

Applicant Name: Dr. Karin Kettenring, Assistant Professor of Wetland Ecology, Department of Watershed Sciences and Quinney College of Natural Resources, Utah State University
Co-Applicant Name: Wes Thompson P.G., Principal Hydrogeologist, BIO-WEST, Inc.
Project Title: Restoration of *Phragmites*-invaded wetlands in Willard Bay and associated Great Salt Lake wetlands
Agency or Business Name: Utah State University and BIO-WEST
Mailing Address: 5210 Old Main Hill, Logan, UT 84322
Phone: (435)797-2546 **E-mail:** karin.kettenring@usu.edu
 X Academic X Commercial

1. Estimated Project Costs:

Labor	\$288,904
Materials	\$86,261
Equipment	\$40,390
Administration	\$101,771
Miscellaneous	\$10,594
TOTAL	\$527,920

Other current sources of project funding*:

Community Foundation of UT	\$5,000
Delta Waterfowl Foundation	\$10,000
Kennecott Utah Copper Foundation	\$25,000
US Fish & Wildlife Service	\$12,000
UT Div. of Water Quality	\$40,531
UT Div. of Wildlife Resources	\$10,000
UT Div. of Forestry, Fire & State Lands	\$36,483
UT Wetlands Foundation	\$10,000

Total project cost including other sources of funding: \$676,934

**These partner contributions are for informational purposes only and their listing here does not constitute cost share and it will not be tracked as such by Utah State University.*

2. Describe the purpose and need of the project:

The invasion of phragmites (*Phragmites australis*) poses one of the greatest threats to Great Salt Lake (GSL) wetlands including those around Willard Bay impacted by the diesel release. For this proposal, Utah State University (USU) and BIO-WEST, Inc. (BIO-WEST) have formed a project team to address this threat to GSL wetlands. The **purpose** of this project is two-fold. First, this project will catalyze the restoration of phragmites-invaded wetlands throughout the GSL ecosystem (GSL project area) through applied research on effective phragmites management and native plant revegetation techniques and incorporation of research findings into a GSL-wide management plan. Second, this project will enhance the environment in and around Willard Bay (WB project area) by creating and implementing a WB-specific phragmites treatment plan. By focusing our project on these two scales, we will have both an immediate positive impact on the WB project area and a longer-term positive impact on the GSL project area and the ecosystem services these natural areas provide. Phragmites removal and native plant revegetation will enhance wildlife (particularly for migratory birds) through improvements in habitat quality. Recreational opportunities that depend on this habitat (e.g., bird watching, duck hunting) and other recreational activities such as air boating will also benefit. Finally, wetland water quality will benefit by identifying the most efficient herbicide applications to meet desired restoration objectives.

Our specific project objectives are to:

Objective I. Identify and promote the most effective strategies for controlling phragmites and restoring native wetland vegetation in GSL wetlands. In phragmites control demonstration plots, we will evaluate different herbicide types and timing of application, in combination with mowing timing, to determine the most effective means for controlling phragmites. There is a **great need** to control phragmites because it has already taken over more than 26,000 acres on the eastern shore of the GSL alone and is found in great abundance in wetlands, roadsides, and ditches throughout northern UT. Phragmites is of particular concern to managers, duck hunters, bird watchers, and citizens because it is quickly transforming diverse wetlands that support millions of migratory birds each year into vast monocultures with little habitat value. In particular, phragmites-dominated habitats vs. native-bulrush (*Schoenoplectus* species) dominated habitats do not meet the foraging, breeding, and nesting requirements of migratory waterfowl. Managers need a better understanding of which techniques are most effective at restoring native wetland vegetation and wildlife habitat, while minimizing negative impacts on water quality (i.e., unnecessary herbicide application). Of particular importance is whether the broad-scale use of herbicides for phragmites control is warranted.

In native plant revegetation demonstration plots, we will evaluate different techniques for quickly reestablishing native habitat-forming bulrush species. We are particularly interested in how we can rapidly recover productive stands of three bulrush species that are important habitat for migratory birds: *Schoenoplectus maritimus* (alkali bulrush), *S. acutus* (hardstem bulrush) and *S. americanus* (threesquare bulrush). Although there is likely to be some recovery of these species following phragmites control efforts, **there is a need** for active revegetation to establish robust stands of native vegetation that can prevent phragmites reinvasion and best support wildlife. Experiments conducted in other regions in North America have shown that phragmites seed germination is limited when there is dense native vegetation present. There are many means by which to revegetate wetland plants (e.g., broad-scale seeding at different densities, planting seedlings or rhizomes, and/or using “sod mats”) but **there is a need** to understand which approaches are most effective for reestablishing native plant communities that are most productive and thereby more resistant to phragmites invasion. We will integrate the latest findings from these phragmites and native plant demonstration plots into a management plan (*Restoration of GSL phragmites-invaded wetlands*) and disseminate this plan throughout the region (in writing and through outreach presentations) to have the greatest impact on wetlands and their ecosystem services.

Objective II. Control invasive phragmites in the WB project area. We will map the phragmites within the WB project area, run USU’s phragmites treatment prioritization model to identify which patches should be the highest priority for treatment, develop a WB phragmites treatment plan incorporating the most effective phragmites treatments identified through objective I, and treat the highest priority phragmites patches using the most effective phragmites treatments. There is a **great need** for this project in order to improve the wetlands and the wildlife they support in the WB project area, where phragmites is widespread and abundant. This aggressive plant is present in the water conveyance canals, in the campgrounds, and along the dikes in the project area. Furthermore, there is a need to improve access by boats in this popular recreation area.

3. Estimated time frame of the project with significant milestones:

Objective I.

- Apply final phragmites treatments (different combinations of herbicide timing, type, and mowing timing) in demonstration plots in 10 sites on the GSL. One set of plots is designed to evaluate treatments most appropriate for controlling small patches of phragmites while a second set of plots is looking at techniques for controlling large, well-established phragmites stands – completed by September 2014.
- Assess effectiveness of phragmites control treatments (phragmites and native plant cover) in phragmites demonstration plots – completed by September 2014, 2015, and 2016.
- Acquire plant materials for native revegetation demonstration plots – completed by March 2015.
- Establish native revegetation demonstration plots – completed by May 2015.

- Assess survival, density, and biomass production for the three bulrush studies species – completed in September 2015, 2016, and 2017.
- Integrate the latest literature on drivers of phragmites invasion into tangible best management practices for limiting the invasion of phragmites into wetlands and other habitats in the GSL ecosystem for the *Restoration of GSL phragmites-invaded wetlands* plan – completed by December 2015.
- Integrate the findings from the demonstration plots into concrete recommendations in a management plan (*Restoration of GSL phragmites-invaded wetlands*) – completed and disseminated to stakeholders in writing and via outreach presentations by December 2015, updated and disseminated by December 2016 and 2017 based on additional findings from the demonstration plots.

Objective II.

- Assess the best available aerial imagery / Google Earth imagery to map the current extent of phragmites in the WB project area – completed by July 2014.
- Collect GPS points to groundtruth the aerial imagery – completed by September 2014.
- Run the USU phragmites prioritization model to identify the phragmites patches that are most feasible to control and whose control will result in the greatest benefit to habitat and recreation in the project area. This model prioritizes phragmites patches for control across the GSL based on “restoration need” and “restoration feasibility” assessments – completed by December 2014.
- Convey recommended treatment areas to agencies who manage the project area and finalize areas and optimal techniques for treatment in 2015; incorporate the latest findings on phragmites treatment effectiveness (see Objective I) into a *WB phragmites treatment plan* – completed by January 2015.
- Complete any required NEPA or permitting – completed by April 2015.
- Purchase supplies and prepare equipment – completed by May 2015.
- Conduct phragmites treatments – June-September 2015, 2016, 2017 (herbicide spray date dependent on Objective I results).

REPORTING:

- Year-end reporting – December 2014, December 2015, December 2016, December 2017.

4. Describe the location of the project with attached location map, including details on the total area that will be directly enhanced by the project:

Objective I. Phragmites control treatment evaluation in the phragmites demonstration plots will be conducted across 10 sites in GSL wetlands (Figure 1). Native plant revegetation evaluation in demonstration plots will be conducted at two sites at the Bear River Migratory Bird Refuge (BRMBR; Figure 1). The total area to be directly enhanced by Objective 1 is 70 acres.

Objective II. Treatment locations for the WB project area will be determined by results of the USU phragmites prioritization model. Anticipated treatment locations include the south drain, the natural area south of the north recreation area, the creek south of the south recreation area, portions of the WB Wildlife Management Area, areas near the outlet works near the northeast corner of the reservoir, and other areas along the dike. Some limited areas within the state park may also be recommended for treatment (Figure 2). The total WB project area is 12,373 acres (9,915 acres of water; 2,458 acres of land) of which approximately 180 acres will be directly enhanced by the phragmites treatments (the acres successfully treated will depend on the density of phragmites and its accessibility). A much broader area will benefit indirectly by removing phragmites (a seed source) on these 180 acres.

5. Describe how the project will specifically enhance and protect waterways affected by the WB diesel release and improve the conditions of wildlife, habitat, natural vegetation, water quality or emergency response:

Objective I. This project will identify the most efficient use of herbicide needed to control phragmites establishment and growth in the WB area, thereby diminishing unnecessary herbicide run-off to surface

waters in the WB project area (including areas affected by the diesel release) and wherever phragmites management occurs throughout the GSL ecosystem.

Objective II. Waterways in the WB project area are being clogged and taken over by phragmites. Native vegetation is being crowded out and habitat diversity is being reduced. Existing stands of phragmites spread seeds into the reservoir and adjacent waterways by irrigation canals, wind, and other means into areas previously unimpacted by phragmites. Existing patches of phragmites also expand clonally via rhizomes and stolons into neighboring native vegetation. Removal of phragmites within the WB project area will improve the flow of water in conveyance structures. It also will reduce the spread of phragmites onto the shorelines of the reservoir and improve access to surface waters by air boat operators, thereby enhancing travel within the WB project area by resource managers, duck hunters, and emergency response personnel. Increased cover of native vegetation following phragmites control in the WB project area is expected to increase the local diversity and abundance of avian wildlife species.

6. Describe project's connectivity to other natural areas or projects that further enhance wildlife, habitat, natural vegetation, water quality or emergency response:

Objective I. Our phragmites and native plant demonstration projects are occurring across many of the major wetland management units in GSL wetlands (Kennecott's Inland Sea Shorebird Reserve, Ogden Bay Waterfowl Management Area (OBWMA), Farmington Bay WMA (FBWMA), sovereign lands west of OBWMA and FBWMA, Howard Slough WMA, BRMBR, and The Nature Conservancy's Shorelands Preserve (TNC)). Therefore, our project is inherently connected to other natural areas that promote wildlife, habitat, natural vegetation, and water quality. Lessons learned from this work will be communicated broadly – through outreach presentations and our *Restoration of GSL phragmites-invaded wetlands* plan – to interested parties to have synergistic, positive impacts on ecosystem services throughout the GSL project area.

Objective II. The treatment of phragmites within the WB project area will result in beneficial impacts on nearby natural areas (e.g., BRMBR and OBWMA) because of the inherent connectedness of this region. Phragmites spread among sites will be reduced, natural vegetation will be preserved (fewer phragmites seeds to invade other sites), and wildlife with benefit with a greater total area of quality (i.e., phragmites-free) habitat.

7. Describe any additional social benefits of implementing this project:

The greatest social benefits from this project relate to potential improvements in water quality and wetland habitat throughout the GSL project area and particularly enhanced recreational opportunities in the WB project area. The findings from the phragmites and native plant demonstration plots will be integrated into the *Restoration of GSL phragmites-invaded wetlands* plan. Therefore, tools and techniques for improving wetland restoration can be applied throughout the GSL ecosystem and elsewhere in the state. These tools will include the most efficient use of herbicides for killing phragmites (thereby minimizing unnecessary impacts on water quality) and enhancement of avian use of wetlands via conversion of phragmites stands to a mosaic of native plants. Removal of phragmites within the WB project area will improve access to surface waters by duck hunters (including air boaters) and emergency response personnel, while increased cover of native plants will attract a greater diversity and/or abundance of avian species of interest to hunters and bird watchers.

8. Project plans and details, including rights to work on specified piece of land:

Objective I. We are evaluating different combinations of herbicide type (glyphosate-Rodeo and imazapyr-Habitat), spray timing (summer vs. fall), and mowing timing (summer vs. winter) in demonstration plots in two experiments. In the “small patch experiment”, we are looking at treatments effective for controlling small patches of phragmites using 0.25 acre treatment plots, 6 treatments per site, spanning 6 GSL wetland sites (Figure 1). In a second experiment, we are looking at treatments effective for controlling large, well-established stands of phragmites using 3 acre treatment plots, 5 treatments per

site, spanning 4 GSL wetland sites (Figure 1). In both experiments, we are monitoring treatment effectiveness by looking at changes in cover of phragmites, open water, and other vegetation including important habitat-forming native plants. The treatments were first applied in 2012, and follow up treatments were applied in 2013. Under this grant, in 2014, we plan to complete the third and final year of treatments. We will then monitor treatment effectiveness for two additional years (2015 and 2016) once treatments have ceased; at this time, we will be able to discern if we have achieved managers' goals of removing phragmites *and* reestablishing native wetland vegetation, rather than just short-term phragmites mortality. This project has broad, **multi-agency support**. The landowners of these sites (UT Division of Wildlife Resources (UDWR), US Fish and Wildlife Service, TNC, Kennecott, and UT Division of Forestry, Fire & State Lands) where we are and will continue to conduct these studies have committed to supporting the project through 2016.

To identify the most effective means for restoring native wetland vegetation that will be resistant to future phragmites invasions, we will establish native revegetation demonstration plots at two sites at the BRMBR. Here we will evaluate the effectiveness of seeding (moderate vs. high density), plantings (seedlings vs. rhizomes), and sod mats to reestablish the three most important habitat-forming bulrush species (see above) in GSL wetlands. Each of these techniques requires greater refinement before they can be applied broadly in GSL wetlands to revegetate the 1000s of acres that are targeted for phragmites control. We will monitor these experimental plots over three years to look at differences in survivorship, density, and biomass production across revegetation treatments. Based on research conducted in other regions of North America, the most dense and productive plots will be the most resistant to future phragmites invasions. The USFWS has granted us permission to conduct this revegetation demonstration project in two of their management units at the BRMBR (Figure 1).

The management plan we will develop (*Restoration of GSL phragmites-invaded wetlands*) will include five main components: (1) an assessment of the phragmites invasion in GSL wetlands based on best available data; (2) a description of the factors that lead to phragmites invasion; (3) identification of best management practices to prevent phragmites invasions; (4) an assessment of the most effective techniques for controlling phragmites in GSL wetlands based on the phragmites demonstration plots; and (5) an assessment of the most effective techniques for restoring habitat-forming native bulrushes that will out-compete phragmites in GSL wetlands based on the native plant demonstration plots. These components will be assembled through an exhaustive literature review as well as a thorough analysis of data collected in the demonstration plots.

Objective II. The project team will identify areas with invasive phragmites in the project area, determine where treatment is most beneficial and most likely to succeed based on USU's phragmites management prioritization model, and then treat those areas to stop further spread and to improve wildlife habitat and native vegetation. This information and planning will be integrated into a formal *Willard Bay phragmites treatment plan*. Treatments will be conducted using ATV mounted sprayer, trailer mounted sprayers, and backpack sprayers and a two person crew of Utah-certified applicators. Herbicide treatments will be conducted for 18 days each year (2015-2017) by the crew. The project area is comprised of the lands within the WB Reservoir owned by the Bureau of Reclamation (BoR) and managed by WB State Park (WBSP), Weber Basin Water Conservancy District (WBWCD), and UDWR. The BoR has indicated willingness to allow phragmites control to occur on their lands, pending completion of a NEPA assessment (see attached letter). In addition, WBWCD and UDWR are enthusiastic supporters of the project (see attached letter). Willard Bay State Park was verbally supportive of our project but did not provide a letter of support since they were submitting a competing proposal.

9. Describe your experience in implementing projects of similar scope and magnitude:

Phragmites Control Demonstration Project in GSL Wetlands. In 2011 and 2012, Dr. Kettenring and her graduate students at USU designed, garnered broad financial support from stakeholders, and implemented the small patch and large stand phragmites demonstration plots. The treatments were

successfully applied, on schedule and as designed, in 2012 and 2013. Furthermore, extensive data collection on treatment effectiveness was successfully carried out in 2012 and 2013. Broad dissemination of *preliminary* research findings has occurred every year through numerous outreach presentations (e.g., Utah Weed Control Association; GSL Phragmites Working Group; GSL Advisory Council; GSL Technical Team; BRMBR; UDWR; Friends of GSL Issues Forum; UT Wetlands Foundation) and reports. The funding requested here from UT Division of Water Quality would allow us to collect the most essential data yet, on restoration success once phragmites treatments have ceased rather than just short-term impacts, and to complete this project by 2016.

WB Habitat Restoration and Invasive Species Removal. In March 2013, BIO-WEST was contracted to respond to an accidental release of diesel fuel from a ruptured pipeline near WB in Box Elder County, UT. Post-clean-up tasks included noxious weed control and invasive species removal. Noxious weeds treated included puncturevine, poison hemlock, nightshade, thistles, knapweed, burdock, cocklebur, bindweed, and phragmites. Weeds were treated using backpack and ATV sprayers. Saltcedar and Russian olive trees were cut with a chainsaw, the stumps painted with herbicide, and were hauled to the landfill. Under contract with EarthFax Engineering, 2013-present.

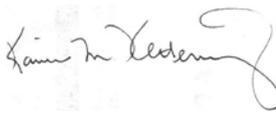
Hobble Creek Invasive Weeds Treatment. BIO-WEST was contracted to provide noxious weed control at the Hobble Creek delta wetland restoration site. Following construction of a new channel, oxbows, ponds and restoration planning, noxious weed control was required as part of the wetland permit. BIO-WEST treated 26 acres of wetlands and uplands using backpack sprayers. Species treated included burdock, kochia, thistles, perennial pepperweed, phragmites, saltcedar, Russian olive, and Siberian elm. BIO-WEST coordinated mowing of selected areas each season. Under contract with the Central UT Water Conservancy District, 2009-present.

10. Describe how ongoing maintenance of the project will be funded and carried out:

Long-term maintenance of the phragmites and native plant demonstration plots and the phragmites treatments in the WB project area will be completed through operating budgets of the individual landowners. For the WB project area, the proposed project would likely result in greatly reduced efforts required to manage phragmites in the future. This project would also provide guidance on where to concentrate future efforts in the WB project area with the greatest likelihood of success.

11. List consultants or agency partners that have participated in project development (below):

Kerry Schwartz, Bureau of Reclamation, 302 East 1860 South Provo, UT 84606, 801.376-5821.
James Morgan, Willard Bay State Park, 900 West 600 North, Willard UT 84340, 435.230.0050.
Mark Anderson, Weber Basin Water Conservancy District, 2837 UT 193, Layton, UT 84040, 801.771.1677.
Val Bachman, Randy Berger, Rich Hansen, UT Division of Wildlife Resources, 1594 W North Temple, Salt Lake City, UT 84116, 801.389.2820 (Val); 435.452.8503 (Randy); 801.391.1454 (Rich)
Chris Brown, The Nature Conservancy, 559 East South Temple, Salt Lake City, UT 84201, 801.791.1661
Randy Kaufman and Laura Vernon, UT Division of Forestry, Fire & State Lands, 1594 W North Temple, Salt Lake City, UT 84114, 801.673.0227 (Laura); 801.419.1450 (Randy)
Howard Browers, U.S. Fish & Wildlife Service, 2155 West Forest Street, Brigham City, UT 84302, 435.452.8468
Ann Neville, Kennecott Utah Copper, 4700 Daybreak Parkway, South Jordan, UT 84095, 801.891.6842


Signature: (Karin M. Kettenring) **Date:** May 5, 2014


Signature: (Wes Thompson) **Date:** May 5, 2014

PARTNERS

Federal: Howard Browers, US Fish and Wildlife Service, Bear River Migratory Bird Refuge

State: Randy Kaufman and Laura Vernon, Utah Division of Forestry, Fire & State Lands (Waterfowl Management Areas - WMAs)

State: Val Bachman, Randy Berger, Rich Hansen, Utah Division of Wildlife Resources (Sovereign Lands)

NGO: Chris Brown, The Nature Conservancy, Great Salt Lake Shorelands Preserve

Private: Ann Neville, Kennecott Utah Copper, Inland Sea Shorebird Reserve

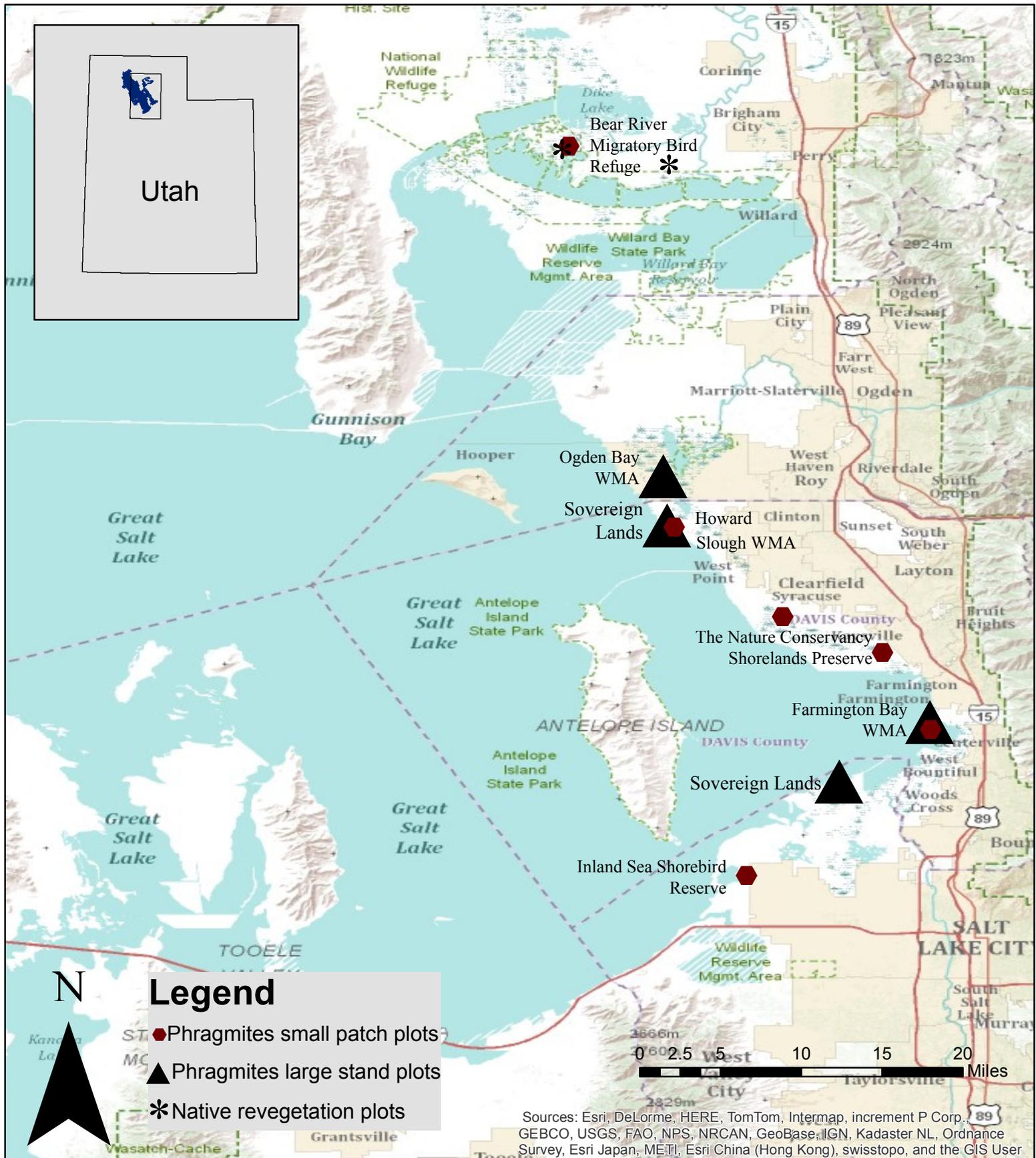


Figure 1. The locations of the study plots for the phragmites and native revegetation demonstration studies.

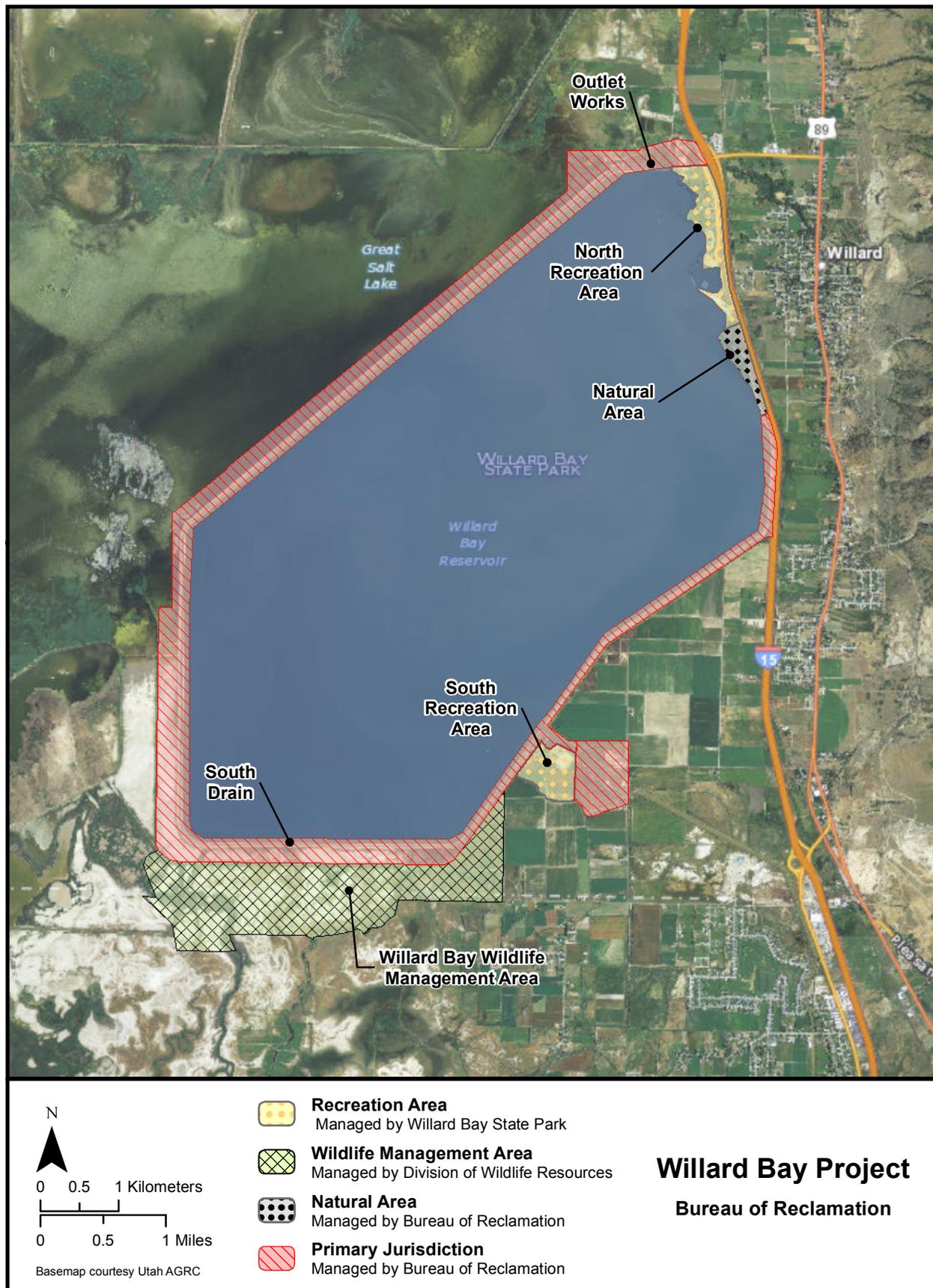


Figure 2. Willard Bay project area.



Karin Kettenring <karin.kettenring@gmail.com>

Phragmites Proposal for DEQ Chevron Pipeline Grant

Wes Thompson <westhompson@bio-west.com>

Thu, May 1, 2014 at 4:12 PM

To: Karin Kettenring <karin.kettenring@usu.edu>

----- Forwarded message -----

From: **Mark Anderson** <manderson@weberbasin.com>

Date: Thu, May 1, 2014 at 4:08 PM

Subject: RE: Phragmites Proposal for DEQ Chevron Pipeline Grant

To: Wes Thompson <westhompson@bio-west.com>

Cc: Chris Hogge <chogge@weberbasin.com>, Scott Paxman <spaxman@weberbasin.com>, Darren Hess <dhess@weberbasin.com>

Wes,

WBWCD will support this proposal for phragmites weed control at the Willard Bay and will grant permission for this project on lands we manage at Willard Bay.

Sincerely,

Mark Anderson, P.E.
Assistant General Manager
Weber Basin Water Conservancy District
2837 East Highway 193
Layton, UT 84040
801-771-1677
801-544-0103 fax
manderson@weberbasin.com



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From: Wes Thompson [mailto:westhompson@bio-west.com]

Sent: Tuesday, April 29, 2014 7:33 AM

To: manderson@weberbasin.com

Chad Cranney <chadcranney@utah.gov>

Mon, Apr 28, 2014 at 5:12 PM

To: Karin Kettenring <karin.kettenring@usu.edu>

Cc: Wes Thompson <westhompson@bio-west.com>, Dustin Lofthouse <dlofthouse@bio-west.com>, Val Bachman <valbachman@utah.gov>

The Utah Division of Wildlife Resources and the management personnel at Ogden Bay (OBWMA) and Willard Bay Upland Game Area (WBUGA) support this proposed Phragmites project under the stipulation of received written permission from Weber Basin Water Conservancy District and US Bureau of Reclamation, who are the primary landowners. Access to lands managed or owned by the UDWR will be provided in order to implement this project.

Sincerely,

Chad Cranney

Assistant Wetland Manager OBWMA/WBUGA

[801-388-3942](tel:801-388-3942)



Karin Kettenring <karin.kettenring@gmail.com>

Fwd: Phragmites Control Proposal for DEQ Chevron Pipeline Grant

6 messages

Wes Thompson <westhompson@bio-west.com>

Fri, Apr 18, 2014 at 1:43 PM

To: Karin Kettenring <karin.kettenring@usu.edu>, Dustin Lofthouse <dlofthouse@bio-west.com>

----- Forwarded message -----

From: **Schwartz, Kerry** <kschwartz@usbr.gov>

Date: Fri, Apr 18, 2014 at 1:28 PM

Subject: Re: Phragmites Control Proposal for DEQ Chevron Pipeline Grant

To: Wes Thompson <westhompson@bio-west.com>

Once your project has been approved for funding by Utah Division of Water Quality, Reclamation will issue a letter of authorization for the work at Willard Bay. Reclamation would also need to do NEPA prior to the physical treatment or application of any herbicide.

Kerry Schwartz
Manager, Water and Environmental Resources Division
Bureau of Reclamation
Provo Area Office
302 East 1860 South
Provo, UT 84606
(801) 379-1150 office
(801) 376-5821 cell

On Thu, Apr 17, 2014 at 4:47 PM, Wes Thompson <westhompson@bio-west.com> wrote:

Kerry:

Thank your for talking with me recently about the Utah State University (USU) and BIO-WEST proposal for phragmites treatment modeling and control within Bureau of Reclamation owned lands at Willard Bay. USU is submitting a proposal to the Utah Division of Water Quality for funding for a mitigation project to control invasive phragmites at these two state parks. The funding for this project is part of the Chevron Pipe Line Company Settlement. BIO-WEST will be on USU's project team to assist with mapping and treatment.

Karin Kettenring and her graduate students at USU have developed a model that uses variables such as distance to water, access, patch size, cost, distance to other phragmites, wetland type, etc. to evaluate both the restoration need and the restoration feasibility for phragmites. The model outputs a GIS layer that ranks or prioritizes the mapped phragmites patches based on restoration need and restoration feasibility.

The project team will be mapping the areas with phragmites, running the USU model, and then treating the identified high priority phragmites patches. Specific details of areas recommend for treatment will be forwarded for discussion and approval from your organization. Phragmites would be treated using truck and/or trailer mounted sprayers and all terrain vehicle sprayers. Backpack sprayers may be used for small or isolated patches. All spray personnel will be Utah-certified for weed treatment. Treatments will conducted once per year for three 3 years with the treatment ending in fall of 2018. Treatments will both broadcast and spot spraying.

BIO-WEST is also seeking involvement in additional equipment, labor, and supplies from the Division of Wildlife Resources (DWR), Utah Lake commission, and others, but have not yet solidified those agreements.

The Project Team is also obtaining written permission from Weber Basin Water Conservancy District, DWR, the Bureau of Reclamation and Willard Bay State Park for this project.

This email is to confirm that your organization would support this phragmites control effort and will provide access to lands managed or owned by your organization to the project team.

Please reply via email with a simple statement that your organization will grant permission for this project on lands they manage and would support this weed control effort.

Sincerely,

--

Wes Thompson P.G.
Principal Hydrogeologist
BIO-WEST, Inc
1063 West 1400 North
Logan, Utah 84321
Phone 435-752-4202
Cell 435-232-3057



Karin Kettenring <karin.kettenring@gmail.com>

Fwd: Fragmites

2 messages

Wes Thompson <westhompson@bio-west.com>

Tue, Apr 22, 2014 at 9:18 PM

To: Karin Kettenring <karin.kettenring@usu.edu>, Dustin Lofthouse <dlofthouse@bio-west.com>

----- Forwarded message -----

From: **Troy Esterholdt** <testerholdt@utah.gov>

Date: Tue, Apr 22, 2014 at 8:13 AM

Subject: Fragmites

To: westhompson@bio-west.com

Hello Wes,

I am sending this e-mail to confirm the phone conversation we had concerning the fragmites along the I-15 right of way. UDOT has been, and will continue to spray the fragmites, along the I-15 right of way, including those near Willard Bay. We have a weed spraying program in place, and treat all of our right of ways every year, trying to contain, not only fragmites, but all noxious weeds.

--

Troy Esterholdt
North Area Supervisor
Cell - [435-881-1044](tel:435-881-1044)
Office - [801-620-1612](tel:801-620-1612)
Email - testerholdt@utah.gov

--

Wes Thompson P.G.
Principal Hydrogeologist
BIO-WEST, Inc
1063 West 1400 North
Logan, Utah 84321
Phone 435-752-4202
Cell 435-232-3057



United States Department of the Interior
U.S. Fish & Wildlife Service



Bear River Migratory Bird Refuge
2155 West Forest Street
Brigham City, Utah 84302
Phone: (435) 734-6451 Fax: (435) 723-8873

FWS-14-0009

To whom it may concern:

I am writing this letter to offer continued support for Dr. Karin Kettenring's proposal entitled, "Restoration of *Phragmites*-invaded wetlands in Willard Bay and associated Great Salt Lake wetlands".

Managing the spread of the non-native and invasive phragmites constitutes one of the biggest problems that Bear River Migratory Bird Refuge (Refuge) has to confront. Results from the phragmites control and native plant revegetation studies should help us to better understand the effectiveness of different control and revegetation techniques, which in turn should help us to more efficiently target our limited resources.

The Refuge is providing access to Refuge wetlands for Dr. Kettenring and her students where they can conduct their experiments. Furthermore, the Refuge will assist Dr. Kettenring and her students with their phragmites control studies by implementing the assigned phragmites treatments on Refuge lands.

Sharon Vg/L (Acting)

Bob Barrett
Project Leader

April 24, 2014

To whom it may concern:

I am writing a letter in support of the work Dr. Karin Kettenring is conducting entitled “Restoration of *Phragmites*-invaded wetlands in Willard Bay and associated Great Salt Lake wetlands.”

Many approaches have been undertaken in regards to this highly aggressive and invasive plant. We have had some success and many failed attempts at control and eradication of this plant. This research will help us to better understand the plant, and choose treatment options for optimal results. The Nature Conservancy has invested much time and money into the treatment of *Phragmites* at our Great Salt Lake Shorelands Preserve and is continually looking for ways to maximize our effectiveness. This research should help us to accomplish our goals at the preserve and give us a better understanding of our treatment options.

We at The Nature Conservancy fully support this research and offer any assistance we can give to Dr. Kettenring and her students, including access to our property for their experimental plots.

Sincerely,


Chris Brown
Director of Stewardship

Rio Tinto Kennecott
4700 Daybreak Parkway
South Jordan, Utah 84095
T +1(801) 204-2128
M +1(801) 520-1860
E-mail chris.kaiser@riotinto.com

Chris Kaiser
Manager - Environment

April 29, 2014

Subject: Support for Research Proposal "Phragmites control and best management practices in Willard Bay State Park and Great Salt Lake Watershed"

To whom it may concern:

This letter is in support of Dr. Karin Kettenring's research proposal "Phragmites control and best management practices in Willard Bay State Park and the Great Salt Lake Watershed".

Kennecott Utah Copper (KUC) recognizes the value in better understanding Phragmites, control and revegetation.

KUC recognizes invasive Phragmites as one of the top concerns with regards to Utah's wetlands and their productivity for wildlife and their recreational value. KUC recognizes the lack of studies and research that are applicable in this geographic area and the need for additional new applicable information that can be used as tools for control and containment of Phragmites.

KUC is committed to providing Dr. Kettenring and her students access to KUC property where they can conduct their Phragmites control studies. Furthermore, KUC has committed to assist Dr. Kettenring and her students with their control studies by implementing the assigned Phragmites treatments on company property.

Regards,



Chris Kaiser
Manager, Environment



GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Wildlife Resources

GREGORY J. SHEEHAN
Division Director

April 26, 2014

To Whom It May Concern:

This letter is in support of Dr. Karin Kettenring's research grant proposal "Restoration of *Phragmites*-invaded wetlands in Willard Bay and associated Great Salt Lake wetlands".

The Utah Division of Wildlife Resources recognizes the value in research addressing invasive weed control, and wetland habitat restoration and enhancement. Research that seeks to answer pertinent questions and develop management tools for wetland managers is desirable.

The Division recognized invasive *Phragmites* as one of the top concerns with regards to Utah's wetlands and their productivity for wildlife and recreational value to sportsmen. The Division recognizes the lack of studies and research that are applicable to the geographic area and the need for additional new applicable information that can be used as tools. The Division supports efforts toward control and containment of invasive *Phragmites*. The Division supports efforts to gain information, techniques and strategies for restoration of impacted wetlands to encourage native plant establishment.

The Division is committed to providing Dr. Kettenring and her student access to Division property where they can conduct their *Phragmites* control studies. Furthermore, the Division will assist Dr. Kettenring and her students when possible with their research with available resources and assistance in the implementation on Division lands.

Sincerely,

Randy Berger
Assistant Wildlife Manager,
Wetland Manager Salt Creek, Public Shooting Grounds, Locomotive Springs WMA's,
Noxious and Invasive Weed Control Project Leader
Utah Division of Wildlife Resources

Val Bachman
Wetland Manager Ogden Bay, Howard Slough and Harold Crane WMA's
Utah Division of Wildlife Resources

Rich Hansen
Wetland Manager Farmington Bay, Tempie Springs WMA's
Utah Division of Wildlife Resources





April 30, 2014

To whom it may concern,

The spread of phragmites around Willard Bay has adversely impacted the Utah Airboat Association membership and our ability to use and enjoy the marsh. In addition to destroying habitat, it also reduces our ability to navigate safely in the water flows going out to Willard Spur. Because of these concerns, the Utah Airboat Association supports the proposed project from USU and Bio-West that would address the phragmites invasion in and around Willard Bay State Park.

Regards,

Kerry McCloud --President

Utah Airboat Association