.
**Bridges**

Bridges keep fill and equipment out of the water better than any other stream crossing option. Temporary bridges can be constructed from ice, timber, steel, or prestressed concrete. A licensed engineer may be required to review the design of any bridge that is fabricated from locally available materials; otherwise, manufactured bridges are made for various span lengths and load capacities.

Bridge installation must be in compliance with local codes and permitting requirements.

**Ice Bridges**

Ice bridges are most common stream crossing methods during winter months with night temperatures below 0 degrees Fahrenheit (°F) with several days to build up thick enough ice. An estimated formula was developed to estimate minimum ice thickness to support a given load.

$$H=4(P)^{1/2}$$

Where:
- **H** = Ice thickness in inches
- **P** = The load or gross weight of the vehicle plus its contents, in tons

Placing mats on top of ice bridges provides added support in case ice was to give way.
**Timber Bridges**

Two common designs for timber bridges are the log stinger bridges and solid sawn stringer bridges with or without a plank deck. Log stringer bridges are built by cabling logs together from trees felled in the area of construction. Solid sawn stringer bridges are built with new lumber, railroad ties, or demolition materials.
TEMPORARY EROSION CONTROL

Temporary Seeding

Stabilizing crop seed mixture, or temporary seeding, used should be in accordance with the following rates and schedule unless otherwise specified in the contract documents.

<table>
<thead>
<tr>
<th>Location</th>
<th>Species</th>
<th>Season(s)</th>
<th>Application Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois and Iowa</td>
<td>Perennial Ryegrass</td>
<td>All</td>
<td>40 lbs/acre</td>
</tr>
<tr>
<td>Minnesota and Wisconsin</td>
<td>Winter Wheat</td>
<td>Fall</td>
<td>100 lbs/acre</td>
</tr>
<tr>
<td>Minnesota and Wisconsin</td>
<td>Perennial Ryegrass</td>
<td>Spring</td>
<td>100 lbs/acre</td>
</tr>
</tbody>
</table>

Mulching

Straw or hay can be used as mulch but must be free of noxious weed contaminants. State approval is necessary for mulching in wetlands.

HydroMulching

Hydromulching is a planting process which utilizes a slurry of seed and mulch. Hydromulching material is weed free and is typically produced from recycled paper or raw wood. The material enhances initial growth by providing a micro environment beneficial to seed germination.
COMMON EROSION AND SEDIMENT CONTROL BMPs

Street Cleaning of Paved Roads

Cleaning tracked sediments and debris from paved streets prevents unwanted material from washing into surface waters and improves the appearance of public roadways. State and many county requirements also dictate that no dirt can be tracked on to public paved roads.

Paved roadways adjacent to construction or maintenance sites must be inspected at the end of each day and tracked soil shall be promptly removed.
Truck Washing

Vehicle washing can generate dry weather runoff contaminated with detergents, oils, grease and heavy metals. External washing of trucks and other construction vehicles must be limited to a defined area on the site. Runoff must be contained and waste properly disposed of; untreated wash water must not be transported into waters of the state. No engine degreasing is allowed on site.

In addition to limiting the potential for sediment transport, washing vehicles prior to entering/leaving work site helps deter the spread of invasive species. This mitigates the spread of invasive species by not allowing new species to enter the site with the vehicles, and likewise prevents the transport of species from the project site to other locations. Vehicle washing also may be a condition of the permit.
Wash areas should be designed to direct wash water to an appropriate containment facility or treatment facility through use of silt fences, log rolls, etc. Blowers, vacuums or shovels can be used instead of water to remove dry material from vehicles. If water is to be used, high-pressure water spray without detergents is to be utilized.

All designated washing areas should be clearly marked and only used for vehicle washing activities.

A wheel wash can be installed at or near the exit of the site to wash excess dirt and mud off truck tires. A series of railroad rails spaced 2 to 8 inches apart can be used to shake off loose rocks and dirt while the vehicle is driving through the wheel wash. The water used must be treated to remove turbidity before being discharged.
PERIMETER CONTROL

Silt Fence

- Porous fabric (woven, non-woven, mono-filament) held up by wooden or metal posts that ponds sediment laden stormwater runoff, causing sediment to be retained by the settling process.
- Place silt fence around staging areas, stockpiles, and trees to protect from damage.
- In addition, place silt fence at the downstream side of access roads to protect streams and ditches. Silt fence shall be either machine sliced or hand installed into the soil.

Hay Bales

Straw or hay bales have been used as check dams, inlet protection, outlet protection, and perimeter control. Because many applications of straw and hay bales have been ineffective, the EPA often recommends other BMPs be considered first.
**Fiber Logs/Biorolls**

- Fiber logs are tube shaped devices filled with straw, flax, rice, coconut fiber material, or composted material and wrapped with UV-degradable materials like burlap, jute, or coir.

- Biorolls are straw or wood fibers encased in a netting with a minimum 6 inch diameter slows runoff velocities allowing sediment to settle out and remain on site.

- Place along toe, top, face, and at-grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow

- In addition, place at the end of a downward slope where it transitions to a steeper slope, along the perimeter of a project, as check dams in unlined ditches, downslope of exposed soil areas, and around temporary stockpiles.
**Sediment Trap**

Sediment traps are a temporary measure with a design life of approximately 6 months to 1 year and are maintained until the site area is permanently protected against erosion by vegetation and/or structures.\(^5\)

Direct discharge from dewatering operations to a temporary sediment trap constructed with a spillway that consists of geotextile fabric and crushed rocks.

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Temporary Entrance/Exit for heavy access

- Construct entrances and exits by overlaying a 12-ounce geotextile fabric with a 6-inch layer of 1 to 3 inch diameter washed aggregate or woodchips.

- Stone or wood chip pads consists of clean rock or wood chips designed in such a way that vehicle tires will sink slightly in, helping remove mud from tires as vehicle passes over the mat.

- Vegetation and topsoil should be removed from the shoulder zones to construct the entrances, however, tall vegetation may be mowed.

- If the entrance/exit begins to rut, stabilize by placing a geogrid and additional washed aggregate or woodchips in the roadway.

- Remove the entrance/exit restore the area to the geometry of the intersection at the end of each project.

- Areas outside of the permanent roadway shoulder may require re-grading.

- Compacted soils shall be loosened by ripping or disking, then seeded and mulched.
Temporary Entrance/Exit for lower traffic access

Temporary access paths are required throughout the Project limits. Access paths will consist of areas of cleared vegetation and are anticipated to be approximately 16 feet wide. The paths will follow the natural terrain and will not result in increased impervious area.

Temporary access (low-traffic) using composite mats

Temporary access (low-traffic) using mulch
Check Dams

Check dams are made of rocks, straw, logs, lumber, or interlocking pre-cast concrete blocks within a ditch, drainage, swale, or channel to reduce the gradient of a ditch, thus slowing the water, lowering its ability to cause erosion, and allowing sediment to settle out.\(^6\)

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Dewatering

Areas with a high water table may require dewatering to facilitate construction, prevent erosion and sediment transport, and/or to prevent pollution of groundwater. Sediment-laden water cannot be discharged directly into a surface water or into a drainage pipe, inlet, or ditch that flows to a surface water. If dewatering is required, a site assessment shall be conducted and documented to determine the physical site characteristics that will affect the placement, design, construction, and maintenance of dewatering activities. Dewatering systems must be consistent with state defined specifications.

The following dewatering methods will be used as appropriate:

- Pump directly into a temporary sedimentation basin, overflow protection by rock, or super-duty silt fence system
- Chitosan or floc sock installed in a pump or hose section, which will be directed into a temporary sedimentation basin with outflow protection
- Pump head placed into a barrel with filtering holes and rock
- Pump head and gravity inlet installed on a floating head skimmer
- Pump into a plastic lined dumpster, with Chitosan treatment and floating head discharge
- Pump into an engineered treatment plastic lined dumpster, with Chitosan or starch floc treatment and filter fence liner
- Sand media particulate filter with inline Chitosan sock
- Alternative method engineered to meet specific circumstances.
**Winter Construction**

Erosion control permit conditions must still be met in the winter. For sites where construction started prior to ground freeze, perimeter control and other BMPs must be inspected and maintained throughout the winter so they are functional if and when thaws arrive.

For areas where construction begins after ground freeze, installation of erosion control BMPs can be difficult.

*Suggested methods include clearing the area and anchoring the BMPs:*

- Using rocks to weigh compost or mulch logs
- Placing filter rock over fabric lip of silt fence

For areas with erosion control blanket, snow should be removed from the area prior to installation, and the anchors should be 6” nails and washers
SPILL RESPONSE AND PROTOCOLS

1. Identify key spill response personnel.

2. Clean up leaks and spills immediately.
   
   › Place a stockpile of spill cleanup materials where they will be readily accessible (e.g. near storage and maintenance areas).

   › Utilize dry cleaning methods to clean up spills to minimize the use of water. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then used cleanup materials are also hazardous and must be sent to a certified laundry or disposed of as hazardous waste. Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.

   › Never hose down or bury dry material spills. Sweep up the material and dispose of properly.

   › Clean up chemical materials with absorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.

   › For larger spills, a private spill cleanup company or hazardous material team may be necessary.
Spill Response Reporting

Report spills that pose an immediate threat to human health or the environment to local agencies.

- **Illinois** – Illinois Emergency Management Agency (217) 782-7860 or (800) 728-7860
- **Iowa** – Iowa DNR (515) 281-8694
- **Minnesota** – Minnesota Pollution Control Agency (State Duty Office) (651) 649-5451 or (800) 422-0798
- **Wisconsin** – Wisconsin DNR (800) 943-0003

Establish a system for tracking incidents. The system should be designed to identify the following:

- Types and quantities (in some cases) of wastes
- Patterns in time of occurrence (time of day/night, month, or year)
- Mode of dumping (abandoned containers, “midnight dumping” from moving vehicles, direct dumping of materials, accidents/spills)
- Responsible parties

Federal regulations require that any oil spilled into a water body or onto an adjoining shoreline must be reported to the National Response Center (NRC) at (800) 424-8802 (24 hour).
LOCAL SEED VENDORS

**Iowa**
Ion Exchange, Inc
1878 Old Mission Drive
Harpers Ferry, IA
(563) 535-7231

**Minnesota**
Brock White
6784 10th Avenue Southwest
Rochester, MN 55902
(507) 282-2421 or (800) 279-9034

Shooting Star Native Seeds (Seed Only)
20740 County Road 33
Spring Grove, MN 55974
(507) 498-3944

Sodko, Inc. (Sod Only)
20740 County Road 33
Spring Grove, MN 55974
(507) 498-3943

Ramy Turf Products
842 Vandalia Street
St. Paul, MN 55114
(651) 917-0939 or (800) 658-7269

**Wisconsin**
La Crosse Forage and Turf Seed Corporate
2541 Commerce Street
La Crosse, WI 54603
(608) 783-9560 or (800) 328-1909

**Illinois**
Genesis Nursery, Inc. (Wholesale)
23200 Hurd Road
Tampico, IL 61283
Phone: (815) 438-2220

Mason State Nursery
IL Dept. of Natural Resources, Forest Resources
17855 N Country Road, 2400 E.
Topeka, IL 61567
Phone: (309)-535-2195

National Seed
4720 Yender Avenue
Lisle, IL 60532
Phone: (630)-963-8814