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INCORPORATING INVASIVE PLANT ANALYSIS INTO NEPA

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Abstract: One of today's largest ecological problems is biological pollution, or the spread of invasive plant and animal species. We lose 4600 acres daily to new weed infestations. The ecological and economic costs to the nation are staggering (Westbrooks 1996). In response, the Federal Interagency Committee on the Management of Noxious and Exotic Weeds (FICMNEW) helped draft Executive Order 13112. All 16 agencies involved were responsible for the field guidance that followed (NISC 2001). In accordance with the EO 13112 goals of prevention, control, restoration, and education, FHWA sent guidance to all state Departments of Transportation asking that analysis of invasive species be incorporated within the NEPA process. The 1999 guidance was aimed at preventing the spread of weeds on highway projects and through maintenance practices (Harper-Lore 2000). State case studies will demonstrate how this Executive Order was incorporated into national policy and translated to highway construction and maintenance projects.

The Importance of Early Analysis

We all have learned that whenever soil is disturbed, opportunistic plants are likely to fill bare spots. Some of these plants are early successional and short-lived plants, about which we do not worry, i.e. lambsquarters (*Chenopodium berlandieri*) and curly dock (*Rumex crispus*). They do not exist for long. It is the plants that capture a site quickly and tenaciously persist over time that raise concern. Plants like purple loosestrife (*Lythrum salicaria spp.),* yellow star thistle (*Centaurea solstitialis*), spotted knapweed (*C. maculosa*), leafy spurge (*Euphorbia esula*), giant reed (*Arundo donax*), common buckthorn (*Rhamnus carthartica*), multiflora rose (Rosa multiflora), saltcedar (*Tamarix spp*.), Russian olive (*Eleagnus angustifolia*), and tree-of-heaven (*Ailanthus altissima*) that cause economic and ecological harm. Their impacts and costs are well known. How do we then prevent them from pioneering into disturbed sites? How do we minimize the disturbance, especially in highway construction and maintenance projects? Since highway corridors crisscross the nation, how do we minimize the spread of invasive plants through and from the corridors? These are questions we must answer before the disturbance takes place.

Because of EO13112 and its subsequent guidance, all highway construction will be analyzed early in the NEPA process, before highway design or construction specifications are completed. By analyzing the existing site and adjacent lands at this point, modifications can be made to minimize impacts and design management plan to deal with invasive plants already on site. Thus invasives can be prevented and controlled through design, site preparation, construction methods, contract specifications, and project monitoring.

Research is Needed

To identify invasive threats in soils and adjacent lands

Of course, much remains to be learned about prevention of invasive plants on disturbed sites. In order to identify existing and adjacent weeds, we must do more than write a presence list while walking the potential construction limits. Many invasive plants have long seed viability in the soil. Therefore we have a new challenge, to analyze the soils on a project before we disturb them. We need to find a way to field test these soils to identify the problems that are out of sight. A soil analysis, at this time, can only be done through field collection and greenhouse propagation to identify the weeds waiting for the disturbance on which they will thrive. This takes a lot of time and patience, plus excellent botanical skills. How might we identify the seeds themselves?

1. Determine seed and plant identification techniques for field use.
2. Design a soil field test that identifies the extent of threat.
3. Develop an inventory technique that allows mapping of weeds that can be incorporated into geographic information systems (GIS).

To determine cost efficiency

Another cost of weeds is controlling them and/or restoring sites after construction. If we do not eradicate them up front, they will linger as competition for desired plants for decades to come (Curtis 1959). If we are not aware of the invasives on the site, we cannot take appropriate precautions to minimize them, i.e. wash construction equipment before it arrives or departs each segment. Naturally, there is a need to avoid bringing weed seed into the construction zone, through imported soils, mulches, sods and other plants added for purposes of erosion control, mitigation, turf establishment, landscaping, etc. Arranging these specifications with weeds in mind can save time and money later.

To track effectiveness over time

We have no long-term assessments of invasive plants and their control on construction and maintenance maneuvers over time. In the 50's, DOTs used a combination of mowing and spraying to remove existing weeds. In the 70's, they aimed at reducing mowing and spraying. In the 90's, DOTs moved towards being proactive with the weed issue and began looking for ways to prevent weed establishment and movement up front (Harper-Lore 2001). We do need studies to learn if our existing best management practices are effective and cost saving over time.

Existing Practices

The Wyoming Department of Transportation (DOT) has been using an ecological strategy since 1991. They along with other States in their region require the use of weed-free forage to be used as mulching on construction and other planting projects. The State Departments of Agriculture have cooperating in setting up certification of these mulches. Thus one more avenue for weed introduction into a project is closed.

Wisconsin has joined an interagency, interdisciplinary State association to work on that State's weed issues. Through information sharing and support, Wisconsin's DOT is likely to make great strides in weed control.

State Weed Councils are organizing everywhere. The Wyoming DOT also belongs to a weed council. New Hampshire has also worked with their Department of Agriculture to release biocontrol beetles to reduce purple loosestrife infestations. The Vermont DOT is experimenting with biocontrols also. They used a Minnesota Department of Natural Resources model for rearing the beetles (*Galerucella spp*.). Releases have occurred on 20 sites, which are being monitored. New Mexico Highway and Transportation Department has joined 33 groups in a Memorandum of Understanding (MOU) that draws together all levels of land managers to work on Coordinated Weed Management Areas throughout the state. The MOU should lead to inventory, management, prevention, and eradication of invasives throughout the state.

The Colorado DOT is inventorying all rights-of-ways to identify presence of noxious weed species. Knowing what already exists will lead to improved planning for and management of invasive species on highway upgrades and new projects. Utah's DOT has led the response to the Executive Order 13112. They formed an internal team of design, construction, maintenance and environmental divisions. Along with the Utah FHWA Division Office, they defined how invasives would be included in the NEPA decision-making process. Appropriate Best Management Practices (BMPs) were also defined.

During the concept phase, determine impacts that would spread noxious weeds.

1. Include a Special Provision in contracts for "Invasive Weed control".
2. The Special Provision provides for the following BMPs:
    A. Cleaning all earthmoving equipment before entering a project,
    B. Minimizing disturbance of areas known to be infested with weeds,
    C. Minimizing soil disturbance anywhere in the right-of-way,
    D. Monitoring and controlling disturbed areas and soil stockpiles,
    E. Renegotiating bare soils as soon possible after disturbance,
    F. Controlling weeds with pre-emergent, herbicides,
    G. Including payment for equipment cleaning under mobilization,
    H. And paying for control of weeds as a separate bid item.

Implementation of EO 13112 on invasives will be studied by each state DOT. One by one they will determine their best practices to prevent, control and monitor these weedy species. As new research provides new tools and

proves cost and time effectiveness, more Departments of Transportation will be proactive. They are one of many partners needed to wage this war on weeds.

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