

16th Annual Invasive Species Workshop

Invasive species and highway construction: DOT&PF Southcoast Region practices

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On February 3, 1999, President Clinton signed Executive Order 13112 (E.O.), which calls on Executive Branch agencies to work to prevent and control the introduction and spread of invasive species. Complying with the E.O. means that federal-aid and Federal Lands Highway Program funds cannot be used for construction, vegetation or landscaping activities that purposely include the use of known invasive plant species.

Determinations of the likelihood of introducing or spreading invasive species and a description of measures being taken to minimize their potential harm should be made part of any process conducted to fulfill Alaska DOT&PF responsibilities under the National Environmental Policy Act (NEPA). The Federal Highway Administration (FHWA) strongly encourages statewide, right-of-way inventories of vegetation that map existing invasive plant infestations to provide information for NEPA analysis. DOT&PF must identify the presence and distribution of invasive species within each of its federally funded projects prior to construction.

In February 2014, DOT&PF Southeast Region (now Southcoast Region) developed an Invasive Species Disposal and Control Matrix to better define disposal options for various invasive species encountered during construction as well as control options for maintenance and operations staff. The matrix is used to provide more accurate cost estimates for invasive species handling during the design phase and provides guidance to construction staff to determine means and methods for addressing invasive species that were not previously identified on an ongoing project.

In addition, the DOT&PF Southcoast Region implemented term contracts for professional botanists and other qualified consultants with expertise in invasive species identification for highway design and construction. The term contractors are used for DOT&PF Southcoast Region projects in the southern coastal regions of Alaska extending from Dixon Entrance through the Aleutian Islands.

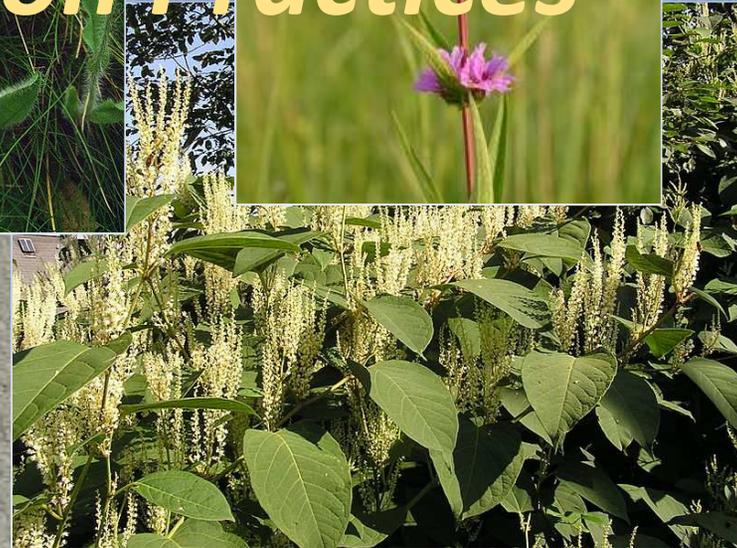
Copies of the DOT&PF matrix are available for download

at: http://www.dot.state.ak.us/stwddes/desenviron/assets/pdf/resources/se_invasive_final.pdf

Invasive Species



Southcoast Region Practices



John Barnett
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October 12, 2015

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The Problem

The Executive Order

Feb 3, 1999, Executive Order 13112

FHWA Policy ~ Control their introduction and spread...eradication strategies should be considered...

Which Species ?

State DNR List? Fed List? The lists are long and getting longer every year!

To What Extent ?

Just clean equipment?
Excavate and dispose?
... where and how?

Herbicides or Pesticides?

Problematic in Southcoast Region due to large number of fish streams & other sensitive receiving waters

Environmental Document

Surveys? When?

Environmental Commitments?

How to Address at PS&E

Extent of excavation, disposal costs, disposal sites, etc.

Contractors Bidding Dilemma

Estimating and bidding to prevent their introduction is easy ...

But excavation and disposal of large areas of infestation?

By the cubic yard, square feet, number of bags, where to put it?

What methods and technology are available?



The Problem

N. Tongass Highway Project – 2012

USACE Conditions in 404 permit issued in 2004 for multi-phase project

Special Condition 11: ... Removing Invasive Species ...

a. Prior to other ground disturbing activities, all areas within the project

footprint infested with: **Reed Canary Grass**

Japanese Knotweed

Tansy Ragwort

Oxeye Daisy

Orange Hawkweed

- **SHALL BE EXCAVATED TO A MINIMUM DEPTH OF 2 FEET**
or to bedrock whichever is less.
- Soil and vegetative matter shall be transported ... **AND BURIED UNDER A LAYER OF EMBANKMENT OR OTHER IMPERVIOUS MATERIAL AT LEAST 4 FEET THICK ...**

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North Tongass Highway

- Permit originally issued in 2004 applied to all 3 phases of project.
- Areal extent of previously surveyed infestations had doubled between each phase.
- Attempts to modify original USACE permit with different excavation and burial depths for 2012 Phase 3 project failed due to lack of readily available research supporting alternative measures.



North Tongass Highway

- Original Phase 3 Invasive Species Survey Estimate
42,469 sq. ft.
- Actual measured Phase 3 quantity
94,780 sq. ft.
- Cost to address invasives 3 times higher than estimated:
Excavation & disposal costs ↑
Additional Stormwater BMP's ↑
- Volume of invasive waste material increased resulting in disposal site challenges.
- The original site proposed for invasive disposal was inadequate in capacity resulting in invasives being “mounded” and covered with geotextile and shot rock.



North Tongass Highway

Stormwater Ramifications

Due to the requirement to remove invasive species prior to other earth disturbing activities – additional Stormwater BMPs, inspections, and BMP maintenance were required in areas where work was not scheduled to be performed for months.



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National Problem

“Inadequate funding is the primary obstacle faced by state DOTs and others trying to control invasive species. Control efforts tend to be highly fragmented. Statewide roadside inventories for invasive species have been undertaken by 20% of DOTs to assess what needs and challenges there are and the effectiveness of treatments over broader periods of time and space. However, many DOTs say that they are unlikely to attempt such inventories, with several reporting that they were impeded by lack of templates or guidance on invasive species management.”

National Cooperative Highway Research Program, 2006



The Southcoast Solution

Control & Disposal Matrix Approach

Construction Specifications

Environmental Commitments

Invasive Species Survey Term Contractors

M&O Practices

Follow the Technology!

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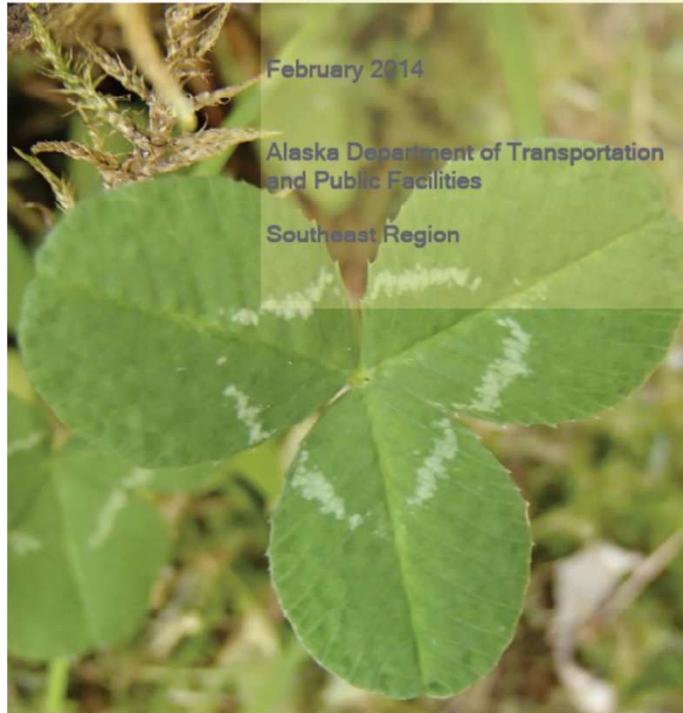
Control & Disposal Matrix

Disposal and Control of Invasive Plant Species

February 2014

Alaska Department of Transportation
and Public Facilities

Southeast Region



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Control & Disposal Matrix

- Based on extensive literature review and interviews with invasive species management experts throughout the US and Canada.
- Results summarized in a report and associated appendices.
- The report includes general commentary regarding practical experience with control and disposal of non-native species.
- Management techniques for particular species are compiled in the following Matrices:
 - Invasive Species Disposal Matrix (Appendix A)
 - Invasive Species Control Matrix (Appendix B)
 - Invasive plant list organized by Latin name (Appendix C).
 - Interview contact details and annotated bibliography linked to matrices (Appendix D).



ADNR Invasive Species List

(FHWA Mandated List)

- Leafy spurge (*Euphorbia esula*)
- Purple loosestrife (*Lythrum salicaria*)
- Orange hawkweed (*Hieracium aurantiacum*)
- Canada thistle (*Cirsium arvense*)
- Perennial sowthistle (*Sonchus arvensis*)
- **Whitetops and its varieties**
(*Cardaria draba*, *C. pubescens*, *Lepidium latifolium*)
- Russian knapweed (*Acroptilon repens*)
- Quackgrass (*Elymus repens*)
- Field bindweed (*Convolvulus arvensis*)
- Hempnettle (*Galeopsis tetrahit*)
- Galinsoga (*Galinsoga parviflora*)
- Austrian fieldcress (*Rorippa austriaca*)
- Horsenettle (*Solanum carolinense*)
- Blue-flowering lettuce (*Lactuca tatarica*, (*L. pulchella*))

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Other Species Addressed

- **Japanese knotweed**
(*Polygonum cuspidatum*, *P. bohemicum*)
- **Spotted knapweed**
(*Centaurea stoebe* (*C. maculosa*))
- **Reed canarygrass**
(*Phalaris arundinacea*)
- **Ornamental jewelweed**
(*Impatiens glandulifera*)
- **White sweetclover**
(*Melilotus alba*)
- **Meadow hawkweed**
(*Hieracium caespitosum*)
- **Cheatgrass**
(*Bromus tectorum*)
- **Siberian pea shrub**
(*Caragana arborescens*)
- **European bird cherry**
(*Prunus padus*)
- **Bird vetch**
(*Vicia cracca*)
- **Garlic mustard**
(*Alliaria petiolata*)
- **Common toadflax**
(*Linaria vulgaris*)
- **Scotchbroom**
(*Cytisus scoparius*)
- **Rampion bellflower**
(*Campanula rapunculoides*)
- **Foxtail barley**
(*Hordeum jubatum*)
- **Tansy ragwort**
(*Senecio jacobaea*)
- **Bull thistle**
(*Cirsium vulgare*)
- **Oxeye daisy**
(*Leucanthemum vulgare*)
- **Common tansy**
(*Tanacetum vulgare*)
- **Narrowleaf hawksbeard**
(*Crepis tectorum*)
- **Splitlip hempnettle**
(*Galeopsis bifida*)
- **Western salsify**
(*Tragopogon dubius*)
- **Hairy catsear**
(*Hypochaeris radicata*)



Disposal Methods

Appendix A Including Excavation & Burial Depths

Species	Invasive Species Disposal Methods				Rooting Depth/Excavation Depth	Reproduction	Burial Depth Summary and Suggested Field Tests ¹
	General Disposal Information	Burning / Incineration ²	Burial/Burial Depth	Composting			
Spilltip hempnettle <i>Galeopsis bifida</i>	No information found on this species, but the two species of hempnettle treated in this report (<i>G. bifida</i> and <i>G. tetrahit</i>) are very similar, sometimes producing hybrids, and are sometimes treated as the same species (44).	No information found.	Seedlings typically emerge from a depth of 0.4-1.6 inches. No specific burial information was found.	No information found.	No information found.	Plant is an annual and reproduces by seed only. Seeds may be viable up to 14 years.	Field test ¹ : Since reproduction is by seed and seed germination for the closely-related species, <i>G. tetrahit</i> , is generally within 2 inches of the soil surface, burial of plants and infested soil under a shallow amount (e.g., 12 inches) of weed-free soil may inhibit regrowth.
Meadow hawkweed <i>Hieracium caespitosum</i>	Dispose of plants and flower heads by burial or by burning or by bagging and bringing to landfill (5).	Plant material may be burned (5).	No information found on burial depth for rhizomes, but seeds failed to germinate at depths greater than 1 inch (33).	Do not compost (5).	Shallow, fibrous root system (33).	Mostly reproduces vegetatively from stolons, rhizomes, and stolon fragments (10)(33). Also reproduces by seed. Seeds can survive up to 7 years (10). Reproduces from adventitious root buds.	Field test ¹ : Since reproduction is generally achieved via shallow roots, burial of plants and infested soil under a shallow amount (e.g., 12 inches) of weed-free soil may inhibit regrowth.
Foxtail barley <i>Hordeum jubatum</i>	No information found.	No information found.	No information found on burial depth for rhizomes, but seeds germinate at depths of 3 inches or less (44). Burial under at least 2 inches of soil hinders seedling growth (58).	No information found.	Shallow, fibrous roots (58).	Reproduces prolifically by seed and also vegetatively by tillers (33)(58). Reproduction entirely by seed (44). Reproduces by seed and also from vegetative buds which are located on the root crown, slightly below the soil surface.	Field test ¹ : Since reproduction is generally achieved via shallow roots, burial of plants and infested soil under a shallow amount (e.g., 12 inches) of weed-free soil may inhibit regrowth.
Hairy catsear <i>Hypochaeris radicata</i>	No information found.	Repeated torching can be effective but prescribed burns have had mixed results (49).	No information found, but light is required for seeds to germinate and see rooting depth notes (44)	No information found.	Deep taproots (49), but the plant does not re-sprout from root fragments that do not contain a portion of the root crown (which extends only 1 inch below soil surface) (44).	Reproduces by seed and vegetatively through crown and root sections (10), but see rooting depth notes. Seeds are small (44), easily dispersed by wind and re-infest sites, but only survive briefly in the soil (49).	Field test ¹ : Since vegetative reproduction is generally achieved via shallow roots, burial of plants and seed-infested soil under a shallow amount (e.g., 12 inches) of weed-free soil may inhibit regrowth.
Ornamental jewelweed <i>Impatiens glandulifera</i>	If plants are flowering, flowers/seed heads should be cut, bagged and disposed of in landfill (5).	Should be incinerated if seeds are present (6).	No information found.	Can be composted on site on a tarp if no seeds are present (5)(6).	These are annual plants with relatively shallow roots (5). Roots extend 4-6 inches deep (72)(78).	Reproduces mainly by seeds, but also spreads vegetatively. Seeds are small (70) and viable for 18 months (5). Does not reproduce vegetatively, reproduces by seed only. Often spreads by seed-contaminated soil (72).	Field test ¹ : Since reproduction is generally achieved via small seeds and shallow rhizomes, burial of plants and seed-infested soil under a shallow amount (e.g., 12 inches) of weed-free soil may inhibit regrowth.
Oxeye daisy <i>Leucanthemum vulgare</i>	Flowering plants need to be bagged and disposed of in landfill (45)(47).	Plant material may be bagged and incinerated (80).	Mulching with 3-4 inches of compacted straw laid over infested area was successful when mulch was applied at the beginning of the growing season.	No information found.	Root system is shallow (1)(7)(44)(5). One study found that plowing to a depth of greater than 6 inches (15.2 cm) was effective at killing the plants (1).	Shallow-rooted perennial plant. May spread by seed or vegetatively (44)(81) Less than 50% of seeds survive 20 years burial and less than 1% germinate after 39 years (92).	Field test ¹ : Since reproduction is generally achieved via small seeds and shallow rhizomes and shallow mulch can inhibit spring growth, burial of plants and seed-infested soil under a shallow amount (e.g., 12 inches) of weed-free soil may inhibit regrowth.



Control Methods

Appendix B

Including How-To's for Burning, Mowing, Tilling, Etc.

Common Name	Scientific Name	Control Methods			
		Manual	Mechanical	Chemical	Biological
Leafy spurge	<i>Euphorbia esula</i>	Suppress growth by mulching with several feet of hay (2). Pulling and digging shoots may cause the shoots to spread more (21). Sheep and goats have been used to control leafy spurge (7).	Plowing/tilling and subsequent planting of competing plants is effective in controlling the spread (7). Mowing before flowers develop can limit seed production (35). Disking or plowing is not effective. Mechanical controls generally are not effective (11).	2,4-D, dicamba, picloram between early bud and bloom stage and repeated in the fall when plants have regrown 4-6 inches (10.2-15.2 cm) (7). Herbicide is the best choice for treatment (21). Repeated applications are likely necessary (35).	Flea beetles, and stem and root boring beetles are used in Minnesota (35). Many insects are available which will reduce but not eliminate populations (11).
Hempnettle	<i>Galeopsis tetrahit</i>	Plants reproduce by seed only and are easily pulled. Hand-pulling should be effective; however hand pulling in the Portage Valley in Alaska has not been effective at reducing the population after 5 years of treatment (44).	Control spread by mowing before plants go to seed (20). Plowing early in spring before seedlings develop can control hemp nettle in ag fields (32).	Cannot be controlled with 2,4-D. Dicamba mixed with MCPA is recommended (14). Chlorsulfuron 10 grams per hectare (44).	None are currently available (32).
Galinsoga	<i>Galinsoga parviflora</i>	No information found.	Crop rotation can be useful in controlling the spread of <i>Galinsoga</i> as well as regular crop rotation in agricultural situations (52). Mechanical control is most effective at the seedling stage (67).	Herbicides which have been proven to be effective are Tillam, atrazine, Goal, Karmex, Lasso, and Lorox; among others (52).	Sudan grass and sorghum have been known to out-compete <i>Galinsoga</i> (52).
Orange hawkweed	<i>Hieracium aurantiacum</i>	Pull by hand when not in seed to avoid spreading seeds. Make sure to remove all roots from the soil so they don't resprout (5). Control by careful digging of rosette plants. Plants re-grow quickly from broken roots left in the soil, so hand pulling is seldom effective (32). Hand pulling may not be effective, but may be preferable to no control at all (81).	Mowing is not effective, as these are perennial (5). Do not mow; it stimulates rhizomatous growth (37). Mowing can limit seed production, but may promote vegetative spread and flowering. Tilling in conjunction with herbicide has been effective (81).	Triclopyr before flowering; aminopyralid; clopyralid before buds form (5), picloram or picloram + 2,4-D provides very good control (32).	None are currently available (44).
Blue-flowering lettuce	<i>Lactuca tatarica</i> , (<i>L. pulchella</i>)	No information found.	No information found.	No information found.	No information found.
Purple loosestrife	<i>Lythrum salicaria</i>	Covering plants with black plastic can potentially slow growth. Thick, heavy mulch from mowed plants could possibly kill some roots (7). Small plant populations may be cut or pulled by hand repeatedly over several years (13).	Mowing is not effective when it is the only control mechanism because plants will develop shoots and adventitious roots (7)(13). If cutting plants, the best time is late in the season in order to deplete root reserves (7). Any control measure should be carried out before plant goes to seed (13).	Formulations for use on right-of-ways and near water are likely needed. 2,4-D, glyphosate, imazamox, metsulfuron-methyl+aminopyralid, triclopyr, imazapyr, and aminocyclopyrachlor (35).	Two leaf feeding beetles (<i>Galerucella</i> sp.) have been very effective in Minnesota (35).
Austrian fieldcress	<i>Rorippa austriaca</i>	Dig small populations by hand (7)(23)(43). When hand-pulling, make sure the entire root is removed (23)(43).	Repeated plowing/tilling may be effective (7). Large infestations were controlled in California by draining wetlands and converting infested areas to agricultural fields (42).	2,4-D (7)(8); 2,4-D or glyphosate (42).	No biological controls are currently available (23).
Horsenettle	<i>Solanum carolinense</i>	Hand pulling is effective in controlling small outbreaks (8).	Tilling and mowing are not effective (8). Do not till (74). Mechanical techniques spread roots and allow propagation while simultaneously allowing deep growing roots to resprout (42). Mowing at first bloom is effective (74). Mowing weekly can reduce but not eliminate this species (42). The best method was to mow monthly and apply herbicide to summer/fall foliage two weeks before the first frost (74).	Glyphosate and 2,4-d applied to young growing plants, picloram applied at flowering, imazapyr applied during active growth (8).	No biological agents are approved or specifically mentioned (42).



“Southcoast Special” Invasive Species Specification

SECTION 201 CLEARING AND GRUBBING

201-3.07 CONTROL OF INVASIVE PLANTS

Control, remove, and dispose of soils and vegetative matter infested with invasive plants. Limit excavation related to invasive plants to only those areas and to the depths shown on the Plans. Accomplish excavation of invasive plants and soil separate from, and prior to, other clearing and ground disturbing activities in the immediate area of the infestation.

1. Invasive Species Survey.

If invasive species have been determined by the Department as present in the project area, but not identified on the Plans, conduct a field survey prior to earth disturbing activities under the direction of a person or firm qualified by training and experience to identify invasive species. Qualified means having at least two years' experience in the identification of invasive species in Southeast Alaska. Contractor will submit the qualifications of the person or firm selected to the Project Engineer for approval prior to conducting the survey. Submit an invasive plant control plan to control the surveyed species at the locations within the work limits.

If an invasive species survey has been completed by the Department the location, extent, and type of invasive species will be identified on the Plans. Do not conduct an invasive species survey. Submit an invasive plant control plan to control the identified species at the identified locations.

2. Invasive Plant Control Plan.

Submit an invasive plant control plan, on the provided form, detailing steps for removal, containment, or disposal of invasive plants using the DOT&PF Southeast Region *Disposal and Control of Invasive Plant Species* as a guide. The guide is located here: http://www.dot.state.ak.us/stwddes/desenviron/assets/pdf/resources/se_invasive_final.pdf

Submit the plan to the Engineer for approval. Allow 10 days for review by the Department. Do not conduct any clearing and ground disturbing activities in the immediate area of invasive species infestations until the plan is approved by the department. Pressure wash all tracked equipment, excavation equipment, and excavation hauling equipment prior to mobilization to ensure that the spread of invasive species is minimized. Clean all parts of equipment so that no invasive species would have the chance of being spread or imported into the community. Use the same cleaning method on all equipment involved in removing and disposing invasive species after working in locations with invasive species. Use the same cleaning method on all tracked equipment, excavation equipment, and excavation hauling equipment prior to demobilization to prevent the export of invasive plant species. Use silt fence, tarps, and other control measures to prevent dispersal of seed and other plant material from equipment cleaning areas and temporary soil or waste stockpiles that contain invasive plants.

201-4.01 METHOD OF MEASUREMENT Add the following:

3. Square Yard. Length times average width before removal.

201-5.01 BASIS OF PAYMENT Add the following:

Payment for Invasive Species Control, Removal, and Disposal includes all work involved in the control, removal, and disposal of the invasive species; the invasive plant control plan; pressure washing equipment; silt fence, tarps, and other control measures to prevent dispersal of seed and other plant material.

	Pay Item	Pay Unit
201(7)	Invasive Species Control, Removal, and Disposal	Square Yard
201(8)	Invasive Species Survey	Lump Sum
201(9)	Invasive Species Control, Removal, and Disposal	Contingent Sum

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SECTION 201 CLEARING AND GRUBBING

201-3.07 CONTROL OF INVASIVE PLANTS

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Limit excavation related to invasive plants to only those areas and to the depths shown on the Plans.

Accomplish excavation of invasive plants and soil separate from, and prior to, other clearing and ground disturbing activities in the immediate area of the infestation.





SECTION 201: CLEARING AND GRUBBING

201-3.07 CONTROL OF INVASIVE PLANTS (Continued)

1. Invasive Species Survey.

a. If invasive species have been determined by the Department as present in the project area, but not identified on the Plans, conduct a field survey prior to earth disturbing activities under the direction of a person or firm qualified by training and experience to identify invasive species. Qualified means having at least two years' experience in the identification of invasive species in Southeast Alaska. Contractor will submit the qualifications of the person or firm selected to the Project Engineer for approval prior to conducting the survey. **Submit an invasive plant control plan to control the surveyed species at the locations within the work limits.**

b. If an invasive species survey has been completed by the Department the location, extent, and type of invasive species will be identified on the Plans. Do not conduct an invasive species survey. **Submit an invasive plant control plan to control the identified species at the identified locations.**

SECTION 201: CLEARING AND GRUBBING

201-3.07 CONTROL OF INVASIVE PLANTS (Continued)

2. Invasive Plant Control Plan.

Submit an invasive plant control plan, on the provided form, detailing steps for removal, containment, or disposal of invasive plants using the DOT&PF Southeast Region Disposal and Control of Invasive Plant Species as a guide. The guide is located here:

http://www.dot.state.ak.us/stwddes/desenviron/assets/pdf/resources/se_invasive_final.pdf



Submit the plan to the Engineer for approval. Allow 10 days for review by the Department.

201-3.07 Control of Invasive Plants

Control Plan Form



State of Alaska
Department of Transportation & Public Facilities
INVASIVE PLANT CONTROL PLAN

Use the DOT&PF Southeast Region *Disposal and Control of Invasive Species* (see link) as a guide when completing this form. Attach pages as needed. http://www.dot.state.ak.us/stwdde/environ/assets/pdf/resources/se_invasive_final.pdf

Project Number:	Project Name:		
Contact Person:	Contracting Firm Name:		
Phone:	Address:		Phone:
Email:			

Part 1 – Control of Invasive Plants

A. Invasive Plants Survey Details: Provide the date the invasive species survey was conducted and the name of the company or agency that performed the survey (e.g., "7/2014, DOT&PF")

B. Invasive Plants Presence/Absence: Place a checkmark next to the correct response to indicate whether invasive plants are present.
 No known invasive plants (do not complete the rest of the form) Invasive plants are present

C. Anticipated Date(s) of Control Activities: _____

D. Place a checkmark next to each of the proposed control methods.

<input type="checkbox"/> Hand Pulling (HP)	<input type="checkbox"/> Excavation (E) (provide depth(s) in Part I, Section E)
<input type="checkbox"/> Herbicide Application (HA)	<input type="checkbox"/> Mowing/Brush Cutting (MC)
<input type="checkbox"/> Tarps or Other Covers (T)	<input type="checkbox"/> Other (O) (Describe in Part I, Section F)

If herbicides are proposed, this form must be approved by the DOT&PF Regional Environmental Manager. Herbicide use must be consistent with the DOT&PF Integrated Vegetation Management Plan http://dot.alaska.gov/stwdmno/documents/ADOTPF_IVMP.pdf and must comply with the ADEC Pesticides General Permit.

E. Invasive Plants List. List invasive plants known to occur at the project site in column I, attach extra pages if necessary. For each species listed in column I, enter the applicable control method in column III using abbreviations defined in Part 1D. If excavation is proposed, include the excavation depth (inches) in column III. For example, an entry of "E(36)" in column III indicates the corresponding species will be excavated to a depth of 36 inches.

I. Species:	II. Are seeds, pods, and/or berries expected to be present during control?	III. Control Method (see Section D, above)
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____

Southcoast Region Invasive Plant Control Plan 2014 v1 Page 1 of 2

Part 1 - Control of Invasive Plants (contd.)

F. Use this space to describe additional features of proposed control activities. For example, if tarps or other covers will be used, specify the materials, installation specifications, and monitoring plan. Attach additional pages if necessary.

Part 2 – Disposal of Invasive Plants

A. Location of proposed plant disposal site. (If the contractor will incinerate plant materials, indicate the disposal location for ash)

On-site, within project boundaries. If this option is selected, list below the stationing from plans.
 Off-site. If this option is selected, list below the address or GPS coordinates. Also attach to this form the property owner's written permission, waiver of claims, and copies of any required permits.

B. Place a checkmark next to each of the invasive plant disposal methods listed below that will be utilized as part of this control plan.

Incineration Transport to a Landfill or Composting Facility Burial

Other: _____ (Describe in Part 2, Section C)

C. Use this space to describe additional features of the disposal plan. For example, if applicable, outline plans to prevent dispersal of plant materials during transportation to an off-site location; describe incineration methods; and/or, if plant materials will be buried, specify depth(s) of burial and the materials that will be used to cap and/or line the burial pit. Attach additional pages if necessary.

Prepared by:

Name (Print): _____ Signature: _____

Date: _____ Title: _____

For DOT&PF Use only: Approved Approved with Conditions Disapproved

Name (Print): _____ Signature: _____

Date: _____ Title: _____

Southcoast Region Invasive Plant Control Plan 2014 v1 Page 2 of 2



SECTION 201: CLEARING AND GRUBBING

201-3.07 CONTROL OF INVASIVE PLANTS (Continued)

- Do not conduct any clearing and ground disturbing activities in the immediate area of invasive species infestations until the plan is approved by the department.
- Pressure wash all tracked equipment, excavation equipment, and excavation hauling equipment prior to mobilization to ensure that the spread of invasive species is minimized.
- Clean all parts of equipment so that no invasive species would have the chance of being spread or imported into the community.
- Use the same cleaning method on all equipment involved in removing and disposing invasive species after working in locations with invasive species.
- Use the same cleaning method on all tracked equipment, excavation equipment, and excavation hauling equipment prior to demobilization to prevent the export of invasive plant species.
- Use silt fence, tarps, and other control measures to prevent dispersal of seed and other plant material from equipment cleaning areas and temporary soil or waste stockpiles that contain invasive plants.



SECTION 201: CLEARING AND GRUBBING

201-4.01 METHOD OF MEASUREMENT

Add the following:

3. Square Yard. Length times average width before removal.

201-5.01 BASIS OF PAYMENT

Add the following:

Payment for Invasive Species Control, Removal, and Disposal includes all work involved in the control, removal, and disposal of the invasive species; the invasive plant control plan; pressure washing equipment; silt fence, tarps, and other control measures to prevent dispersal of seed and other plant material.

Pay Item	Pay Unit
201(7) Invasive Species Control, Removal, and Disposal	Square Yard
201(8) Invasive Species Survey	Lump Sum
201(9) Invasive Species Control, Removal, and Disposal	Contingent Sum



In the Environmental Document

The NEW Invasive Species Environmental Commitment

References Specification 201-3.07

If a survey has been completed -

“Invasive plant species **have been identified** within the project limits; _____, _____, _____, and _____. Contractor shall follow the conditions and guidance outlined in specification 201-3.07.”

OR

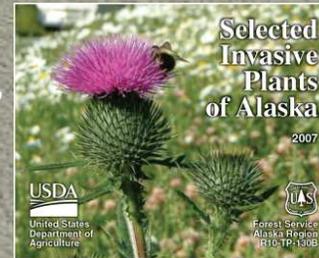
if no survey -

“Invasive plant species such as _____, _____, and others, **are suspected to occur** within the project limits. Contractor shall follow the conditions and guidance outlined in specification 201-3.07.”



Invasive Species Surveys Identification Issues?

- Some Environmental Impact Analysts may be able to identify many Invasive Species due to education or specialized training
- Others may just use the “book”



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Southcoast Term Contractors for Invasive Species Surveys

- AMEC ~ Dr. Kristie Dunkin,
- AES ~ Mr. Paul Ramert
- SW Soil & Water Conservation District ~ Mr. Brian Maupin
- HDR Alaska, Inc. ~ Mr. Tim Gallagher
- Coshow Environmental, Inc. ~ Ms. Kai C. Rains
- Stantec Consulting ~ Ms. Sara Lindberg
- Ecological Land Services, Inc. ~ Ms. Jacqueline Massey
- Bosworth Botanical Consulting ~ Ms. Koren Bosworth
- Hattenburg Dilley & Linnell, LLC ~ Mr. Dennis Linnell



What's Next

Improving Current M&O Practices

- M&O Seed Mixtures
Insuring Seed Blends are not Invasive!

Example - ~~Emerald Supplies DOT Blend~~



DOT AK Junco			
LOT NO. 1889	Germination Origin		
Dormant Red Fescue	44.00	9046	Oregon
Park Kentucky Bluegrass	44.94	9046	Oregon
Annual Ryegrass	08.21	9046	Oregon
Other Crop	00.00		
inert Matter	00.00		
Weed Seed	00.00		
Noxious Weeds: None found			
SE Warehouse Junco			Test Date: 5/14
6540 Glacier Highway			Net Wt. 50lbs
Junco, AK 99501			AWS #704

- Mowing, Clearing, and Ditching Practices Using a Matrix Approach



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What's Next

Continue to investigate current research and development of mechanical, chemical, and bio-control methodologies applicable to linear transportation projects in Southcoast Region

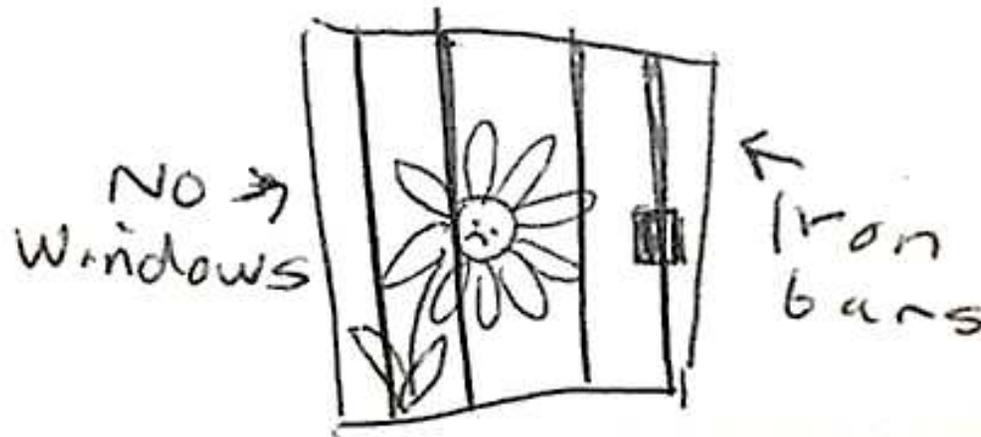
- Technological advances in portable incinerators and composting techniques, improved mowing and tilling equipment, and other mechanical invasive species control methodologies.
- Targeted (non-spraying) **direct injection** herbicide delivery system for Japanese Knotweed (using 2,4-D or glyphosate)
- Follow current research of Bio-control technology - such as ***Aphalara itadori*** to control invasive knotweeds (currently being released in Great Britain)
- Education and Outreach to DOT&PF Planning, Design, Construction, and M&O staff
- Follow the Technology!

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Questions?

Draw a plant cell and identify its most important parts.



THIS KID IS GOING PLACES

Not Harvard, but places

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