



INTERAGENCY AGREEMENT WITH UNITED STATES DEPARTMENT OF AGRICULTURE

Agreement No. IAA 13-118

This Agreement is between the UNITED STATES DEPARTMENT OF AGRICULTURE, referred to as “USDA” and the Washington State Department of Natural Resources, Aquatics Resources Division, referred to as the “DNR.”

The DNR is under authority of RCW Chapter 43.30 of Washington State, Department of Natural Resources. DNR and USDA enter into this agreement under Chapter 39.34, Interlocal Cooperation Act.

The purpose of this Agreement is conduct invasive species mapping of *Z. japonica* particularly in shellfish growing areas and areas where the invasive species *Spartina alterniflora* has been controlled in the coastal estuaries of Willapa Bay and Grays Harbor for Marine Spatial Planning.

Attachment A **STATEMENT OF WORK**

Scope of Work

Mapping the Distribution and Progression of an Invasive Aquatic Seagrass with respect to beneficial intertidal uses in Washington State's outercoast estuaries

Background:

The non-native Japanese eelgrass (*Zostera japonica*) was likely introduced to the west coast of N. America in the early 1900's and has since colonized most coastal estuaries where the native eelgrass *Zostera marina* is also present. While native seagrasses are declining in many locations worldwide, *Zostera japonica* has been expanding into west coast tidflats, in areas where the Washington Department of Natural Resources has invested significant resources in eradicating the non-native *Spartina alterniflora*, and into areas where Shellfish aquaculture has been conducted for over a century. Marine Spatial Planning requires the beneficial uses and resources of coastal areas be identified and explicitly delineated to evaluate ecosystem service tradeoffs involved in potentially generating power from ocean energy sources. We propose to use the best existing datasets to document the expansion of this invasive species with respect to other intertidal uses in Willapa Bay and document the overlay and interaction between *Z. japonica* and other intertidal habitats including shellfish aquaculture in this estuary. We suggest a similar survey for collecting baseline information in Grays Harbor.

Objectives:

1. Document the spread of *Z. japonica* in coastal estuaries at the landscape scale over time
2. Examine the interaction of *Z. japonica* with other estuarine habitats including *Z. marina*, oyster and clam aquaculture beds, upper intertidal mudflats where *Spartina* was once abundant, , and burrowing shrimp

Tasks:

Willapa

1. On- ground surveys
 - a. Use a model based on 2006/7 baseline intertidal habitat survey (USDA-ARS) and intertidal bathymetry (ONRC/USDA-ARS) to project areas where *Z.japonica* expansion could have occurred and use this along with historical maps of *Spartina alterniflora* (WDNR) to guide 2012/2013 follow-up surveys particularly in two shellfish growing areas.

- i. Resurvey 100 m grid at Ellen Sands where USDA –ARS has previously surveyed intertidal habitats (2006, 2009- 2012; 200 m sampling grid, 350 points, but choose 1000 points w/100m grid)
 - ii. Resurvey 100 m grid at Stackpole where USDA – previously surveyed intertidal habitats (2006, 2012; 100 m sampling grid, 500 points)
 - iii. Additional areas – Repeat 2011 surveys at Cedar River, Bone River, North Nahcotta, North Peterson, Leadbetter, and South Oysterville (PSI; 214 grid points) in August 2012 and May/June 2013 for comparison.
 - b. Transect surveys. Two 500m transects located on the west side of Willapa Bay near the WDFW shellfish lab and off of Goose Pt. on the eastern shore were surveyed annually during the mid 1990's for burrowing shrimp and eelgrass cover. Repeat these surveys in 2012 (25 points at 20 m intervals on each of 2 transects at each site in October for direct seasonal comparison).
- 2. Aerial photographs
 - a. Shoot 2013 photos in April – June to replicate previous work and time frame
 - i. Geo-referencing and orthorectification
 - ii. Ground-truthing – (50 additional points)
- 3. Elevation
 - a. New Lidar

Grays Harbor

- 1. Aerial photographs
 - a. Look for old photos e.g. 2011 NAIP photos look pretty good
 - b. Shoot 2013 baseline photographs
 - i. Geo-referencing and orthorectification
 - ii. Gound –truthing – (50 additional points)
- 2. On- ground surveys
 - a. Shellfish growing areas
 - i. Survey 100 m grid in South Bay and North Bay
- 3. Elevation
 - a. Look for existing layers e.g. ACOE and NOAA likely to have existing data
 - b. Where possible incorporate LiDAR imagery into bathymetric and topographic mapping.

Expected Products:

- 1. Maps and GIS layers of intertidal habitats including *Zostera japonica* in Willapa Bay and Grays Harbor, WA – produced for interested parties and contributed in archival form to DNR and ONRC

Study report covering: A) Distribution of *Z. japonica* and documenting the spread of this invasive plant via habitat change analyses and B) Influence of and interaction between *Z. japonica* and other intertidal habitats.