

**Confederated Tribes of  
Coos, Lower Umpqua, and Siuslaw Indians  
Terrestrial and Aquatic Invasive Species  
Management Plan**

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## **1.0 Introduction**

The Confederated Tribes of the Coos, Lower Umpqua and Siuslaw (CTCLUSI) hold widespread and discontinuous properties covering a diverse range of habitat types, including estuarine, marine, coastal lake, riparian, forest and urban lots (Figure 1). These remnants of the tribes' ancestral territory consist of 405 acres, spread over 3 counties with parcels ranging for 0.02 to 140 acres. The diverse nature of these properties provides an opportunity to intensively monitor discrete areas for invasive species. Presidential Executive Order 13112 defines invasive species as non-native plant, animal or microbial species whose introduction does or is likely to cause economic or environmental harm to human health. Invasive species can directly impact tribal peoples by displacing culturally relevant species, such as those used as traditional foods, medicines and tools as well as altering spiritually significant locations in negative ways. Impacts from invasive species are on the rise. Although the CTCLUSI holds a relatively small percentage of land compared to the state overall, the nature of the properties makes them conducive as sentinels for the early detection of high priority invasive species if actively monitored.

### **1.1 Scope of Invasive Specie Management Plan**

This document addresses actions regarding prevention, early detection and rapid response (EDRR), control and management, restoration and rehabilitation, partnerships with other agencies and education and outreach. The management actions outlined in this document are targeted primarily at invasive plants/weeds but will not ignore invasive invertebrates and vertebrates. The effects of climate change and its effect on native ecosystems and invasive species will also be considered.

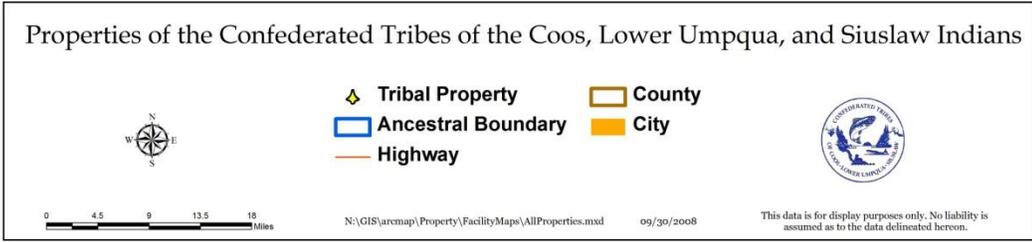
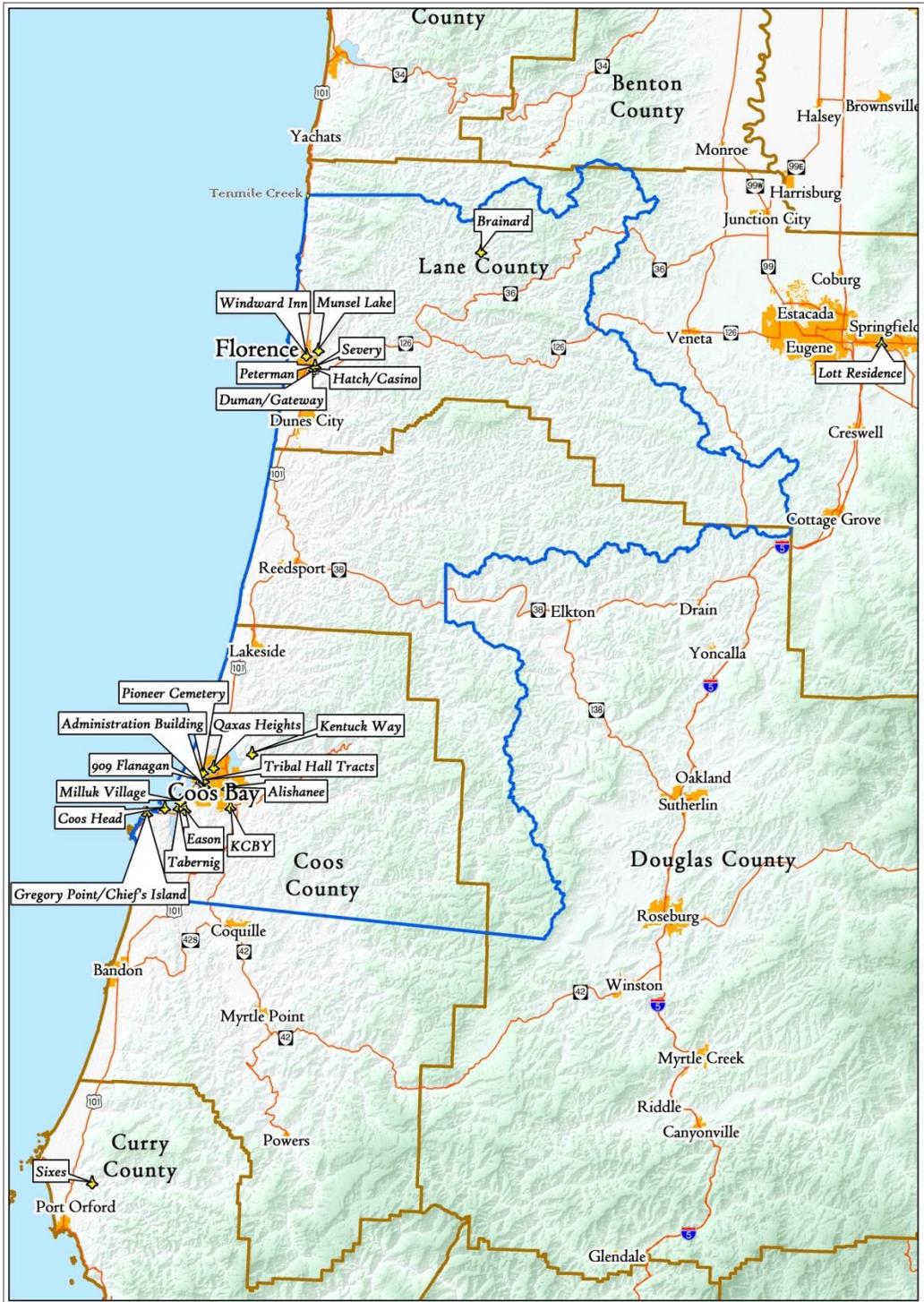


Figure 1.

## **2.0 Authorities and Programs**

Relevant programs that currently address the invasive species problem at the federal, regional, and state level are described briefly in the following paragraphs with emphasis on those that have been active in Oregon and are necessary to facilitate the implementation of this plan.

### **2.1 Federal**

At the federal level, no single agency has authority over the management of invasive species. Rather, multiple agencies have developed invasive species programs, largely in reaction to severe invasive species issues. Effective invasive species management in the United States will require federal agencies to expand existing efforts to deter nonindigenous species introductions through the oversight of international and interstate trade and commerce and associated transport vectors such as commercial shipping and the trade of organisms via mail order and the Internet

Federal programs dealing with nonindigenous species that existed prior to the passage of NANPCA (Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990) are largely related to interstate and international transport of known pest plants and animals and the protection of valuable horticultural, aquacultural, or endangered species. These laws include:

**The Lacey Act of 1900 (and amendments):** The Lacey Act establishes a permitting process administered by the US Fish and Wildlife Service regulating the importation and transport of vertebrates, mollusks, and crustacea that are "injurious to human beings, to the interests of agriculture, horticulture, forestry, or to wildlife or the wildlife resources of the United States." The Secretary of the Interior maintains the Injurious Species List

**The Federal Seed Act of 1939 (and amendments):** This act prohibits the importation of seeds of unknown type and origin by ensuring the purity and proper labeling of seed imports.

**The Endangered Species Act of 1973 (and amendments):** The Endangered Species Act can be used to authorize the eradication or control of AIS in the case that a listed species is threatened by the invader's presence or spread.

**The Plant Protection Act of 2000 (amending the Noxious Weed Act of 1974).** The Plant Protection Act gives the US Department of Agriculture (USDA) Animal and Plant Health

Inspection Service (APHIS) the authority to prohibit the import and interstate transport of species included on the Noxious Weed List developed by the USDA. In cooperation with state agricultural departments, APHIS annually designates priority agricultural pest species for annual intensive monitoring efforts.

The most recent invasive species initiative developed at the federal level came in February of 1999 with Executive Order 13112. This order establishes the National Invasive Species Council, a federal interagency organization charged with the biennial development of a National Invasive Species Management Plan.

### **Federal Programs and Activities**

In addition to the regulations outlined in the above legislation, several government agencies have recognized the severity of the invasive species problem, and have adopted the management and control of invasive species as priority programs areas.

#### **The US Fish and Wildlife Service (USFWS)**

The U.S. Fish and Wildlife Service is the only agency of the U.S. Government whose primary responsibility is the conservation of the nation's fish, wildlife, and plants. The USFWS has traditionally been the lead in dealing with invasive species at the federal level and provides technical assistance to states in developing invasive species control plans. The USFWS administers grants that can be used for invasive species management through the Wildlife Restoration Program.

#### **The US Geological Survey (USGS)**

The USGS Invasive Species program has the goal of developing new strategies for the prevention, early detection, and prompt eradication of new invaders. The USGS further identifies information management and documentation of invasions as a priority for the agency. The USGS has developed and maintains an extensive, spatially referenced database of nonindigenous species, which is accessible via the Internet (<http://biology.usgs.gov/invasive>). Within the USGS five year

program plan (fiscal years 2005-2009) the Pacific Northwest is briefly noted as being invaded by “Eurasian water milfoil, hydrilla, smooth cordgrass, English ivy, and dozens of non-native fish”.

### **The US Department of Agriculture (USDA)**

The USDA works with state agricultural agencies to monitor for agricultural pests and noxious weeds. Individual state monitoring programs are directed by a state survey committee, which is made up of representatives from state agencies and scientific institutions. Each year, the state survey committee reviews an Animal and Plant Health Inspection Service (APHIS) recommended list of potential pests for survey (the Noxious Weed List), and chooses one or more for annual surveillance efforts. Target species may include weeds, plant diseases, insects, and other invertebrates. APHIS also cooperates with the US customs Service to limit the import of specified plant pests and their hosts into the country.

**The US Environmental Protection Agency (EPA)** – document 2005 (Developing Aquatic Invasive Species Rapid Response Management Plans). The document contains federal insecticide, fungicide and rodenticide act (FIFRA), the principal law that authorizes EPA to regulate the manufacture, distribution, sale, and use of pesticides in the United States. Region 10: the Pacific Northwest invasive species program primarily focuses on aquatic invasive species.

### **NOAA National Sea Grant Office (NSGO) – Oregon State University**

The National Sea Grant College Program was established in 1966 to foster research, outreach, and education for the promotion of sustainable development of coastal regions. The Program has played an active role in research on invasive species issues in the United States through projects such as the National Aquatic Nuisance Species Clearinghouse, the Zebra Mussel Training Initiative, and a competitive grant program for invasive species research and outreach projects

## **2.2 State**

The following is an overview of the current roles of Oregon agencies and organizations involved in invasive species management.

### **Oregon Department of Fish and Wildlife (ODFW)**

Control of invasive species is considered a key conservation issue of statewide concern by the Oregon Conservation Strategy (citation: Oregon Department of Fish and Wildlife. 2006. Oregon Conservation Strategy. Oregon Department of Fish and Wildlife, Salem, Oregon). ODFW coordinates with the Dept of Ag and the Invasive Species Council.

The Aquatic Invasive Species Prevention Program was established by the 2009 Oregon Legislature in an effort to keep Oregon's lakes, rivers and streams free of destructive invasive species. ODFW and the Oregon State Marine Board are charged with managing boat inspection stations and education and outreach efforts. The program is funded by boaters who purchase a \$7 permit.

The ODFW's 10 most unwanted invaders are Zebra/Quagga mussels, Northern Snakehead, Asian Carp, Chinese Mitten Crab, NZMS, Rusty Crayfish, Oriental Weatherfish, Feral Swine, Non native turtles and the American Bullfrog.

### **Oregon Department of Agriculture (ODA)**

The Noxious Weed Control Program exists within the Plant Division of the Department of Agriculture. The program operates to fulfill part of the Department's mission to protect Oregon's agricultural industry and natural resources by preventing and limiting the spread and impact of invasive exotic plant species (noxious weeds) which displace and compete with native and desirable domestic plant species. Home of the State of Oregon official noxious weed list maintained by the Oregon State Weed Board (OSWB) and Noxious Weed Control Program. Weeds in this list are classified into A and B designations depending on the severity of the impacts or threat.

### **Oregon Invasive Species Council (OISC)**

The OISC was created by the Oregon legislature (ORS 561.685). The council began official business on January 1, 2002. The council's main functions are to create a system for reporting sightings and referring those sightings to the appropriate agencies, educational activities to increase awareness and develop a statewide plan (Oregon Invasive Species Action Plan, 2005 most recent) for dealing with invasive species.

OISC coordinates a comprehensive effort to keep invasive species out of Oregon and to eliminate, reduce, or mitigate the impacts of invasive species already established in Oregon. OISC maintains a hotline for reporting invasive species and a list serve for sending out invasive species updates, meetings and events. The OISC also lists the current 100 most dangerous invaders to Oregon.

### **Oregon Department of Environmental Quality (ODEQ)**

In 2001, the Oregon legislature enacted a law to regulate ballast water releases. ORS 783.640: “(1) Owners or operators of vessels regulated under ORS 783.630 to 783.640 must report ballast water management information to the Department of Environmental Quality at least 24 hours prior to entering the waters of this state.”

## **2.3 Regional**

Portland State University

Native Plant Society of Oregon

Pacific Biodiversity Institute

Nature Conservancy

Northwest Weed Management Partnership (source of Integrated Pest Management Guide)

## **3.0 Problem and Concerns**

The following section highlights some of the major impacts of past introductions, identifies priority pathways by which these species may have been imported, and identifies established and threatening species of greatest concern to the Tribe. The discussion and identification of the major problems and concerns outlined below have served as the foundation for the development of detailed Management Objectives and Actions outlined in Section 4.

### **3.1 Invasive Species Impacts**

Current impacts from invasive species generally include:

Reduced diversity of native plants and animals

Impairment of recreational uses such as swimming and boating.

Degradation of water quality.  
Degradation of wildlife habitat.  
Increased threats to public health and safety.  
Diminished property values.  
Declines in native species populations.  
Loss of coastal infrastructure due to habits of fouling and boring  
Local and complete extinction of rare and endangered species.

Invasive species reduce biodiversity and displace native plants and wildlife, often reduce land values, impeded water flow, reduce water availability and increase soil erosion, fire hazards and some are toxic to animals and humans. Economic impacts of invasive species in the U.S. are estimated at \$143 billion/year (Pimentel et al. 2005). A report by the Oregon Department of Agriculture (2000) puts Oregon's economic losses from selected noxious weeds at \$125 million/year. Rapid assessment surveys of tribal properties conducted in 2008 showed significant infestations with well-known and established invasive species, with the largest numbers within disturbed areas.

### **3.2 Effects of Climate Change**

According to the Oregon Climate Assessment Report (2010) Oregon may experience a range of problems associated with climate change. Severe storms are expected to become more frequent but with reduced snow buildup in the mountains, sea level rise, drought, heat waves, increased forest fires and invasive species. The U.S. Environmental Protection Agency warns that in response to temperature increases, the habitat ranges of many North American species are moving northward in latitude and upward in elevation. In Oregon, warmer streams and rivers would harm salmon and other native species and non-native species could replace them. There is recent evidence that Pacific coast abalone populations are suffering from range reductions potentially caused by climate change (Rogers-Bennett. 2007). The cultural practices of Oregon's tribes could be affected with the loss of iconic species, as could the businesses and recreation practices of those who rely on the state's native species.

Traditional knowledge is important when analyzing the impacts of invasive species within ecosystems. Tribal members can provide insight into a landscape's state prior to colonization of invasive species. Having knowledge of the pre-invasive species habitat composition can be a useful management tool for the early detection of invasive species and restoration efforts. Ecosystem adaptation and change in the wake of climate change has yet to be fully understood and can not be reliably predicted. Despite the unknown precise effects of climate change, invasive species already present to the south should be given extra attention due to their potential to move northward as temperatures increase. A changing climate does not imply a radically different set of management options, but will likely necessitate changes in the timing or intensity of control efforts. Weeding or pesticide applications may need to be moved earlier in the spring to account for shorter winters and earlier spring events. The most effective approach to limiting the spread of invasive species is to prevent the introduction of invasive species and adopt an early detection and rapid response (EDRR) management strategy (Section 4.4).

### **3.3 Management Priorities**

#### **Transport Vectors**

It is important for tribal members and employees to be aware of routine activities that may increase the chance of spreading invasive species. Potential transport vectors specific to tribal activity includes natural resource monitoring gear, lawn care and earth moving equipment and the transplanting of wild collected native plants to new areas. Awareness of potential IS vectors supports IS prevention objectives. Decontamination protocols are included in Appendix B and C.

#### **Priority Species (Or Species Groups)**

The species described below were designated as high priorities based on the following priority species designation criteria.

- 1) Severity of the problem posed to Oregon by the introduced species.
- 2) Existing capabilities for management (species for which management options are currently available are given higher priority).
- 3) Associated costs and benefits of management.

Species were selected based on a review of the most current lists of nonindigenous species in Oregon. The CTCLUSI Department of Natural Resources will periodically update the list of priority species based on new information generated through implementation of this plan.

**Established Species (includes ODA B designation)**

The following species are established or present in Oregon and are considered highest priorities for management on tribal property. Most have been noted as present on or near tribal property during preliminary baseline surveys to determine the presence or absence of invasive species.

**Gorse** (*Ulex europaeus*) Noted as present in modest amounts on 3 CTCLUSI properties. A single large plant was discovered at the Tribal Hall location and manually removed in 2011.

**Scotch Broom** (*Cytisus scoparius*)

Widespread and abundant on many of the CTCLUSI properties, especially at the Administration and Tribal Hall locations.

**French Broom** (*Genista monspessulana*)

Noted as present at CTCLUSI Tribal Hall location

**Armenian Blackberry** (*Rubus armeniacus*)

Formerly confused with Himalayan blackberry (*Rubus discolor*)

**Butterfly Bush** (*Buddleja davidii*)

A landscaping plant that has escaped from cultivation. This plant crowds out native species.

**Purple Loosestrife** (*Lythrum salicaria*)

A wetland invader imported from Europe in the early 1800s for its beautiful purple flowers and medicinal value. The plant is extremely difficult to eradicate although some biological control agents are effective in suppressing the plants. It is noted as present on the Umpqua River near Dean Creek.

**English and Irish Ivy** (*Hedera helix* and *H. hibernica*)

Landscaping plants that have escaped to native habitats where they create large monocultures. Ivy is often seen climbing and covering trees.

**Yellow Flag Iris** (*Iris pseudocorus*)

A rhizomatous emerged wetland forb with very showy yellow iris flowers introduced in the early 1900's as an ornamental. It is noted as present in the Umpqua River near Dean Creek where it has formed dense thickets. The plant is poisonous if ingested.

**Cotoneaster** (*Cotoneaster* spp.)

Evergreen shrubs, prostrate to erect, to ten feet tall, depending on species; many-branched from ground level, the branches are laden with clusters of quarter-inch, white, rose-like flowers in summer followed by red berries in autumn and winter. Introduced from China as an ornamental, cotoneasters have escaped garden cultivation. Birds eat the red berries, which can persist on the plants well into winter. Cotoneasters displace native plants by their rapid growth, competition for light, abundant seed production, and an effective seed-dispersal strategy. Noted as present on several CTCLUSI properties.

**New Zealand Mud Snail** (*Potamopyrgus antipodarum*)

Native to New Zealand but long established in Australia and Europe, this species was discovered in North America in 1987 in the Snake River in south-central Idaho. Population levels can exceed 100,000 snails per square meter (NCSE 1999). Modes of transportation may include hitchhiking on recreational equipment and other equipment used in water, in the guts of harvested fish, on waterfowl and other aquatic birds. NZMS degrade habitat due to their high reproductive capacity and the subsequent impacts on invertebrate food sources. Fish receive little, if any nutritive value from eating the snail and the snails can survive passing completely through the digestive tract. Observed as present in the Coos and Umpqua rivers by CTCLUSI staff.

**Saltmeadow Cordgrass** (*Spartina patens*)

This species has the potential of colonizing the Hatch tract Tribal property on the Siuslaw River. *Spartina patens* is found on Cox Island in the Siuslaw River and is known to have existed on Cox Island since the 1930s. It is the only known colony of this species in Oregon. It is currently under

management by The Nature Conservancy. A 2010 survey of the Hatch tract by Portland State University, with assistance and observation by a CTCLUSI staff member, noted the current absence of Saltmeadow Cordgrass. Construction of a new bridge replacement over the North Fork of the Siuslaw River caused some disturbance and removal of native plants that may provide an opportunity for Saltmeadow Cordgrass colonization.

### **Threatening Species (Includes ODA A designation)**

The species listed below have not yet been documented in Oregon, but are considered as viable threats on Tribal property.

**Zebra Mussel** (*Dreissena polymorpha*): Introduction of the zebra mussel into the Great Lakes and the resulting impacts such as fouling, alteration of community structure, and competition with rare species led to an increased awareness of the invasive species problem at the national level, and the passage of the National Invasive Species Prevention and Control Act. Since its introduction in 1988, the zebra mussel has spread throughout many of the major drainage basins of the Midwest and Northeast, including the Mississippi River down to the Gulf of Mexico (USGS, 2011). The zebra mussel has yet to be documented in Oregon, but has recently been found in California.

**Chinese Mitten Crab** (*Eriocheir sinensis*): The Chinese mitten crab has undergone explosive growth along the California coast since its discovery in San Francisco Bay in 1992. A highly valued food item throughout China, it is unclear if this species was intentionally introduced, or was released in ballast water originating in the Yellow Sea or Europe (Wynn et al., 2000). Threats from this species include clogging of fish collection devices, fish-ways and hydropower intakes; damage to levees and other coastal structures that result from its burrowing habits; and alteration of the native community structure through predation (Washington Sea Grant, 2001). The dramatic ability of this species to grow in great numbers as shown in central California indicates the need to prevent the introduction of this species to Oregon waters and to develop a response protocol in the event that it is discovered here.

## **4.0 Management Objectives and Actions**

### **4.1 Coordination:**

Invasive species management requires the coordination of state, federal and private organizations and requires an understanding of the views and roles of each stakeholder with ongoing cooperation, communication and dialogue.

## **4.2 Prevention**

Preventing the introduction of invasive species in the most cost-effective means to avert or reduce the risk of harmful infestations of invasive species. Investment in prevention avoids the long-term economic, environmental and social costs associated with invasive species infestations. Currently, little is known regarding the specific role transport vectors play in IS introduction and spread in Oregon and the region. Careful study of species introduction through these vectors, followed by efforts to communicate with related industry representatives, will be a critical first step in reducing IS transport.

### **4.3 Monitoring**

The distribution of IS in Oregon is poorly understood. Continued designation of priorities for management (both species and pathways) will require ongoing invasive species monitoring efforts.

For all CTCLUSI property sites, invasive plants will be identified and quantified by stem counts or colony size. Invasive animals (invertebrates and vertebrates) will be quantified by counting visible individuals or by estimation if numbers are large (swarms). Unrecognized species will be photographed and representative samples collected for later identification with reference materials or the advice of an expert. The locations of all invasive species will be recorded using a GPS unit (Garmin GPSMAP 60CSx). For invasive plants that form larger colonies, a polygon of the colony will be mapped using GPS. Field personnel will perform reconnaissance-level, pedestrian surveys to identify occurrences of invasive species with extra attention to recently disturbed sites and construction areas that are favored by invasive species. Any individual or small grouping of invasive plants identified during the course of the monitoring process will be removed by hand and disposed of offsite. Larger colonies will be scheduled for removal as available personnel and time allows. Larger colonies of invasive plants will be controlled with manual removal methods when possible or using approved herbicides in strict accordance with State regulations for handling and application. Application of herbicides will be performed only by State-certified pesticide applicators. Site monitoring will be done annually.

### CTCLUSI Properties with Dominant Invasive Species noted

Site Name	Total acres	County	Description	Priority	Dominant Problematic Invasives	Control effort	Management Comments
Alishanee	1.43	Coos	Urban vacant lot	Low	Gorse, Brooms	annual mowing/ herbicides	
Tribal Hall	10.26	Coos	Buildings/ vacant lots/ wooded	Medium	Brooms, Blackberry, Ivy	annual monitoring, manual removal of invasives	Native plants are becoming well established and will help prevent recolonization
Hatch	99.20	Lane	Casino/ dunes/ wooded/ riparian	Medium	Gorse, Brooms	mowing and manual removal	
Coos Head	43.10	Coos	Buildings/ wooded	High	Brooms, Ivy	manual and mowing removal, native plantings	Active development with associated natural area justifies high removal and control effort
Fulton/Tribal Admin	13.08	Coos	Buildings/ wooded	Medium	Brooms, Cotoneaster		Native plants are becoming well established and will help prevent recolonization
Flanagan/ Wulatch	3.32	Coos	Unmaintained cemetery	Medium	Brooms	annual monitoring, manual removal	Native plants are becoming well established and will help prevent recolonization
Connecticut/ Qaxas	3.50	Coos	Maintained housing	Low	Brooms Cotoneaster	annual monitoring, manual removal	Very few plants to remove, minimal effort required

Site Name	Total acres	County	Description	Priority	Dominant Problematic Invasives	Control effort	Management Comments
Fisher/KCBY	2.24	Coos	Building/ estuary	Low	Brooms, Blackberry, Ivy	annual monitoring, manual removal of invasives	
Munsel Lake	140.00	Lane	Lake/ wooded	Low	Pond plants	annual monitoring	Preserve. The few present nonnative pond plants are not considered a threat to the lake
Eason	18.80	Coos	Wooded	Low	Brooms	annual monitoring, manual removal of invasives	
Kentuck Slough	0.02	Coos	Slough	Low	Reed Canary Grass	annual monitoring	
Sixes River	1.25	Curry	River/ riparian	Low	Reed Canary Grass	annual monitoring	Preserve
Miluk Village	1.69	Coos	Estuary	Low	Blackberry	annual monitoring, manual removal of invasives	Preserve
Brainard	38.79	Lane	Wooded/ riparian	High	Blackberry	multiple mowings/ possible herbicide use	Aggressive blackberries will limit use of area if not actively controlled
Gregory Point/ Chief's Island		Coos	Wooded/ rocky island	Low	No significant invasives	annual monitoring	Preserve/minimal management

Table 1.

#### **4.4 Early Detection Rapid Response**

When invasive species elude preventative actions, early detection is the next line of defense. Early detection consists of monitoring for invasive species. When invasive species are detected, it is essential to respond rapidly before they become established, spread and cause harm. A delay in response can lead to higher costs of control and management. The objective of rapid response is containment or eradication of the target species. Identify funding and personnel resources for the eradication of new introductions to previously uninfested areas. Once established, invasive species may be impossible to completely eradicate. Removal of any introduced species will require a coordinated protocol for immediate response and eradication of the species of concern.

#### **4.5 Control and Management**

Control of established populations of IS continues to be costly and labor intensive in most if not all cases. Limiting the spread of priority IS will require continued development of cost-effective control technologies.

#### **4.6 Research**

As invasive species populations change in size and new invaders are introduced to Oregon, priorities for management will change as will research needs. Effective IS management will require that research priorities are reevaluated periodically, and that these priorities are recognized and addressed by scientists and managers in the region.

#### **4.7 Education and Outreach**

Continued education of resource managers, tribal members and the general population regarding threats from IS and as a preventative measure will be necessary to limit the introduction and spread of invasive species to Oregon. The greater the awareness on the identity of targeted high priority species, the greater the chance a targeted species is recognized at an early stage of invasion with a corresponding higher chance of rapid response success. The CTCLUSI website will include a list of invasive species, properties and control methods to educate the CTCLUSI tribal membership and employees.

## **5.0 Program Monitoring and Evaluation**

The evaluation process of the CTCLUSI Invasive species monitoring plan will provide a means of monitoring progress, evaluating needs and problems, coordinating effort and pursuing the goal of prevention and management of introductions, population growth and dispersal of invasive species. Mid-course corrections will be made when and if necessary. Annual reports presenting an analysis of the monitoring results and a summary of the remedial actions performed will be presented in the following manner.

### **Introduction:**

A review of the goals and objectives for invasive species monitoring.

A summary of any remedial measures that occurred over the preceding year.

### **Methods:**

A brief description of the field methodology employed to collect data

### **Results:**

Map occurrences of all invasive species identified

A summary of the results of the invasive species monitoring and a report on any control measures taken.

### **Assessment and Management Recommendations**

**Assessment of Threat:** A summary discussing the distribution and density of identified species within the project area. This analysis will consider species abundance, identification of possible vectors for species introduction and whether or not that vector is controllable.

**Management of Invasive Species:** The methods employed for invasive species control carried out during the preceding year will be discussed, as will the results of any herbicide application on any identified and treated colonies. Tabular results of invasive species occurrences and control by location including GPS coordinates will be produced for each tribal property with site photographs annotated with site location and number.

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## Appendix A

### Rapid Assessment Surveys of Tribal Property (Example)

In 2008, environmental site inspections were conducted on tribal properties. The site inspections included a rapid assessment of the presence and magnitude of known invasive species with notation and collection of unfamiliar species for later identification. Where feasible, tracts were inspected on foot with individual plants and patch edges of invasive species marked on printed topographic maps. This rapid assessment lacks the resolution, and was not intended, for management purposes. The exercise was useful to familiarize staff with the sites and the challenges of invasive species management. A single example is included here. All sites are scheduled to be resurveyed in 2014 with photo points of each property.



**Tract Name:** Alishanee

**County:** Coos

**BIA Tract Number:** 149T1116

**Acres:** 1.43

**Invasive Species:**

French Broom (*Genista monspessulana*)

Scotch Broom (*Cytisus scoparius*)

Armenian (Himalayan) Blackberry  
(*Rubus armeniacus*)

Gorse (*Ulex europaeus*)

Bull Thistle (*Cirsium vulgare*)

Fennel (*Foeniculum vulgare*)

Knotweed (*Fallopia spp.*)

Cherry Laurel (*Prunus laurocerasus*)

**Notes:** This tract is a vacant lot surrounded by commercial buildings. The Gorse is browning from a 2008 herbicide application but many plants are still living. This tract will likely be developed in the future with complete removal of all surface material. The recommendation is for mowing to reduce seed production

and spreading of Gorse to adjoining properties.

## **Appendix B**

### **Decontamination Protocols**

#### **Treating Equipment with Hot Water:**

Before moving to a different body of water, a hot water decontamination of boots and sampling equipment is recommended to prevent spread of NZMS, rock snot and other aquatic invasive species and diseases. Compact propane units are to be kept in DNR vehicles for the onsite generation of hot water. Wading gear has been implicated in the spread of New Zealand mudsnails as well as other aquatic invasive species such as Didymo (the diatom *Didymosphenia geminata*) and fish and amphibian diseases.

- Wear appropriate personal protection equipment to prevent burns to self and others.
- Avoid or protect parts of equipment that might be damaged by hot water.
- Ensure that the water is at least 140° F (60° C) at the discharge side of whatever's being treated.
- Flush for at least 10 sec. for all equipment except felt soles and nets; 5 min for felt-soled boots and nets at 140° F (60° C).
- After treatment, ensure equipment drains and dries before re-stowing equipment

#### **Boat, Boat Engine and Trailer decontamination:**

Wash and remove debris before moving to a different body of water.

#### **Boat Trailers:**

1. Flush all interior and exterior surfaces of trailers, wheels, and tires until clean. Interior surfaces are the inside of the trailer's metal tube framing.

#### **Boat Hulls: Exterior and Interior**

1. Remove gear as needed (e.g. deck mat, dip nets, net anchors, boat anchor and line, ropes) to provide access to all areas of the boat to allow for effective cleaning.

2. Wash down the boat working from bow to stern, and top to bottom. Flush all nooks and crannies to get at all areas where aquatic species may have gotten into. Wash all boat-related gear.
3. Wash all bilge areas where accessible using hot water, working from bow to stern. However, do not flush the bilge of the jet sled with hot water because of the fuel tank located there.
4. Raise bow of boat for effective draining of water and muck that gets into bilge. Work all of the bilge water, sediment, and muck out of drain on transom.
5. Flush all interior and exterior thru-hull pipes and screens. These may be located on the bottom of the hull, on the transom, or inside the hull (e.g. Skookum's strainers for washdown pumps and engine cooling system). Try backflushing bilge pumps by introducing water into the bilge pump discharge port (on transom or hull exterior) and check to see if water flows through the bilge pump and into the bilge.

### **Boat Engines: Propeller and Jet Pump**

Boat engines pump ambient water through them for cooling and can pick up and harbor unwanted material – which may be transported to another waterbody. While most boat engines have fine-mesh screens (~2 mm) that can prevent debris from getting into the engine, sand and mud particles may pass through. Jet-pump engines operating in shallow waters often move sediment and fine debris through the cooling passages, so more effort is needed for cleaning jet-pump engines. The external parts of engines can also collect weeds or other debris, especially propellers and other parts submerged in the water. Clean external parts of engines to remove all visible debris. Clean internal parts of engines by flushing with water.

### **Earth moving and lawn equipment decontamination**

To prevent the spread of invasive species weed seeds and soil borne diseases all earth moving construction equipment and lawn maintenance equipment should be thoroughly cleaned between sites. Methods will vary depending on the type of equipment to be cleaned, but all dust, mud and visible plant material should be removed and the equipment washed as thoroughly as practical.

## Appendix C

### Native Plant Transplanting

Wapato (*Sagittaria latifolia*) was an important traditional food source for many tribal peoples where it occurred in abundance. Unfortunately, Wapato is now scarce or nonexistent in much of its historic range, especially within the territory of the Coos, Lower Umpqua and Siuslaw Tribes. There is an interest to expand the existing remnant populations of Wapato using locally collected wild plants.

Currently, the most accessible populations of Wapato are on the Umpqua River, Oregon near Brandy Bar. Unfortunately, this site is also heavily infested with the highly invasive New Zealand Mud snail (*Potamopyrgus antipodarum*). Wild collected specimens of Wapato from the Umpqua River intended for transplantation must be quarantined, cleaned and inspected to reduce the risk of spreading the invasive snails.

Collection of Wapato is in the Fall (late October-early November) by digging up the mature edible tubers. During the collection of tubers, it is essential to avoid contact with surface mud to avoid the transfer of snails. Snails are only on or near the surface of the mud and not present at the depth the tubers are found. Tubers should be transferred directly to a container without placing first on the substrate surface as this may cause the transfer of snails.

Rinse the tubers thoroughly in the field and rinsed again before storage in an outdoor container of saturated soil covered with standing water for several weeks or months. Tubers will begin to show signs of growth in late December to early January and should be transplanted prior to this time to avoid damaging growing tissue and for easier final handling, cleaning and inspection. Growing sheaths on the sprouts can hold soil and possibly tiny snails which makes cleaning much more difficult.

Due to the highly invasive nature of the NZMS, alternative sources of Wapato are being sought, such as native plant nurseries or wild populations free of contaminating invasive species.

### Wapato Decontamination Protocol

Harvest tubers (Oct-Nov) crudely rinse in field, avoid tuber contact with surface mud.

Rinse again in lab or home to remove all visible soil, dispose of rinse water away from bodies of water.

Store outdoors or refrigerate in wet soil for 4-6 weeks (quarantine period)

Remove tubers from storage and wash off soil for final inspection and potential planting (Dec-Jan)

Final magnified visual inspection and final wash with rinse bottle of any remaining soil (save rinse water), concentrating on sprout sheaths if present for retained soil.

Examine rinse water for snails or snail shells at 8x magnification with stereo scope.

If no living snails or snail shells are present, tubers are considered clean and acceptable for transplanting.