

## **Preventing the spread of invasive plant species:**

### **Guidelines for Best Management Practices for movement of topsoil and gravel fill, mulch and equipment in Connecticut.**

#### **Dispersal of Invasive Plant species in Biologically Contaminated materials:**

Many invasive plant species spread naturally through seed dispersal by wind, water or wildlife. However, others disseminate inadvertently through human activities such as the movement of excavated soil, sand, gravel, and mulches; or through the movement of mowing, logging, maintenance and excavation equipment from invaded sites to uninvaded sites.

Soil, sand, gravel, and mulches that are contaminated with viable seed or other propagules of invasive plant species (such as root or stem fragments from which a new plant can grow) can be considered Biologically Contaminated in that the transfer of this material to a site free of invasive plants will aid in the dispersal of the invasive species and disrupt or damage the biological diversity of the native flora and fauna.

#### **Adverse impacts and costs associated with Invasive Plants:**

Invasive plant species adversely affect native ecosystems and may cause harm to human health or economic well-being. Invasive plants adversely impact ecosystems in a variety of ways by crowding out native plants and reducing plant diversity which results in a loss of food and shelter for wildlife and alterations in nutrient and water availability. Some invasive species such as giant hogweed present health risks to people while others such as Japanese barberry create habitats that favor rodents associated with elevated levels of Lyme disease-transmitting deer ticks. Other invasive plants (including mugwort and certain species of thistle and knapweed) are problematic weeds that cause economic damage in agricultural fields and grasslands in addition to the damage they cause in native habitats.

Some invasive species can be very destructive and problematic in the built environment as well. Vines and large shrubby invasive species in particular impair sight lines on roads, climb on and obscure street signs, and overgrow utility installations and infrastructure.

#### **General principles for pro-active control of invasive plant spread**

Since many invasive species are very difficult to eradicate once introduced, the most effective management strategy is to prevent invasive plant species from spreading into new habitats. Preventing the initial spread of invasive plant species is easier and less expensive than remediating a landscape after the invasive plants become established.

Once an invasive species spreads to new habitat, early detection and rapid response is the best course of action for preventing establishment. By detecting an invasion early and reacting quickly the cost of remediation can be greatly reduced.

**Concerns associated with movement of fill, mulch and equipment:**

These **Best Management Practices (BMPs)** were developed to assist landowners, work crews and supervisors in preventing the introduction and spread of invasive plant species on disturbed and managed land. The risk of inadvertent spread of invasive species is whenever materials (e.g. soil fill, gravel, mulch) and equipment are moved and natural plant cover is disturbed or removed; circumstances which are commonly associated with residential or commercial construction projects, road work and some agricultural management activities. This movement of materials and equipment spreads not only seeds but also viable stem and root fragments that can readily sprout to invade new habitat.

Roadsides provide a desirable habitat for invasive plants due to ample sunshine, disturbed and bare soils, and moist drainage channels. If bare areas are present or if vegetation is eliminated due to herbicide treatments, it is important to reestablish desirable vegetation, such as turfgrasses or native plants, before non-native plants invade the area.

The three keys principles in preventing the inadvertent spread of invasive plant species are AVOID, MINIMIZE, and MITIGATE. Whenever possible AVOID moving invasive species into uncontaminated sites. If that is not possible MINIMIZE the movement and impact through inspection, and always follow through with MITIGATION using quick remedial action.

**Best Management Practices (BMPs):****Planning Pre- and Post- Growing Season**

1. Start by hiring or appointing a competent invasive plant expert to coordinate invasive plant identification, training of work crews, pro-active site practices, species control, and follow-up monitoring.
2. Develop a plan to identify and map work areas with new and existing areas of invasive plants. Keep the entire crew engaged in the identification of new areas. It is much easier to eradicate a small, new area of invasive plants than an established, large one. Establish a schedule and prioritize your approach depending on the best time to control.

The online invasive plant mapping database, EDDMapS has a map query function (<https://www.eddmaps.org/tools/query/>) that enables the downloading of site-specific invasive plant records for each Town in Connecticut. This database can be useful (particularly for determining if uncommon invasive species are nearby), but note that it is not a substitute for onsite examination because many records are not yet posted due to time-lags in the verification process, or because there has been no reporting for most sites.

3. As needed, develop species-specific control plans that include when to use herbicides or when to mow and/ or control in the vegetative phase. Repeat control for aggressive species, especially perennials.

4. Monitor work areas after soil disturbance and/or control treatment for at least two years (Note: some species like multiflora rose, Japanese stiltgrass have very long-lived seeds and will require much longer monitoring periods). Return to re-treat, as needed.

**Soil and Excavated Material from site of origin:** "Top" material - topsoil, gravel, etc - is frequently contaminated with invasive plant propagules such as seeds or rhizomes (underground stems, small fragments of which can sprout). Screened topsoil may be free of larger rocks, but it contains seeds, usually from several sites where soils were excavated.

1. Minimize soil disturbance and monitor excavation sites for emerging invasive species for at least two years.
2. If possible, avoid transporting soil, fill, stone, hay, or other materials (see HANDLING EXCAVATED MATERIAL FROM BIOLOGICALLY CONTAMINATED SITES below). If moving these materials is necessary, first verify that they are free of invasive plant fragments or seeds, and monitor the site with this deposited material for emergence of invasive plants for at least two years. Respond rapidly to any invasive plants found during monitoring.
3. Stabilize disturbed soils as soon as practical with acceptable seeding and mulch.
4. Do not use excavated material elsewhere unless it is free of invasive plant fragments or seeds.
5. Wherever possible, avoid excavation in areas containing Japanese knotweed, giant knotweed, purple loosestrife, mugwort, swallowwort, and phragmites. Plants will emerge from the root fragments of these extremely difficult to control species.

#### INSPECTION & MONITORING:

1. Inspect sites where soil and other fill or mulch is to be introduced. Record presence of invasive species already present. Use of a mapping tool such as EDDSmaps, iMapInvasives or similar free online-tool which also has an App may be of use, but is not a substitute for field examination. Treating invaded areas before introducing new material is recommended.
2. Inspect soil and gravel fill prior to movement. Before moving soils or gravel, inspect the area of origin (including but not limited to, surrounding ditches, top soil piles, gravel/sand piles, fence rows, roads, easement, rights-of-way, working area, storage areas, and buffer zone surrounding the entire area).
3. Inspect soils and gravel fill prior to spreading on new site.
4. Monitor sites where new fill or mulch is introduced. Treat newly emerging invasive species immediately. Monitor the site for at least two years, and until a desirable cover is established

#### Manage existing topsoil and dead plant material to reduce contamination by invasive plants.

1. Develop topsoil management plans on all projects that include grading or earthwork, prior to soil disturbance.
2. Save local existing, invasive-free topsoil for reuse. However, if topsoil and duff are found to be contaminated with invasive plants, do not reuse this material on a new site. Instead, a mitigation plan is in order (See HANDLING EXCAVATED MATERIAL FROM BIOLOGICALLY CONTAMINATED SITES)..

3. Identify on the worksite plans, where local topsoil and dead plant material should be:
  - a. Removed or excavated
  - b. Stockpiled
  - c. Reapplied
4. When excavating local topsoil and removing duff material, minimize handling of the material to reduce soil compaction and detrimental impacts on microorganisms and soil health.
5. Stockpile clean, local topsoil and duff material in windrows no taller than ten feet for local topsoil and five feet for duff. Implement temporary erosion control measures to reduce the likelihood of invasive plant establishment and loss of material.
6. Seed local topsoil stockpiles that will remain in place for over six months with a fast-growing non-invasive (preferably native) plant species to maintain soil microorganisms. Seeding is the preferred covering for topsoil stockpiles, as opposed to impermeable barriers such as tarps or plastic sheeting, which may destroy living soil microorganisms.
7. Monitor stockpiles of topsoil and duff material regularly as they are highly susceptible to invasion by invasive plants. Determine management needs based on presence of invasive plants.

#### When using mulch:

1. Use weed-free mulch.
2. Apply mulch at the recommended thickness to suppress the establishment and growth of invasive plants. Ensure mulch remains on-site. Lighter mulches will blow away in areas prone to heavy wind; mulches can move if watering results in surface flow. Consider the use of Tackifiers (e.g. adhesive compounds used to increase the tack or stickiness of the surface) or biodegradable netting to stabilize mulch on erosion prone areas.
3. Supplement with additional mulch to retain thickness and effectiveness after it begins to decompose.

#### SOIL DISTURBANCE & STABILIZATION

1. Minimize soil disturbance whenever possible, as invasive plants readily colonize areas of disturbed soil. Monitor recent work sites for the emergence of invasive plants for a minimum of 2 years after project completion.
2. Stabilize disturbed soil as soon as possible by seeding with, and quickly establishing a dense cover of native species. A temporary cover of clean mulch or straw can be used to stabilize before native species are established. A cover of rip-rap or gravel may be appropriate on certain sites. All species listed on the Connecticut Invasive Plants Council list are considered invasive or potentially invasive; and none should be intentionally planted. It is illegal to plant those species prohibited by State statute. In addition, for the few species on the list exempted from regulation, State statutes prohibits the use of those species by State agencies or contractors.
3. Avoid using fill if possible, especially on sites that are not contaminated with invasive species. Materials such as fill, loam, mulch, straw, rip-rap, and gravel should not be brought into project areas from sites contained by invasive plants. If fill is used, monitor work sites for the emergence of invasive plants for a minimum of 2 years.

## MOVEMENT &amp; MAINTENANCE OF EQUIPMENT

1. Where invasive plants are present, mark areas where equipment should not be driven or parked to prevent the subsequent spread of invasive propagules (seeds, fragments etc) within the work area.
2. Require that undercarriages, wheel wells and parts of the equipment that come into contact with soil are cleaned prior to equipment being brought onto the site
3. When equipment needs to be moved, plan work flow so that equipment is moved from non-invaded sites to invaded sites. This is especially important during ditch cleaning and shoulder scraping.
4. Use staging areas that are free of invasive plants to avoid spreading seeds, clippings or plant fragments.
- If working in areas with invasive plants, clean all equipment, clothing, and hand tools of all visible soil and plant material before leaving the project site. Acceptable methods of cleaning include, but are not limited to:
  - Portable wash station that contains runoff from washing equipment (containment must be in compliance with wastewater discharge regulations);
  - High pressure air;
  - Brush, broom, or other hand tools (used without water).
5. If equipment will be used in invaded areas, remove above-ground invasive plant materials such as purple loosestrife, Phragmites, and Japanese knotweed prior to the start of work.
6. Excavated material taken from sites that contain invasive plants cannot be used away from the invaded site until all viable plant material is destroyed. Excavated material from areas containing invasive plants may only be reused within the *exact* limits of the invaded site. (See HANDLING EXCAVATED MATERIAL below).
7. Whenever possible, excavation should be avoided in areas containing Japanese knotweed, purple loosestrife, mugwort, swallowwort, Phragmites, and seed propagated species such as stiltgrass. If excavation does occur in these areas, the BMPs described for 'HANDLING EXCAVATED MATERIAL & INVASIVE PLANT MATERIAL' must be followed.
8. Ditched areas should be stabilized daily as part of the regular work operations. The disturbed soils and new ditch profile are to be protected as soon as possible by stone, erosion control materials or seeding and mulch from a source free of invasive plant material. Seeds of native species should be used whenever possible. Mulch may be straw or a manufactured product.

## MOWING

1. Frequent mowing of areas infested with purple loosestrife, Phragmites, mugwort, and Japanese knotweed can be a viable method of suppressing the spread of these species. However, since these species can sprout from stem and root fragments, as well as from seed, it is imperative to avoid inadvertently spreading propagules when mowing.
2. Mow these areas BEFORE seed head formation.
3. Clean mowing equipment daily, and prior to transport to and from each location. This is particularly important if mowing is after seed maturation.

## HANDLING EXCAVATED MATERIAL FROM BIOLOGICALLY CONTAMINATED SITES.

Excavated materials taken from infested areas should only be used onsite, unless all plant material including seed has been destroyed. Only use within exact limits of infestation.

1. Excavation should be avoided in areas containing purple loosestrife, Phragmites, mugwort, and Japanese knotweed.
2. Any excavated Biologically Contaminated material that cannot be reused within the limits of the work site must be stockpiled on an impervious surface and treated on site to destroy any viable plant material OR the material must be disposed of using a prescribed method.
3. Destroy removed plant material. Methods include:
  - Solarization: place on impervious surface and cover with clear plastic
  - Brush piles: not for plants with fruit or seed
  - Burying: minimum of 3-5 feet below grade (Note: the proper depth varies with species. Burial may not be an option for species, such as Japanese knotweed, that have robust underground storage organs).
  - Burning: have a designated burn pile for invasive plants and the proper burn permit
  - Herbicide: requires a licensed applicator (CT DEEP)
4. Whenever transporting soil or fill materials containing invasive species, cover the load during transport.

### References and resources:

Preventing the Spread of Invasive Plants: Best Management Practices for Land Managers (3rd Edition). California Invasive Plant Council. <https://www.cal-ipc.org/resources/library/publications/landmanagers/>

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