

**Yellow Iris Management Plan**  
**Lower Lewis Creek, Ferrisburgh, VT**  
**January 4, 2018**  
**Prepared for Lewis Creek Association**  
**By Habitat Restoration Solutions, LLC**  
**With funding support for LCBP, LCBP L-2017-017**

**A. Description and Values of Site**

Lower Lewis Creek and the associated floodplain is an approximately 160-acre area containing a diversity of priority natural communities including stream bank, floodplain forest, deep bulrush marsh, and buttonbush swamp. It is home to numerous RT&E species. There are three main landowners; State of Vermont (Little Otter WMA), Kimball Brook Farm, and Long Point Homeowners Association, and two additional private landowners. This range is indicative of the variety of priorities and land management practices currently in place.

The main management objective is the protection and/or enhancement of priority natural communities and their associated function and values. While these natural communities are largely intact and unlikely subject to further development pressures, their integrity is not without threats. Primary are impacts from exotic/invasive plant populations. While the list is long (see section D below), the focus of this initiative is the control of *Iris pseudacorus*, or yellow iris. This is a continuation of the infestation characterization and mapping performed in 2015/2016 under the LCBP Grant (project code L-2015-018.)

Exotic/invasive plant control initiatives often lead to laser-like focus. A concerted effort should be made to consider all stressors, and not just our target species. While the focus of this grant is specific to control of yellow iris, this work should be performed in concert with analysis of all major stressors.

**B. Exotic Invasive Plant Species Impacts to Management Goals**

The range of functions and values provided by Lower Lewis Creek floodplain is attributed, in great part, to the diversity of plant natural communities. Over the years, the plant communities have been impacted by a number of exotic plants including the following:

	<b>VT Noxious Designation?</b>	<b>Wetland Status</b>	<b>Level of Infestation</b>	<b>Natural Community Threat</b>	<b>Potential for Control</b>
<b><i>Iris pseudacorus</i> (yellow iris)</b>	Yes	Obligate	Present in moderate levels and expanding rapidly	Impacting floodplain forest understory and emergent and wet meadow communities	Plants respond well to single foliar application (fall) of herbicide. Persistent seed bank likely, but not established.
<b><i>Phalaris arundinacea</i> (reed canary grass)</b>	No	FAC wet	Present in moderate levels and expanding rapidly	A significant threat to wet meadow communities, found mostly in Thorp Floodplain survey area	Extensive rhizome/root mass, difficult to kill with single herbicide application. Prolific seed producer, seeds will persist for at least 1 year.

	VT Noxious Designation?	Wetland Status	Level of Infestation	Natural Community Threat	Potential for Control
<b>Botumus umbellatus (flowering rush)</b>	Yes	Obligate	Present in moderate levels, not showing evidence of rapid expansion	At this point, not considered a significant threat	Likely responds to herbicide, difficult to limit off-target damage.
<b>Lysimachia nummularia L. (moneywort)</b>	No	FAC wet	Presents as ground cover 1-2" height, a major component of the feet floodplain forest herb layer.	Established component of herb layer, endemic to area floodplain forests	Likely responds to herbicide, difficult to limit off-target damage.
<b>Myosotis Scorpioides (forget-me-not)</b>	No	Obligate	Presents as ground cover 4-6" height, a major component of the wet floodplain forest herb layer.	Established component of herb layer, endemic to area floodplain forests	Likely responds to herbicide, difficult to limit off-target damage.
<b>Hydrocharis morsus-ranae (European Frogbit)</b>	Yes	Obligate	Present as a new population in emergent communities	It has become a serious threat in nearby wetlands, progress in Lewis Creek emergent communities has not been assessed.	Levels can be controlled by regular manual removal, particularly in open waters. Difficult to control in emergent vegetation.

The decision to control yellow iris in the presence of the aforementioned exotic/invasive species is based on the following factors:

1. Iris can invade virtually all landscape features and plant communities within the floodplain.
2. Iris populations are growing at a significant rate (Phalaris as well). Other species have been present in this floodplain for years and their population levels are growing at slower rates.
3. Iris produces large, dense seeds that are transported by water only. Previous surveys have identified and mapped landscape features that serve as major seed contributors. Phalaris seeds are much more prone to wind distribution and are therefore, harder to control.

#### Phenology

The 2015/16 study detailed in LCBP report "Aquatic Yellow Iris Removal and Spread Prevention Plan for Four Lake Chaplain Tributaries" (LCBP Project Code L-2015-018) provides useful insights into plant phenology. Iris can grow in both low-light and full sun conditions. Plants in full sun display vigorous foliar growth and prolific flowering. In 2016, one identified clump contained 164 peduncles, or flowering stalks, each with multiple flowers. A 2015/16 test plot recorded a 100% increase season-to-season in number of plants within clumps. The majority of the clumps identified in the 2017 survey display a vigorous growth and flowering pattern.

### Response to Mid-Season Cutting

Mature, flowering plants can be cut mid-season to eliminate seed production for that year. Cutting clumps to ground level in late June yielded plants with full foliage in September, but no evidence of flowering or seed production. Cut peduncles with either flowers or immature seed pods did not continue to mature and produce viable seeds.

### Seed Viability and Seed Bank Persistence

Iris seeds have a resilient shell and likely persist in the seed bank for multiple years. Seed germination requires cold stratification under controlled conditions, and other factors clearly influence rate of germination in the field, as rates appear to be relatively low. It should be noted that we have no empirical data to support these observations.

### **C. Inventory of Targeted Plant Species**

Iris has been observed in all natural community types found in Lower Lewis Creek, with the exception of the deep bulrush marsh. This is a curious result, as it has been found in this community type in nearby wetlands. Given the widespread nature of the infestation, it is advantageous to prioritize efforts. The top priority is the elimination of seed producing stands with ready access to water. Seed production is directly correlated with sun exposure. Major seed producing stands are found in 4 landscape features: stream bank, button bush swamp margins, sloughs with seasonal flows, and wet meadows.

<b>Unit</b>	<b>Owner(s)</b>	<b>Nat Community description/treatment potential</b>	<b>Benefit</b>
<b>north shore - river right, upstream of state access</b>	- Long Point HA - Gilson Lane - Kimball Brook Farm	Mostly open, full sun, primarily reed canary grass (RCG). Medium density infestation, mature flowering stands on river bank.	Low restoration potential for plant community, could reduce seed contribution to river if control is implemented in conjunction with upstream control.
<b>floodplain forest - river left</b>	- State - Kimball Brook Farm	Mostly closed canopy. Herb layer a mix of native and established e/i (moneywort, forget-me-not). RCG recently expanded in higher sun areas. Majority of understory clumps on state land	Based on 2015/16 survey many small clumps limited by sun exposure. Many could be controlled without herbicide. Larger clumps will require herbicide. Controlling iris will not address other e/i impacts
<b>Buttonbush swamps</b>	- Largest spans state and KBF lands (river left), - Smaller swamp (river right) on KBF land exclusively	Healthy buttonbush stands creating open canopy with herb layer a mix of native and e/i, with robust clumps of iris and growing populations of RCG.	YI likely not impacting buttonbush populations, but will greatly alter the composition of herb layer. Also, a significant YI seed source

Unit	Owner(s)	Nat Community description/treatment potential	Benefit
<b>Intermittent stream sloughs</b>	- Kimball Brook Farm - Brett Danyow (upstream of study area)	Full sun communities dominated by RCG, with some very large robust clumps producing many YI seeds	Feasible to treat and eliminate seed source
<b>Stream Bank (entire length of study area)</b>	Numerous, TBD	Depending on sun exposure, major seed source for entire system due to water proximity	Feasible to treat and eliminate seed source. Need landowner permission

#### Notes

- Herbicide treatment in year 1 followed by hand pulling in years 2 and 3.
- Setbacks from production areas, per NOFA and landowner, will be employed to maintain organic certification.

#### **D. Evaluation of Treatment Methods**

The 2015/16 field work provided an opportunity to evaluate treatment methods. We experimented with both mechanical and chemical control of iris. Small clumps of iris, generally < 5 plants, could be easily dug without creating excessive soil disturbance. And as a result of our mid-season cutting, we determined that only mature seed pods and rhizomes need to be bagged and removed. However, once clumps progress to display a 'circular' growth pattern, digging becomes very labor-intensive and results in excessive soil disturbance. We determined that fall foliar application is very effective in eliminating iris clumps. It should be noted that U.S. Fish & Wildlife has implemented foliar applications in June with good results as well. While we harbor concerns about introducing more chemicals to these highly valued natural communities, we feel it is the only viable option for controlling an infestation of this scale. We also believe that a fall application maximizes efficacy while reducing collateral damage to off-target plants and animals.

#### **E. Proposed Treatment Plan**

Pre-treatment Survey: Surveys were conducted on foot and in canoe over the course of 2015 and 2016. While the survey revealed widespread iris, seed production emanates from selected landscape features (see attached map.) These will be the focus for treatment.

Treatment Objectives: Eradicate 90+% of clumps in identified treatment areas.

#### Treatment Methods

Year 1: A foliar application of 5% Rodeo herbicide (glyphosate active ingredient, EPA registration # 62719-324) with an aquatic approved surfactant applied using a backpack sprayer is proposed. Application will take place in June, while plants are flowering. If water levels preclude access with required equipment, clumps can be flagged for treatment in fall.

Years 2 and 3: hand pulling/digging by volunteers of new growth.

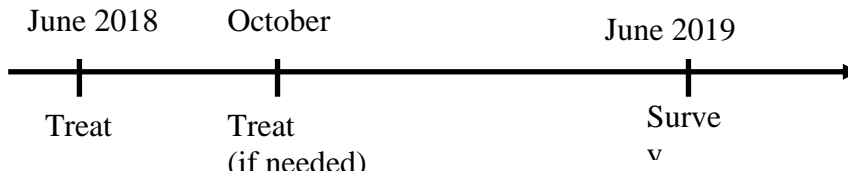
#### Landowner Consent and Regulatory Approval

Landowner consent and Wetlands Program approval has been obtained. For areas adjacent to agriculture operations, NOFA approved setbacks will be maintained. Kimball Brook Farm provides access for treatments

except glyphosate. VTFWD approves all management treatment options and is interested to partner on long term planning and implementation.

Efficacy Monitoring: The scale of proposed treatment will allow for monitoring in subsequent growth season.

Timeline



Cost  
HRS projected cost range, \$800-\$1200. Variables include site access challenges (primarily water levels and stream blockages), level of infestation at time of treatment, and whether treatment will require an October application as well. LCA is pursuing additional funding from towns and the state.