



February 16, 2016

Ref: 57276.03

Mr. Michael Adams
Senior Project Manager
USACE / Regulatory Branch / Vermont Project Office
11 Lincoln Street, Room 210
Essex Junction, VT 05452

Re: Jay Peak Resort - Jay, Vermont
Permit Number: NAE-2008-1314
Golf Course Wetland and Stream Mitigation
Fifth Annual (2015) and Final Monitoring Report

Dear Mike:

On behalf of Jay Peak Resort ("JPR"), VHB has prepared the enclosed report and supporting documentation to summarize the results of the fifth year of monitoring of the wetland and stream features which were restored or created as part of mitigation for the golf course, which was constructed without U.S. Army Corps of Engineer ("USACE") authorization. This monitoring was completed in accordance with Special Condition #4 of the Section 404 Individual Permit ("IP") (Permit Number NAE-2008-1314), which was issued after-the-fact.

As described in the IP application narrative and subsequently approved, the monitoring methods used for this site were developed to determine if the mitigation goals were being met. The goals are described in Special Condition #2 of the IP, and include:

- The restoration of natural vegetation communities in the restored/created wetlands and streams;
- The replacement of the functions and values provided by the impacted wetlands and streams.

Please find enclosed one hardcopy of the complete *Jay Peak Resort, Golf Course Wetland and Stream Mitigation, Fifth Annual (2015) and Final Mitigation Report* and Appendix with supporting documentation, as well as a complete electronic copy on compact disc.

Mr. Michael Adams
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Please do not hesitate to contact me if you have any questions or comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Patti B. Kallfelz-Werts", with a large, stylized flourish at the end.

Patti B. Kallfelz-Werts
Environmental Scientist

PBW/jkw

cc: Denise Leonard, U. S. Environmental Protection Agency (one hardcopy)
Policy Analyst/ Technical Support Branch ("PATs"), USACE (one hardcopy)
Walter Elander, JPR (electronic copy only)

Enclosure:

- *Jay Peak Resort – Golf Course Wetland and Stream Mitigation – Fifth Annual (2015) and Final Mitigation Monitoring Report* (one hardcopy and one electronic copy)

**Fifth Annual (2015) and Final Mitigation
Monitoring Report**

JAY PEAK RESORT
GOLF COURSE WETLAND AND STREAM MITIGATION
Jay, Vermont

Prepared for: **Jay Peak Resort**
Jay, Vermont

Prepared by: **VHB**
40 IDX Drive
Building 100, Suite 200
South Burlington, VT 05403

February 16, 2016





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Appendix:

- Appendix 1: Jay Peak Resort Golf Course Site Location Map
- Appendix 2: Jay Peak Wetland and Stream Mitigation, 2015 Monitoring Maps (Index and Maps 1 through 7)
- Appendix 3: Herbaceous Species and Cover Summary Data from Permanent 1m² Plots and Wetland Data Plots
- Appendix 4: Woody Stem Survival Assessment Based on 0.02-acre (5-meter Radius) Permanent Vegetation Monitoring Plots and Wetland Data Plots
- Appendix 5: Wetland Determination Data Sheets
- Appendix 6: Jay Peak Resort Golf Course Mitigation Monitoring – Year 5 Photographs
- Appendix 7: Mitigation Report Transmittal and Self-Certification



1.0 Introduction

On behalf of Jay Peak Resort ("JPR"), VHB has prepared this report to present the findings of the fifth and final year of post-construction monitoring of the restoration work conducted by JPR to mitigate for impacts which resulted from the construction of an 18-hole golf course at the resort between 2004 and 2006 (see JPR Golf Course Site Location Map in the Appendix 1). This mitigation was necessary for JPR to qualify for an after-the-fact Individual Permit ("IP") under Section 404 of the Clean Water Act, for dredge and fill work conducted in jurisdictional waters of the U.S., including wetlands ("Waters"). The IP (Permit Number: NAE-2008-1314) (the "Permit"), was issued June 23, 2011, and required JPR to monitor the restoration and creation areas within the golf course for a period of five years, and included reference to the criteria and success standards which were used to conduct these monitoring activities and evaluate performance (USACE 2011). The purpose of the annual monitoring and reporting is to measure the progress of the mitigation areas relative to the success standards and to offer recommendations to ultimately achieve site success standards.

The mitigation activities, which were completed during the 2009 and 2010 construction seasons (VHBP 2010 and VHB 2010), included the restoration of 19 stream segments and 0.58 acre of wetland; an additional 1.86 acres of wetland was created during construction, as compensatory mitigation (VHB 2010). Previous annual monitoring conducted by VHB in summer from 2011 through 2014, indicate that all performance standards were being met in 2011 and most of the performance standards were being met in 2012, 2013, and 2014 (see Table 1 below). The results of the Year Five (2015) monitoring indicate that all but one of the performance standards are being met at this time. The performance standard which has not been met is the presence of vernal pool indicator amphibian species within a select number of restored or created wetlands. It is important to note that the absence of the vernal pool species within the target wetlands does not indicate a lapse on the part of JPR or failure to comply with the conditions of the IP. JPR has not undertaken any changes to these features or the grounds in the vicinity of these features that would affect their ability to support vernal pool, or any, biota. Since all of the performance standards that are within JPR's ability to influence have been met, and JPR is in compliance with the conditions of the Permit, VHB recommends that mitigation monitoring should not continue after Year Five (2015).



Field activities for the Year Five (2015) monitoring took place on August 13 and 14, 2015, and were conducted by VHB Environmental Scientists. A summary description of each standard and Year Five (2015) monitoring results are provided in Table 1, with greater detail provided in Section 2.0.

| Table 1: Performance Standard Outline and Success Measure | | | | | | | |
|---|---|--|--|---|---|---|---|
| Performance Standard | Success Criteria | Monitoring Method | Performance Standard Met (?) | Performance Standard Met (?) | Performance Standard Met (?) | Performance Standard Met (?) | Performance Standard Met (?) |
| | | | Year 1 (2011) | Year 2 (2012) | Year 3 (2013) | Year 4 (2014) | Year 5 (2015) |
| 1. Re-establish (or establish in created wetlands) a natural wetland vegetation community in restored wetland areas | Herbaceous vegetation coverage of a minimum 80% of native, wetland plants within the restored and created wetland areas | Monitor herbaceous vegetation from permanent 1 square meter herbaceous vegetation monitoring plots [established in Year One (2011)] within the restored and created wetlands and adjacent to large stream restorations | Yes; based on extrapolation of 1 square meter plots, average coverage within the wetland mitigation areas is 100% | Yes; based on extrapolation of 1 square meter plots, average coverage within the wetland mitigation areas is over 100% | Yes; based on extrapolation of 1 square meter plots, average coverage within the wetland mitigation areas is over 100% | Yes; based on extrapolation of 1 square meter plots, average coverage within the wetland mitigation areas is over 100% | Yes; based on extrapolation of 1 square meter plots, average coverage within the wetland mitigation areas is over 100% |
| | Survival rate of 80% of the planted native, wetland shrubs | Establish permanent 0.02-acre (5m radius) monitoring plots within the restored and created wetlands | Yes; based on extrapolation of 0.02-acre (5m radius) plots, shrub stem survival within the mitigation wetlands is 93% | Yes; based on extrapolation of 0.02-acre (5m radius) plots, shrub stem survival within the mitigation wetlands is 84% | Yes; based on extrapolation of 0.02-acre (5m radius) plots, shrub stem survival within the mitigation wetlands is 80% | Yes; based on extrapolation of 0.02-acre (5m radius) plots, shrub stem survival within the mitigation wetlands is 79%; average shrub survival for restored stream floodplains is 81%; total average shrub survival rate for all plantings is 80% | Yes; based on extrapolation of 0.02-acre (5m radius) plots, shrub stem survival within the mitigation wetlands is 78%; average shrub survival for restored stream floodplains is 83%; total average shrub survival rate for all plantings is 80% |

Table 1: Performance Standard Outline and Success Measure

| Performance Standard | Success Criteria | Monitoring Method | Performance Standard Met (?) | Performance Standard Met (?) | Performance Standard Met (?) | Performance Standard Met (?) | Performance Standard Met (?) |
|--|--|---|--|--|--|--|--|
| | | | Year 1 (2011) | Year 2 (2012) | Year 3 (2013) | Year 4 (2014) | Year 5 (2015) |
| | Wetlands develop a natural community, which blends into the adjacent, undisturbed features | Establish at least one permanent photograph monitoring station within each restored or created wetland which shows the adjacent undisturbed feature | Yes; permanent photograph stations were established in each wetland feature which shows the restored or created feature, and the adjacent undisturbed features | Yes; photographs recorded from permanent photograph stations (established in 2011); photos illustrate the restored or created feature, & the adjacent undisturbed features | Yes; photographs recorded from permanent photograph stations (established in 2011); photos illustrate the restored/ created features & the adjacent undisturbed features | Yes; photographs recorded from permanent photograph stations (established in 2011); photos illustrate the restored/ created features & the adjacent undisturbed features | Yes; photographs recorded from permanent photograph stations (established in 2011); photos illustrate the restored/ created features & the adjacent undisturbed features |
| 2. Re-establish (or establish in the created wetlands) wetland hydrology | Clear evidence of hydrology based on the criteria in the <i>Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region</i> (Regional Supplement) (USACE 2011) | Visual assessment of restored or created wetlands for evidence hydrology indicators | Yes; all but one feature (H15-WT1) of the restored/ created wetlands show evidence of persistent wetland hydrology | Yes; despite the below average precipitation during July & August 2012, all mitigation wetlands show evidence of persistent wetland hydrology | Yes; all restored and created wetlands show evidence of persistent wetland hydrology | Yes; all restored and created wetlands show evidence of persistent wetland hydrology | Yes; all restored and created wetlands show evidence of persistent wetland hydrology |
| 3. Re-establish (or establish in the created wetlands) the functions and values provided by the wetlands within and adjacent to the golf course. | Clear evidence of the functions and values are being performed by the restored and created wetlands (previously identified as Groundwater Recharge/ Discharge and Wildlife Habitat) | Assess each wetland using methods in the Highway Methodology (USACE 1999) | Yes; all but one (H15-WT1) of the restored wetlands are showing evidence of performing the function of groundwater recharge; some of the restored/ created wetlands are functioning as wildlife habitat | Yes; all of the restored wetlands are showing evidence of performing the function of groundwater recharge; some of the restored/ created wetlands are functioning as wildlife habitat | Yes; all of the restored wetlands are showing evidence of performing the function of groundwater recharge; some of the restored/ created wetlands are functioning as wildlife habitat | Yes; all of the restored wetlands are showing evidence of performing the function of groundwater recharge; some of the restored/ created wetlands are functioning as floodflow alteration and as wildlife habitat | Yes; all of the restored/ created wetlands are showing evidence of groundwater recharge; some of the restored/ created wetlands are functioning as floodflow alteration and as wildlife habitat |

Table 1: Performance Standard Outline and Success Measure

| Performance Standard | Success Criteria | Monitoring Method | Performance Standard Met (?) | Performance Standard Met (?) | Performance Standard Met (?) | Performance Standard Met (?) | Performance Standard Met (?) |
|---|---|---|---|---|---|---|---|
| | | | Year 1 (2011) | Year 2 (2012) | Year 3 (2013) | Year 4 (2014) | Year 5 (2015) |
| | Evidence of breeding use by vernal pool indicator species | Investigate the selected restored wetlands (WH-WT1, H13-WT2, & H14-WT1) at the appropriate time of year for signs of breeding use by vernal pool indicator species | Yes; all of the selected wetlands showed evidence of breeding use by vernal pool indicator species | No; none of the previously identified wetlands contained evidence of breeding use by vernal pool indicator species (H13-WT2 did contain other breeding amphibians) | No; none of the wetlands identified in 2011 as potential vernal pools contained evidence of breeding use by vernal pool indicator species during a site visit conducted in June 2013 (H13-WT2 did contain other breeding amphibians) | No; based on the results of 2012 and 2013 vernal pool surveys for the wetlands identified in 2011, no vernal pool survey was conducted in 2014 | No; based on data from previous years, the original target wetlands have not been functioning as vernal pools, therefore no vernal pool survey was conducted in 2015 |
| 4. Visually assess each restored stream segment for evidence of natural channel development and stability | Restored stream segments show signs of naturalization, and minimal evidence of erosion | Visually assess each restored stream segment for signs of natural stream development; permanent photograph stations established to record progress throughout the monitoring period | Yes; the restored stream segments showed signs of ongoing substrate sorting, minimal erosion or undercutting of banks, and use of created floodplains (where applicable) | Yes; the restored streams continue to show evidence of naturalization. New areas of erosion in 2 restored streams (P2-TB1 & H16-SC1) have been repaired in 2012, or will be early in 2013. | Yes; the restored streams continue to show evidence of naturalization & have stabilized. Streams repaired in 2012 & 2013 remained stable in late 2013. | Yes; the restored streams continue to show evidence of naturalization & have stabilized. Streams repaired in 2012 & 2013 have remained stable through 2014. Bank sloughing repair was performed on a segment of Stream P2-TB1, during 2014, and bank stability will be monitored during 2015 | Yes; the restored streams have naturalized & have achieved a stabilized state. Bank sloughing repair was performed on a segment of Stream P2-TB1, during 2014, and the repaired bank has remained stable in 2015 |
| | Vegetation communities in the adjacent re-created floodplain areas are developing with native, wetland vegetation | Same as with restored/ created wetlands (1 square meter and 0.02-acre (5m radius) plots) | Yes; average herbaceous vegetation cover is 95%; average planted shrub survival is 91% | Yes; TOTAL average herbaceous vegetation cover is over 100%; average planted shrub survival is 84% | Yes; TOTAL average herbaceous vegetation cover is over 100%; average planted shrub survival is 82% in the restored floodplains | Yes; TOTAL average herbaceous vegetation cover is over 100%; average planted shrub survival is 82% in the restored floodplains | Yes; TOTAL average herbaceous vegetation cover is over 100%; average planted shrub survival is 83% in the restored floodplains |

2.0 Summary and Monitoring Methodologies

The mitigation features have performed consistent with expectations. The vegetation communities in both the wetlands and adjacent to streams have developed, from both the planted species and from native volunteer species which have colonized from adjacent previously undisturbed areas. All of the mitigation wetland features show evidence of wetland hydrology and all of the wetland features demonstrate the groundwater recharge/ discharge function; at the time of the Year Five monitoring data collection, the restored streams are stable and have developed natural stream channel characteristics. The following sections detail the mitigation goals and the methods used to assess adherence to the success criteria.

1. ***Re-establish a native wetland vegetation community within the restored wetlands and adjacent to restored stream segments; establish a native wetland vegetation community within created wetlands.***

In order to ensure a consistent data collection approach which could be compared throughout the five-year monitoring period, VHB conducted the Year Five monitoring in the same locations (using the same data plot designations) and methodologies that were established in Year One. As stated above, the Year Five data collection was completed in early August, at the height of the growing season, which is consistent with procedures outlined in the Mitigation Plan, and with the previous years of monitoring. A full description of data collection methodologies is included in the *Jay Peak Resort – Golf Course Wetland and Stream Mitigation - First Annual (2011) Mitigation Monitoring Report* ("Year One Report") (VHB 2012). Data collection to determine overall herbaceous coverage was conducted using one-meter square plots or wetland determination data plots, established during the Year One monitoring (see Mitigation Monitoring Map Set in Appendix 2 for plot locations).

VHB also completed USACE Wetland Determination Data Forms for a selection of restored or created wetland features (see Appendix 5). These wetlands, listed below, were determined in consultation with the USACE during field reviews, to need full wetland data collection to monitor the development of the three wetland criteria, prior to the Year One monitoring (2011), and were



again the subject of full wetland data collection during 2015. These features include: H11-Create, H11-WT6, H13-WT1/1a/1b, H15-WT1, H16-Create, H5-Create, H6-WT1, and H8-Create.

The one square meter herbaceous vegetation monitoring plots also served as the centers for the 0.02 acre (five-meter radius) shrub survival monitoring plots. The number of surviving planted shrub stems were counted within the 0.02-acre plots; this number was then extrapolated from the 0.02-acre monitoring plot (or plots) to the size of the restored or created feature and compared to the total number of stems planted within each feature (NEE 2010), to determine the overall survival rate of the planted shrubs. All planted shrubs within a feature were counted if that feature was similar in size or smaller than the 0.02-acre monitoring plots used. It is noteworthy that a number of planted shrubs that had not been located in prior monitoring years, (likely due to grazing by wildlife or temporary die-back due to transplant shock), were found to have re-emerged.

Photographs were also recorded from the permanent photograph locations, established in 2011, in order to continue to provide visual documentation of the restored and created wetlands, as well as the restored stream channels (see Jay Peak Resort Golf Course Year 5 (2015) Monitoring Photographs in Appendix 6) to ensure the restored and created features are developing naturally and blending with the adjacent, undisturbed features.

Based on the presence of native wetland vegetation communities within all of the restored and created wetlands, and adjacent to all of the restored stream segments, as summarized in the Herbaceous Species and Cover Summary Data from 1m² Plots and Wetland Data Plots table (see Appendix 3), this performance standard has been met.

2. *Re-establish (or establish in created wetlands) wetland hydrology (and hydrologic connections) through earthwork within restored and created wetlands to connect to existing Waters.*

The purpose of establishing wetland hydrology and hydrologic connections was not only to ensure the development of functioning wetlands, but to ensure that the restored and created features meet USACE jurisdictional parameters. Evidence of hydrology was assessed within each



restored/created wetland during the visual assessment conducted within each feature, and the wetland determination data collection was conducted in a selection of features, based on guidance found from Regional Supplement indicators, and is summarized in Table 2, in Section 4.0 below. Based on the presence of hydrology indicators within all of the restored and created wetlands, this performance standard has been met.

3. *Re-establish (or establish in created wetlands) the wetland functions and values within restored and created wetlands previously provided by the wetlands within and adjacent to the golf course.*

Using the methods described in the USACE's Highway Methodology, VHB assessed each restored and created wetland during the Year Five monitoring activities. VHB previously identified the functions and values of Groundwater Recharge/ Discharge and Wildlife Habitat as the target functions to be restored. In addition to these principal functions, VHB observed evidence of other functions being provided by the restored and created wetlands, including floodflow alteration. The results of this assessment are provided in Table 2, below in Section 4.0.

Because no evidence of use by vernal pool indicator species was found after monitoring in Year One (2011), monitoring in the original target wetlands, WH-WT1, H13-WT2, and H14-WT1, has not been conducted since Year Two (2012). Although no evidence of use by vernal pool species has been found since 2011, other amphibian species were observed using these wetlands, including pickerel frogs (*Rana palustris*), green frogs (*Lithobates clamitans*), and northern leopard frog (*Lithobates pipiens*).

Because the functions previously identified as the targets (Groundwater Recharge/ Discharge and Wildlife Habitat) are being provided by the restored and created wetlands, in addition to other functions, this performance standard has been met.

4. *Visually assess each restored stream segment for evidence of natural channel development and stability.*

During the monitoring activities, VHB walked the length of each stream channel to observe the development of the stream channel naturalization, and to look for potential areas of concern to



be addressed, such as bank erosion, grade control structure instability, disturbance by golfers, course maintenance operations, etc. VHB did not observe any areas of concern that required repair in 2015. Signs of channel naturalization included stream bed material sorting, natural sediment deposition, floodplain use, and the development of in-stream habitats (i.e., riffles, and step/pools). Streams that had areas requiring repairs in 2012, 2013, and 2014, were found to have remained stable during the fifth year of monitoring. Based on VHB's observations of stable, restored stream channels and lack of areas requiring repair, this performance standard is met.

3.0 Vegetation Data Results

3.1 Herbaceous

During monitoring efforts in 2015, VHB found that the total average relative herbaceous cover within the wetlands and within the floodplains of the restored streams is approximately 104 percent overall (see Herbaceous Species and Cover Summary Data from 1m² Plots and Wetland Data Plots table in Appendix 3), exceeding the performance standards of 80 percent coverage by non-invasive wetland herbaceous species. It is noteworthy that additional, native wetland species were recorded during the monitoring, which were not part of the wetland seed mix applied to the mitigation areas; this suggests the surrounding, undisturbed features are contributing seed, and therefore increased species richness and diversity to the vegetation communities.

3.2 Shrub Species

Four shrub species were planted within the restored and created wetlands and adjacent to the large stream restoration segments after the completion of restoration activities in 2010; the species include:

- Winterberry Holly (*Ilex verticillata*),
- Elderberry (*Sambucus canadensis*),
- American cranberrybush (*Viburnum trilobum*)¹, and
- Red-osier dogwood (*Cornus sericea*).

¹The accepted scientific name for American cranberry bush was *Viburnum trilobum* at the time of the restoration activities; the currently accepted name for this species is *V. opulus* var. *americanum* (USDA 2014).



Willow (*Salix* spp.) and dogwood (*Cornus* sp.) tubelings were planted at the same time as the shrubs, adjacent to all restored stream segments in order to increase bank stability. Since these tubelings were planted for the purposes of enhancing stream bank stability and not as vegetation community enhancement, they were not included in the shrub survival assessments.

Based on the data obtained from the permanent vegetation monitoring plots in 2015, the average shrub survival rate within the restored and created wetlands is approximately 78 percent, and the average shrub survival rate for the larger stream segment restorations is approximately 83 percent, resulting in an overall average survival rate of all planted shrubs of 80 percent. The performance standards of 80 percent survival rate of planted shrubs has been met in 2015 (see Woody Stem Survival Assessment Based on 0.02-acre Permanent Vegetation Monitoring Plots and Wetland Data Plots summary table in Appendix 4). Although this performance standard was just met in 2015, it is noteworthy that none of the restored or created feature were proposed to have a shrub cover type. The planted shrubs were included to provide structural diversity within the vegetation communities, and to provide a natural barrier to incursions by golfers.

3.3 Natural Woody Recruitment

Based on observations made in the field, natural woody recruitment within the restored and created wetlands and adjacent to restored stream segments has increased compared to conditions in previous years. It is anticipated that additional species will continue to “volunteer” from the surrounding, undisturbed woodlands. During 2015, VHB noted such natural recruit species as yellow birch (*Betula alleghaniensis*), pin cherry (*Prunus pensylvanica*), choke cherry (*Prunus virginiana*), red maple (*Acer rubrum*), balsam fir (*Abies balsamea*), stepplebush (*Spiraea tomentosa*), and Bebb willow (*Salix bebbiana*), within a number of the restored and created wetlands, and adjacent to restored stream segments. It is expected that these and other volunteer species will continue to naturally propagate and may be represented within the permanent vegetation monitoring plots during future monitoring efforts.

4.0 Hydrology

Based on the results summarized in Table 2 below, all of the restored and created wetlands show evidence of at least one primary, principal hydrology indicator, which would indicate hydrology is present within all of these features, and therefore that this performance standard is being met.

The results of the assessment of hydrology within each restored or created wetland are detailed in Table 2.

| Table 2: Summary of Hydrology Indicators and Functions and Values in the Restored and Created Wetlands | | | | |
|---|---------------|------------------|---|--|
| Feature | Hole # | VHB Map # | Evidence of Hydrology² | Principal Functions and Values³ |
| H5-Create | 5 | 1 | A2 (High water Table); A3 (Saturation); B10 (Drainage Patterns); C3 (Oxidized Rhizospheres on Living Roots) | Groundwater recharge/ discharge and Floodflow alteration (evidence of water retention and adjacent to perennial stream); Wildlife habitat (pickerel frogs and green frog) and various songbirds observed |
| H6-WT1 | 6 | 1 | A1 (Surface Water); A2 (High Water Table); A3 (Saturation) | Groundwater recharge/ discharge (evidence of water retention) |
| WH-WT1 | 6 | 1 | A1 (Surface water); A2 (High water table); A3 (Saturation); B13 (Aquatic fauna) | Groundwater recharge/ discharge (standing water at time of monitoring); Wildlife habitat (pickerel frogs) |
| WH-WT2 | 6 | 1 | A2 (High water table); A3 (Saturation); B1 (Water marks); B4 (Algal mat or crust); B10 (Drainage patterns) | Groundwater recharge/ discharge (evidence of water retention and ground water discharge) |
| H4-WT1/2 | 4 | 2 | A1 (Surface water); A2 (High water table); A3 (Saturation); B10 (Drainage patterns) | Groundwater recharge/ discharge and Floodflow alteration (groundwater discharge present; adjacent to small perennial stream with very dense vegetation) |
| H4-WT3 | 4 | 2 | A2 (High Water Table); A3 (Saturation); B9 (Water-stained leaves); B10 (Drainage patterns) | Groundwater recharge/ discharge (groundwater discharge present, evidence of standing water) |
| H8-Create | 8 | 3 | A3 (Saturation); B9 (Water-Stained Leaves); B10 (Drainage Patterns) | Groundwater recharge/ discharge and Floodflow alteration (adjacent to intermittent stream with dense vegetation) |

² Alpha-numeric codes representing Evidence of Hydrology are from Regional Supplement (Section 4). "A" indicators represent direct observations of surface or groundwater; "B" indicators represent evidence an area is subject to regular ponding or flooding; "C" indicators include other evidence and area is normally saturated; and "D" indicators include other landscape/soil/vegetation features that indicate contemporary (not historic) wet conditions.

³ Principal Functions and Values are from the USACE Highway Methodology (1999).

Table 2: Summary of Hydrology Indicators and Functions and Values in the Restored and Created Wetlands

| Feature | Hole # | VHB Map # | Evidence of Hydrology² | Principal Functions and Values³ |
|---------------------|---------------|------------------|--|--|
| H1-WT1 | 1 | 4 | A3 (Saturation); B9 (Water-stained leaves); B10 (Drainage patterns) | Groundwater recharge/ discharge and Floodflow alteration (adjacent to two perennial streams with little capacity up-gradient) |
| H11-WT2/3 | 11 | 6 | A2 (High Water Table); A3 (Saturation); B10 (Drainage patterns) | Groundwater recharge/ discharge and Floodflow Alteration (adjacent to small perennial stream) |
| H11-Create | 11 | 6 | A2 (High Water Table); A3 (Saturation); B9 (Water-Stained Leaves) | Groundwater recharge/ discharge (evidence of water retention) |
| H11-WT6 | 11 | 6 | B9 (Water-Stained Leaves); C3 (Oxidized Rhizospheres on Living Roots) | Groundwater recharge/ discharge (evidence of water retention and ground water discharge) |
| H16-WT1/ H11-WT1 | 16 | 6 | A2 (High Water Table); A3 (Saturation); B9 (Water-stained leaves); B10 (Drainage patterns) | Groundwater recharge/ discharge and Floodflow alteration (evidence of water retention; adjacent to small perennial stream with limited capacity up-gradient) |
| H16-Create | 16 | 6 | A2 (High Water Table); A3 (Saturation); B9 (Water Stained Leaves); B10 (Drainage Patterns) | Groundwater recharge/ discharge and Floodflow alteration (evidence of water retention and groundwater discharge; large wetland adjacent to perennial stream) |
| H13-WT1/1a/1b | 13 | 7 | A3 (Saturation); B9 (Water-Stained Leaves); B10 (Drainage Patterns); C3 (Oxidized Rhizospheres on Living Roots) | Groundwater recharge/ discharge and Floodflow alteration (groundwater discharge points found; adjacent to small perennial stream with little capacity up-gradient) |
| H13-WT2 | 13 | 7 | A1 (Surface water); A2 (High water table); A3 (Saturation); B1 (Water marks); B9 (Water-stained leaves); B13 (Aquatic fauna) | Groundwater recharge/ discharge, Floodflow Alteration (outlets to small perennial stream) and Wildlife habitat (groundwater discharge points observed; pickerel frog and green frog (<i>Lithobates clamitans</i>) tadpoles observed) |
| H13-WT3 | 13 | 7 | A2 (High water table); A3 (Saturation); B9 (Water-stained leaves); B10 (Drainage patterns) | Groundwater recharge/ discharge |
| H14-WT2/3 | 14 | 7 | A1 (Surface Water); A2 (High Water Table); A3 (Saturation); B9 (Water-stained leaves) | Groundwater recharge/ discharge and Floodflow Alteration (evidence of water retention and adjacent to small perennial stream) |
| H14-WT1 | 14 | 7 | A1 (Surface water); A2 (High water table); A3 (Saturation); B2 (Sediment deposits); B9 (Water-stained leaves); B10 (Drainage patterns) | Groundwater recharge/ discharge (groundwater discharge points observed) |
| H15-WT1 | 15 | 7 | A3 (Saturation); B9 (Water stained leaves) | Groundwater recharge/ discharge |

5.0 Functions and Values Assessment

VHB conducted an assessment of wetland functions and values during the Year Five monitoring efforts, using the methods outlined in the Highway Methodology, in order to ensure that the wetland functions and values impacted by golf course construction were restored. It was determined during the mitigation planning process that the principal functions and values provided by the impacted wetlands were groundwater recharge/discharge and wildlife habitat. Each wetland feature was visually assessed during the monitoring efforts to determine if these previously identified functions and values (or any additional functions) were being provided. Based on this assessment, VHB determined that as of 2015 (the final year of monitoring), all of the restored and created wetlands are providing the function of Groundwater Recharge/Discharge; in addition, several of the restored or created wetlands showed evidence of functioning as Floodflow Alteration and/or Wildlife Habitat. The results of this assessment are listed, by feature, above in Table 2.

5.1 Vernal Pool Biology Assessment

In Year One (2011), use of three wetlands (WH-WT1, H13-WT2, and H14-WT1) by vernal pool indicator species for breeding was observed during the appropriate season. These wetlands were identified as potential breeding habitat for vernal pool species prior to the start of mitigation monitoring in 2011. Based on the negative results of a vernal pool assessment for biological indicator species conducted in Year Two, VHB did not conduct similar assessments in Years Three through Five. During Years Two through Five, observations of other amphibian species in three wetlands were made (H5-Create, WH-WT1, and H13-WT2), and included such species as northern leopard frog (*Rana pipiens*) and pickerel frog (*Rana palustris*).

6.0 Stream Assessments

In addition to the assessment of the herbaceous and shrub vegetation communities within the restored floodplains of the larger stream restoration sites, VHB conducted a visual assessment of



the stream conditions within the restored stream segments. In order to assess stream condition, VHB observed and noted such characteristics as signs of erosion and evidence of channel development (including substrate sorting, occupation of the floodplain, and sediment deposition). Overall, the restored streams have developed and naturalized in a stable manner. Several streams show evidence of accessing the created floodplains during high precipitation events, with minimal erosion occurring; signs include sediment deposits in the floodplain and continued healthy vegetation (herbaceous and woody) growth after the high precipitation events. Evidence was observed that significant substrate sorting has taken place in all of the restored streams. Additionally, streams repaired during 2012, 2013, and 2014 were observed to be stable during 2015. As part of the normal photograph collection for monitoring, each restored stream was photographed to show representative conditions (see Golf Course Mitigation Monitoring – Year Four Photographs in Appendix 6).

7.0 Invasive Plant Species

During prior monitoring years, VHB observed a small population (approximately 10 feet by 10 feet) of common reed (*Phragmites australis*) within Wetland H4-WT1/2. This population has previously been hand cut and treated with herbicide at various times during the growing seasons of 2009 through 2013, prior to which time it was approximately the same dimensions. During the Year Four monitoring, this population of common reed was not observed. However it re-emerged in 2015 although far smaller and less dense than the originally observed condition; VHB recommended following the established treatment protocol in the future if this population persists. No other occurrences of common reed has been observed.

During the 2015 monitoring, a population of reed canary grass (*Phalaris arundinacea*) was observed in Wetland H11-WT2/3. This population was hand removed, bagged, and disposed of off-site. VHB identified the reed canary grass with JPR staff and recommended hand-pulling and spraying with herbicide, similar to the previously approved method for common reed, if this population re-emerges, in order to prevent it from spreading to other features.

8.0 Remedial Actions

Remedial actions undertaken in 2015 were limited to the removal of reed canary grass in Wetland H11-WT2/3 (described above). No other restored/ created wetlands or stream required repair or other additional work.

9.0 Conclusions/Recommendations

Overall, the JPR golf course mitigation areas have met or exceeded the performance standards set out in the Mitigation Plan. Field monitoring efforts identified average, overall herbaceous vegetation cover of over 100 percent; and overall, average shrub survival rates of approximately 80 percent. Both of these results meet or exceed the 80 percent herbaceous cover and the 80 percent shrub survival rate performance standards which were set in the Mitigation Plan.

In addition to the discussion of the performance standards above, VHB also field-checked the boundaries of the restored and created wetlands to determine if there were any significant changes that would require re-mapping the mitigation areas and recalculating the total wetland areas restored or created as part of the mitigation efforts undertaken by JPR. Based on this assessment, the wetland boundaries, and therefore wetland areas, have not changed significantly since the completion of construction in 2010.

Based on the 2015 monitoring results, VHB anticipates that the restored and created wetlands and restored streams will continue to perform the functions that were impacted by golf course construction and then restored for mitigation. Vegetation cover is in general, above the established performance standards, and has developed into a native herbaceous community; and while the overall planted shrub survival rate was found to be at the lower end of the acceptable 80 percent survival performance standard in this final year of monitoring, this is not a concern, since the shrubs were planted to provide minimal structural diversity in the vegetation community and soil stability, and not to develop into shrub wetlands. Additionally, since the shrubs that have survived into 2015, including new observations of planted stems, have been observed to be thriving with natural recruits emerging in a number of features, the overall goal of shrubs



providing structure to the vegetation communities, and prevention of soil erosion, have been met should the survival rate fall below the performance standard.

Additionally, VHB observed evidence of the restored and created wetlands providing the functions that were originally described as the goals in the Mitigation Plan, including groundwater recharge/ discharge and wildlife habitat.

Since the restored/ created wetlands and restored streams have met or exceeded the Performance Standards described in the Mitigation Plan, VHB recommends annual monitoring be concluded after Year Five (2015).

Finally, the signed *Mitigation Report Transmittal and Self-Certification* form as provided by the USACE's 7-20-10 New England District Compensatory Mitigation Guidance is provided in Appendix 7.

10.0 References

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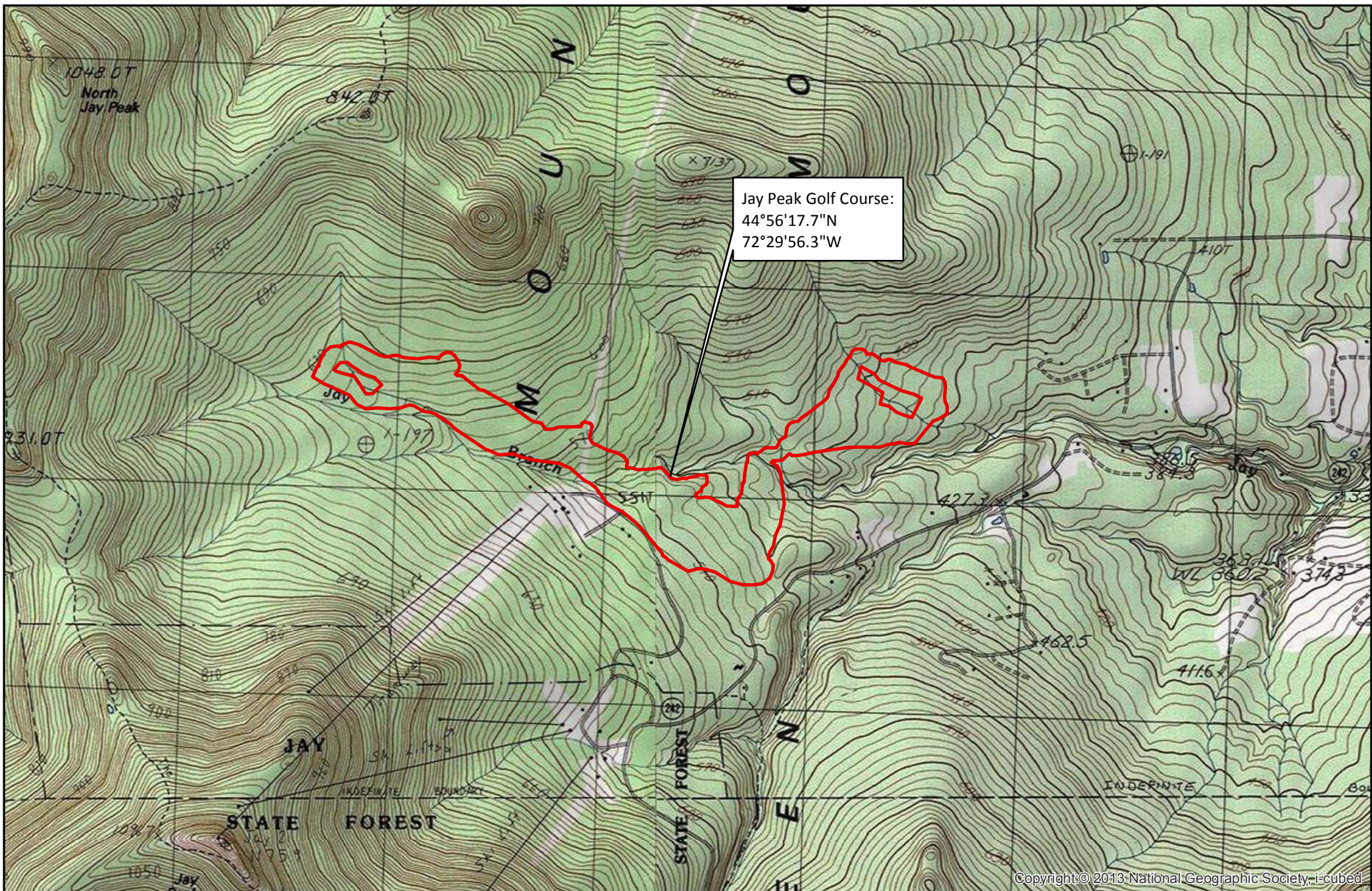
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Legend

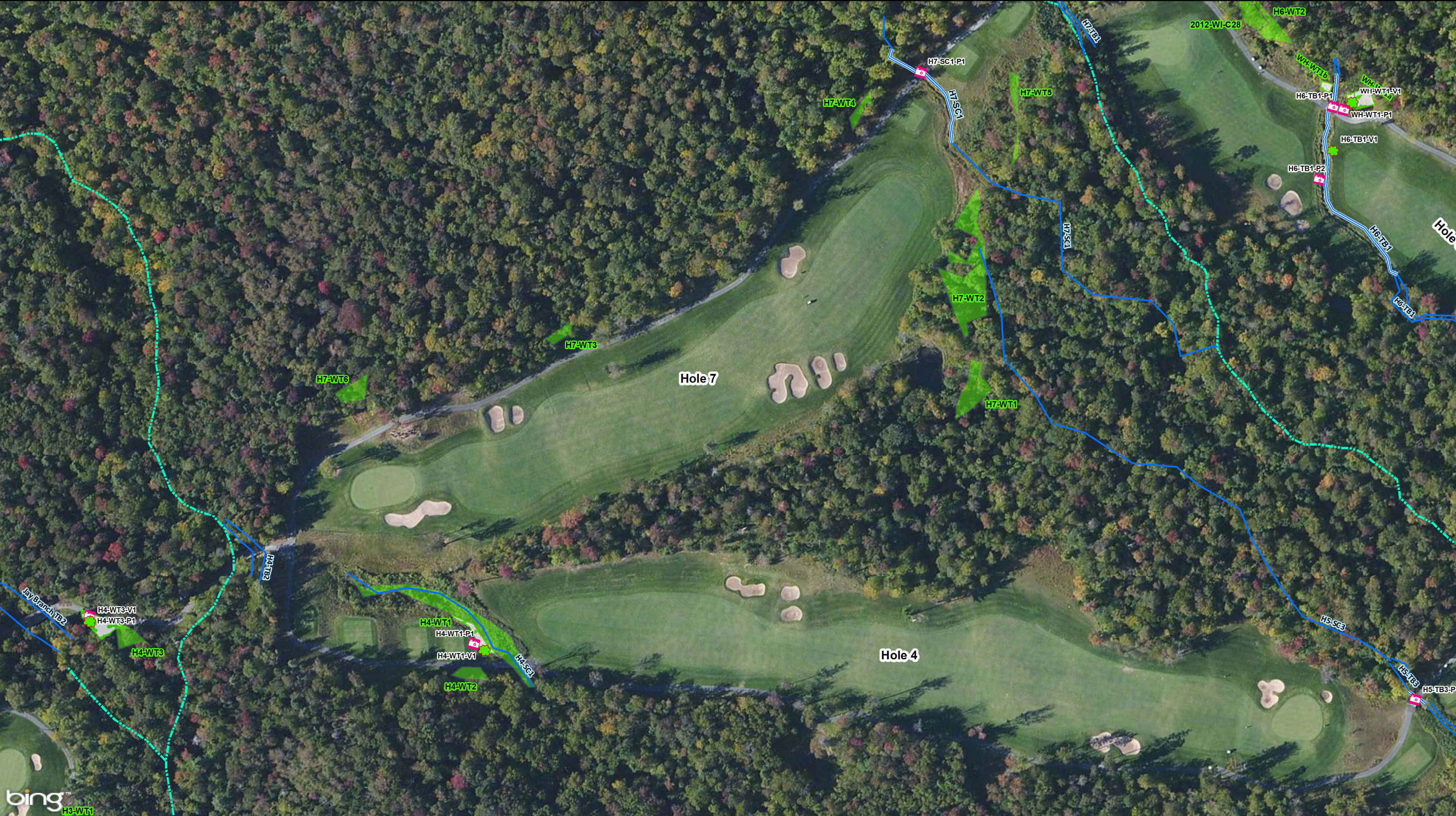
Golf Course Investigation Area

Jay Peak Resort Golf Course
Jay, Vermont
Site Location Map
 December 15, 2014

Feet

Sources: USGS Topos from NGS (2013)
 Investigation area digitized by VHB (2008).

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Legend

Permanent Monitoring Points

Wetland Data Plot

Vegetation Plot

Photo Point

Wetland Restoration/ Creation

Stream Channel Restoration

VHB Wetlands (2008-2012)

VHB Streams (2008-2012)

Stream (VHD)

New Culvert

Remaining Culvert

Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont

Golf Course Mitigation Monitoring

Map 2 of 7

October 27, 2014

150

75

0

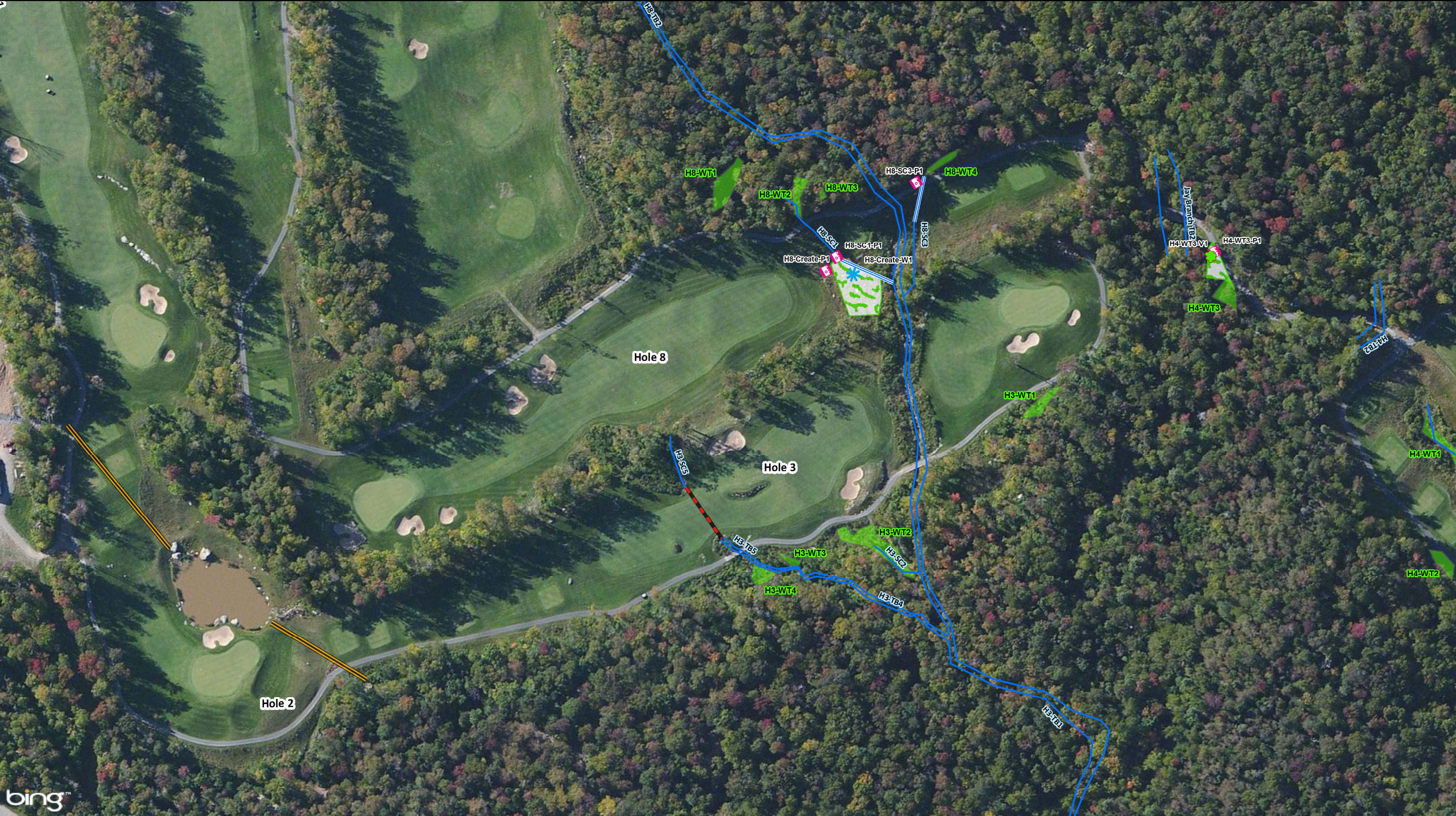
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Feet

Sources: Background: Ortho from Bing (2014);
VHD Streams provided by VCGI (2010); Wetlands,
Culverts and Stream Features field- delineated by
VHB (2008-2012); Restoration Areas GPS'd by
VHB (2009-2010); Permanent wetland data,
vegetation and photograph monitoring points
established and GPS'd by VHB (2011).

Prepared by: PBW

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Legend

Permanent Monitoring Points

Wetland Data Plot

Vegetation Plot

Photo Point

Wetland Restoration/ Creation

Stream Channel Restoration

VHB Wetlands (2008-2012)

VHB Streams (2008-2012)

Stream (VHD)

Culverts

New Culvert

Remaining Culvert

Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring

Map 3 of 7

October 27, 2014

150750150

Feet

Sources: Background: Ortho from Bing (2014);
VHD Streams provided by VCGI (2010); Wetlands,
Culverts and Stream Features field- delineated by
VHB (2008-2012); Restoration Areas GPS'd by
VHB (2009-2010); Permanent wetland data,
vegetation and photograph monitoring points
established and GPS'd by VHB (2011).

Prepared by: PBW

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Legend
Permanent Monitoring Points
Wetland Data Plot
Vegetation Plot
Photo Point

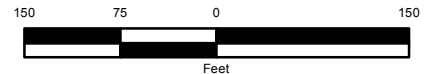
Wetland Restoration/Creation
 Stream Channel Restoration
 VHB Wetlands (2008-2012)
 VHB Streams (2008-2012)
 Stream (VHD)

Culverts
 New Culvert
 Remaining Culvert
 Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring

Map 4 of 7

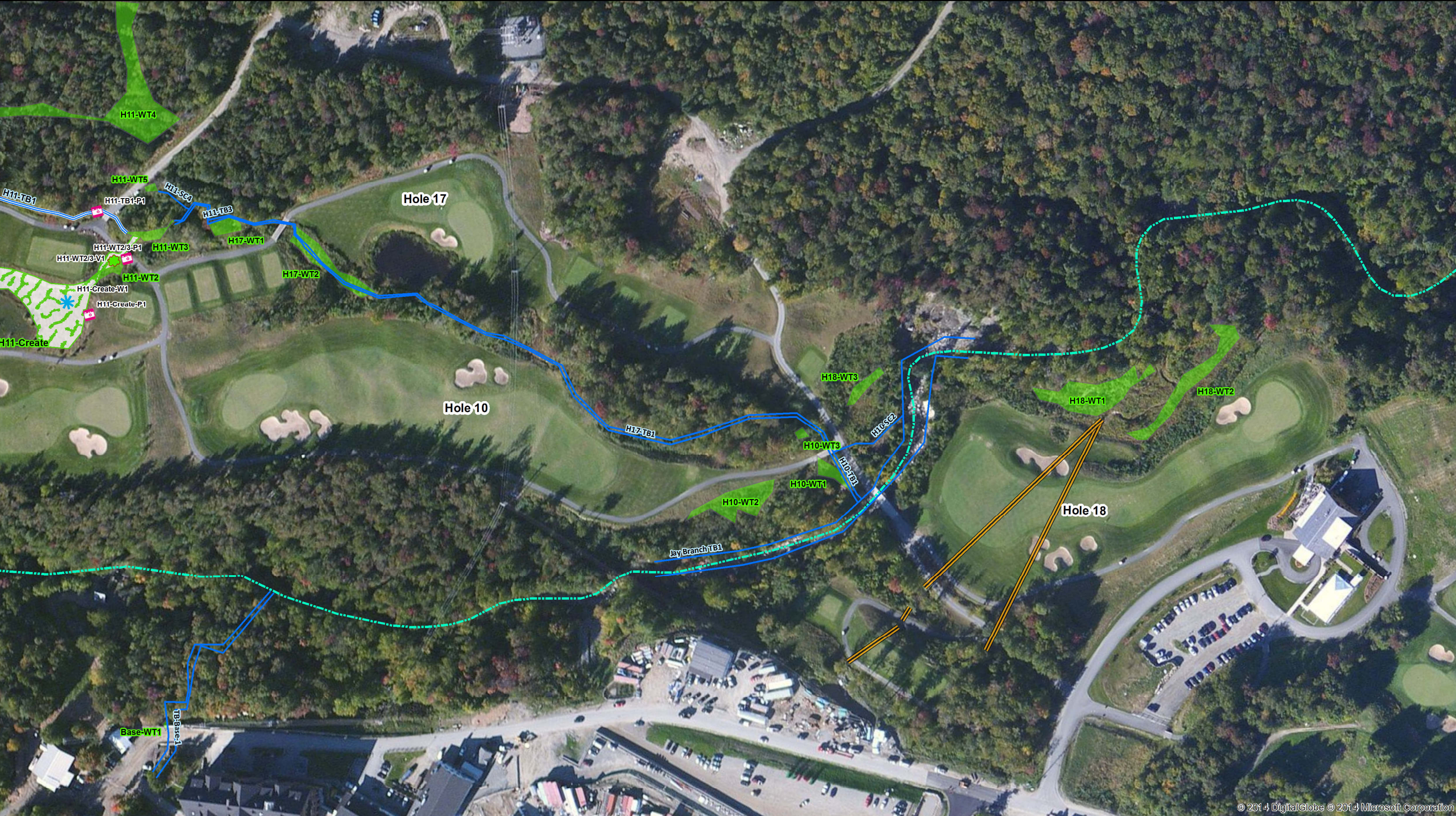
October 27, 2014



Prepared by: PBW

Sources: Background: Ortho from Bing (2014);
VHD Streams provided by VCGI (2010); Wetlands,
Culverts and Stream Features field-delineated by
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Legend
Permanent Monitoring Points
Wetland Data Plot
Vegetation Plot
Photo Point

Wetland Restoration/Creation
 Stream Channel Restoration
 VHB Wetlands (2008-2012)
 VHB Streams (2008-2012)
 Stream (VHD)

Culverts
 New Culvert
 Remaining Culvert
 Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 5 of 7
October 27, 2014

Prepared by: PBW

Sources: Background: Ortho from Bing (2014);
VHD Streams provided by VCGI (2010); Wetlands,
Culverts and Stream Features field-delineated by
VHB (2008-2012); Restoration Areas GPS'd by
VHB (2009-2010); Permanent wetland data,
vegetation and photograph monitoring points
established and GPS'd by VHB (2011).

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| Scientific Name ^{1,2} | Common Name | Indicator Status ³ | VHB Mitigation Monitoring Map 1 of 7 ⁵ | | | | | | | | | Map 2 of 7 | | Map 3 of 7 | Map 4 of 7 | | Map 5 of 7 | Map 6 of 7 | | | | | | | | | | Map 7 of 7 | | | | | | | | |
|---|------------------------|-------------------------------|---|--------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-------------|------------|--------------|------------|--------------------|---------------------|--------------|------------|---------------|---------------|------------|------------|-------------|---------------------|---------------|---------------|---------------|------------|-------------------|------------|------------|------------|--------------|-------------|------------|---------|
| | | | H5-TB1 | H5-Create | | | H6-WT1 | | WH-WT1 | H6-TB1 | WH-WT2 | H4-WT1 | H4-WT3 | H8-Create | H1-WT1 | P2-TB1 | H11-WT2/3 | H11-TB2 | H11-Create | | H11-WT6 | | H12-TB1u | H16-WT1/ H11-WT1 | H16-Create | | | H16-SC1 | H13-WT1/1a/ 1b | H13-WT2 | | H13-WT3 | H14-WT2/3 | H14-WT1 | H15-WT1 | |
| | | | Stream | Wetland | | Wetland | | Wetland | Stream | Wetland | Wetland | Wetland | Wetland | Wetland | Wetland | Stream | Wetland | Stream | Wetland | | Wetland | | Stream | Wetland | Wetland | | | Stream | Wetland | Wetland | | Wetland | Wetland | Wetland | Wetland | Wetland |
| | | | H5-TB1-V1 ⁶ | H5-Create-V1 | H5-Create-W1 ⁶ | H6-WT1-V1 | H6-WT1-W1 | WH-WT1-V1 | H6-TB1-V1 | WH-WT2-V1 | H4-WT1/2-V1 | H4-WT3-V1 | H8-Create-W1 | H1-WT1-V1 | P2-TB1 (in GC) -V1 | P2-TB1 (off GC) -V1 | H11-WT2/3-V1 | H11-TB2-V1 | H11-Create-W1 | H11-Create-V1 | H11-WT6-W1 | H11-WT6-V1 | H12-TB1u-V1 | H16-WT1/H11-WT1 | H16-Create-W1 | H16-Create-V1 | H16-Create-V2 | H16-SC1-V1 | H13-WT1/1a/1b-W1 | H13-WT2-V1 | H13-WT2-V2 | H13-WT3-V1 | H14-WT2/3-W1 | H14-WT1d-V1 | H15-WT1-W1 | |
| APPROXIMATE COVERAGE WITHIN VEGETATION MONITORING AND WETLAND DATA PLOTS ⁴ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ageratina altissima (L.) King & H.E. Robins. | white snakeroot | FACU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | | 1 | |
| Anaphalis margaritacea (L.) Benth. | pearly everlasting | FACU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | |
| Asclepias incarnata L. | swamp milkweed | OBL | | 1 | | | 1 | 3 | 1 | | | | | | | | | | | | | | | | | | 3 | | | | | | | | 3 | |
| Calamagrostis canadensis (Michx.) Beauv. | bluejoint | OBL | | | | 38 | | | | | | | | | | | 15 | | | | | | | | | | | 3 | | | | | | | | |
| Carex comosa Boott | longhair sedge | OBL | | 1 | | | | 15 | | 3 | 3 | | 3 | 1 | 15 | | | | | | | 38 | | | | | | | | | | | | | | |
| Carex crinita Lam. | fringed sedge | OBL | 15 | | | 3 | | | | | 15 | 63 | | | | | | | | 15 | 3 | 15 | | | | 3 | 15 | | | 15 | 3 | 3 | | | 15 | |
| Carex lurida Wahlenb. | shallow sedge | OBL | | 3 | | 3 | 15 | 15 | | | 3 | | 3 | | | 15 | 15 | | | | 38 | 15 | 3 | | | | | 15 | 15 | | | 3 | 15 | 38 | | |
| Carex scoparia Schkuhr ex Willd. | broom sedge | FACW | | 1 | 3 | 3 | | 15 | | | 3 | | 3 | | | 3 | | | | 15 | 3 | 38 | | | | 38 | 3 | 15 | 15 | | | 3 | 15 | | | |
| Carex vulpinoidea Michx. | fox sedge | OBL | 38 | 3 | 15 | 15 | 38 | | 38 | 15 | | | 15 | 38 | | | 38 | 15 | | 15 | | 15 | 15 | 38 | 38 | 15 | | | | | | 63 | 3 | | | |
| Chelone glabra L. | white turtlehead | OBL | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | 3 | | | | |
| Dactylis glomerata L. | orchardgrass | FACU | | | | | | | | | | | | | 38 | | | | | | | | | | | | | | | | | | | | | |
| Digitaria ischaemum (Schreb.) Schreb. ex Muhl. | smooth crabgrass | FACU | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Eleocharis obtusa (Willd.) J.A. Schultes | blunt spikerush | OBL | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | | | |
| Elymus virginicus L. | Virginia wildrye | FACW | | | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | |
| Equisetum arvense L. | field horsetail | FAC | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Epilobium coloratum Biehler | purpleleaf willowherb | OBL | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | 3 | 3 | | | |
| Eupatorium perfoliatum L. | common boneset | FACW | 15 | 3 | 15 | 15 | 15 | 3 | 3 | 3 | 3 | | 3 | 3 | 15 | | 15 | 15 | 38 | 15 | 15 | 15 | | 15 | 38 | 15 | 3 | 15 | 15 | 15 | | 3 | 3 | 3 | | |
| Euthamia graminifolia (L.) Nutt. | flat-top goldentop | FAC | 3 | | | 1 | | | 3 | | 1 | | | 15 | 1 | | | 15 | 3 | | | | | 3 | | | | | 3 | | | | | | | |
| Eutrochium maculatum (L.) E.E. Lamont | spotted joepyeweed | OBL | | 1 | | 1 | 3 | 3 | 3 | | 3 | 1 | | 1 | | | 3 | 3 | | | 3 | 3 | 3 | 3 | | 3 | 1 | 1 | 3 | 1 | 3 | 15 | 3 | 1 | 15 | |
| Festuca rubra L. | red fescue | FACU | | | | | | | | | | | | | | 1 | | 3 | | | | | | | | | | | | | 1 | | | | | |
| Fragaria virginiana Duchesne | Virginia strawberry | FACU | | | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | |
| Galium mollugo | false baby's breath | FACU | | | | | | | | | | | | 1 | | | 3 | | | | | | | | | | | | | | | | | | | |
| Galium palustre L. | common marsh bedstraw | OBL | | | | | | | | 3 | | | | | | | | 1 | | | | | | 3 | | | | | | | | | | | | |
| Glyceria canadensis (Michx.) Trin. | rattlesnake mannagrass | OBL | | | | | | | | | 3 | | | | | | | | | | | | | | | | 3 | | | | | | | | | |
| Glyceria grandis S. Wats. | American mannagrass | OBL | | 3 | | | | | | | | | | | | | | | | | | | | | | | 38 | 38 | | 15 | | | | | | |
| Glyceria melicaria (Michx.) F.T. Hubbard | melic mannagrass | OBL | | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | |
| Glyceria striata (Lam.) A.S. Hitchc. | fowl mannagrass | OBL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Helonias bullata L. | swamppink | OBL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hypericum perforatum L. | common St. Johnswort | UPL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Impatiens capensis Meerb. | jewelweed | FACW | | | | | | | | 3 | | | | | | 38 | 15 | | | | | | | | 15 | | | 15 | | | | | | 3 | | |
| Juncus effusus L. | common rush | OBL | 15 | 38 | 15 | 15 | 15 | 15 | 3 | 15 | | | 38 | | 38 | | 3 | 3 | | 38 | | 15 | | 38 | 15 | 38 | 38 | 15 | 15 | | 3 | | 15 | 38 | | |
| Juncus tenuis Willd. | poverty rush | FAC | | | | | | | 15 | 15 | | | | 3 | | | | | | | 1 | | 3 | | | | | | | | 3 | | | | | |
| Leersia oryzoides (L.) Sw. | rice cutgrass | OBL | | | | | | | | | | | | | | | | | | | | | | | | | | | 15 | | | | | | | |



| Scientific Name ^{1,2} | Common Name | Indicator Status ³ | VHB Mitigation Monitoring Map 1 of 7 ⁵ | | | | | | | | | Map 2 of 7 | | Map 3 of 7 | Map 4 of 7 | | Map 5 of 7 | Map 6 of 7 | | | | | | | | | | Map 7 of 7 | | | | | | | | |
|---|--------------------------|-------------------------------|---|--------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-------------|------------|--------------|------------|--------------------|---------------------|--------------------|--------------|---------------|---------------|---------------|------------|-------------|---------------------|---------------------|---------------|---------------|---------------|------------------|-------------------|------------|------------|--------------|-------------|------------|---------|
| | | | H5-TB1 | H5-Create | | | H6-WT1 | | WH-WT1 | H6-TB1 | WH-WT2 | H4-WT1 | H4-WT3 | H8-Create | H1-WT1 | P2-TB1 | | H11-WT2/3 | H11-TB2 | H11-Create | | H11-WT6 | | H12-TB1u | H16-WT1/ H11-WT1 | H16-Create | | | H16-SC1 | H13-WT1/1a/ 1b | H13-WT2 | | H13-WT3 | H14-WT2/3 | H14-WT1 | H15-WT1 |
| | | | Stream | Wetland | | | Wetland | | Wetland | Stream | Wetland | Wetland | Wetland | Wetland | Wetland | Stream | P2-TB1 (in GC) -V1 | H11-WT2/3-V1 | H11-TB2-V1 | H11-Create-W1 | H11-Create-V1 | H11-WT6-W1 | H11-WT6-V1 | H12-TB1u-V1 | H16-WT1/ H11-VT1 | H16-Create-W1 | H16-Create-V1 | H16-Create-V2 | H16-SC1-V1 | Wetland | Wetland | | Wetland | Wetland | Wetland | Wetland |
| | | | H5-TB1-V1 ⁶ | H5-Create-V1 | H5-Create-W1 ⁶ | H6-WT1-V1 | H6-WT1-W1 | WH-WT1-V1 | H6-TB1-V1 | WH-WT2-V1 | H4-WT1/2-V1 | H4-WT3-V1 | H8-Create-W1 | H1-WT1-V1 | P2-TB1 (in GC) -V1 | P2-TB1 (off GC) -V1 | H11-WT2/3-V1 | H11-TB2-V1 | H11-Create-W1 | H11-Create-V1 | H11-WT6-W1 | H11-WT6-V1 | H12-TB1u-V1 | H16-WT1/ H11-VT1 | H16-Create-W1 | H16-Create-V1 | H16-Create-V2 | H16-SC1-V1 | H13-WT1/1a/1b-W1 | H13-WT2-V1 | H13-WT2-V2 | H13-WT3-V1 | H14-WT2/3-W1 | H14-WT1d-V1 | H15-WT1-W1 | |
| APPROXIMATE COVERAGE WITHIN VEGETATION MONITORING AND WETLAND DATA PLOTS ⁴ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leucanthemum vulgare Lam. | oxeye daisy | FACU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lotus corniculatus L. | Bird's-foot trefoil | FACU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lycopus americanus Muhl. ex W. Bart. | American water horehound | OBL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lycopus uniflorus Michx. | northern bugleweed | OBL | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mimulus ringens L. | Allegheny monkeyflower | OBL | 3 | | 3 | | 1 | 1 | 3 | 1 | | 38 | | | | 1 | | 38 | | | | 3 | 3 | | | | | | | | | 3 | 1 | | | |
| Onoclea sensibilis L. | sensitive fern | FACW | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phalaris arundinacea L. | reed canarygrass | FACW | | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | |
| Poa compressa L. | Canada bluegrass | FACU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Polygonum sagittatum L. | arrowleaf tearthumb | OBL | | | | | | | | 3 | | 15 | | | | 1 | | | | | | | | | | | | | | | | | | | | |
| Potentilla simplex Michx. | common cinquefoil | FACU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Prenanthes altissima L. | tall rattlesnakeroot | FACU | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | |
| Ranunculus acris L. | tall buttercup | FAC | | | | | | | | | | | | | | 1 | | 1 | | | | | | | | | | | | | | | | | | |
| Schoenoplectus tabernaemontani (K.C. Gmel.) Palla | softstem bulrush | OBL | | 1 | | | | 38 | | | | | | | | | | | | | | | | | | 1 | | | | 15 | | 15 | | | | |
| Scirpus atrovirens Willd. | green bulrush | OBL | | 3 | | 1 | 3 | 1 | | 1 | | | | | 1 | 1 | | | | 1 | | | 3 | 3 | | 3 | | | 3 | | 3 | 38 | | 3 | | |
| Scirpus cyperinus (L.) Kunth | woolgrass | OBL | | 3 | | 3 | 3 | | | 15 | 15 | 15 | 3 | | | | | | | | 3 | | | | | | | | 15 | 3 | | | 1 | | | |
| Solidago altissima L. | tall goldenrod | FACU | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | |
| Solidago gigantea | giant goldenrod | FACW | | | | | 3 | | | | | 3 | 15 | 15 | | 3 | | | | | | | | | | 38 | | | | | | | | | | |
| Solidago rugosa P. Mill. | wrinkleleaf goldenrod | FAC | | | | | | | | | 15 | 3 | 3 | | | | | | | 38 | 3 | | | | | 3 | | | 3 | | | 15 | | | | |
| Symphyotrichum novae-angliae (L.) Nesom | New England aster | FACW | | | 1 | 3 | 3 | | 15 | | 15 | 15 | | 38 | 15 | 3 | 38 | 15 | | | | | | 15 | 3 | | | | | | | 1 | 1 | | | |
| Thelypteris palustris Schott | eastern marsh fern | FACW | 1 | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | | | | | |
| Trifolium pratense L. | red clover | FACU | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | | | |
| Trifolium repens L. | white clover | FACU | | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | | | | |
| Typha angustifolia L. | narrowleaf cattail | OBL | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Typha latifolia L. | broadleaf cattail | OBL | | | | | | 3 | | 15 | 38 | | | | | | | | | | | | | | | | | | | | 3 | | | | | |
| Verbena hastata L. | swamp verbena | FACW | 1 | 3 | 3 | 1 | | | | 1 | 3 | | 15 | 15 | 1 | | 15 | | 15 | 15 | 15 | | 15 | | 3 | 3 | 3 | 15 | | 3 | | 3 | | 1 | | |
| Vicia sativa L. | garden vetch | FACU | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | |
| Viola sororia Willd. | common blue violet | FAC | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | |
| % Cover/Sampling Plot ⁴ | | | 106 | 79 | 56 | 117 | 100 | 112 | 84 | 93 | 120 | 98 | 136 | 97 | 127 | 96 | 116 | 106 | 105 | 124 | 87 | 96 | 122 | 121 | 100 | 131 | 111 | 105 | 111 | 108 | 98 | 61 | 119 | 103 | 79 | |
| Average % Cover/ Feature | | | 106 | 68 | | 109 | | 112 | 84 | 93 | 120 | 98 | 136 | 97 | 112 | | 116 | 106 | 115 | | 92 | | 122 | 121 | 114 | | | 105 | 111 | 103 | | 61 | 119 | 103 | 79 | |
| Total Average % Cover for All Mitigation Wetlands: | | | 103 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Average % Cover for Restored Stream Floodplains: | | | 106 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL Average % Herbaceous Cover: | | | 104 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Notes:
¹Species nomenclature follows the USDA Plants Database (USDA - NRCS 2015)
²Species identification follows Haines, Arthur. 2011. *Flora Novae Angliae: A Manual for the Identificaion of Native and Naturalized Higher Vascular Plants of New England* . New England Wildflower Society.
³Indicator status follows: 2014 *National Wetland Plant List* (Lichvar, R.W., M. Bufferwick, N.C. Melvin, and W.N. Kirchner. 2014. *The National Wetland Plant List: 2014 Update of Wetland Ratings*. Phytoneuron 2014-41: 1-42.
⁴Cover class percentages from visual assessment of 1m² quadrats (including those within wetland data plots) and represents approximate coverage within the quadrat. Approximate mid-point cover classes have been used to report data.
⁵Mapping refers to Jay Peak Resort Golf Course Mitigation Monitoring Set, prepared by VHB, and dated **December 4, 2015**
⁶Plot names including "V" refer to 1m2 plots used to assess herbaceous vegetation only; plot names including "W" refer to data from wetland data plots.
⁷Italics indicate invasive species per the Vermont Class A or B Noxious Weed list (Quarantine #3-Noxious Weeds) (2012) or Vermont Invasive Species Watch List (2005).

**Jay Peak Resort Golf Course Mitigation
Year Five (2015) Mitigation Monitoring Report**

Woody Stem Survival Assessment Based on 0.02-acre (5-meter radius) Permanent Vegetation Monitoring Plots and Wetland Data Plots

December 28, 2015

| Mitigation Feature | Feature Type | Mitigation Feature Size (acres) | Mitigation Feature Plot | Planted Shrubs within 0.02-acre (5m-radius) Plots | Total Found Planted Shrubs Within Feature | Total Shrubs Planted ¹ | Approximate Survival Rate of Shrubs/ Feature (%) |
|--------------------------------------|--------------|---|-------------------------|---|---|-----------------------------------|--|
| H6-WT1 | WETLANDS | 0.31 | H6-WT1-V1 | 6 | 100 | 150 | 67% |
| | | | H6-WT1-W1 | 7 | | | |
| WH-WT2 | | 0.10 | WH-WT2-V1 | 4 | 20 | 20 | 98% |
| WH-WT1 | | | 0.03 | WH-WT1-V1 | 14 | 23 | 35 |
| H5-Create | | 0.24 | | H5-Create-V1 | 10 | 116 | 152 |
| | | | H5-Create-W1 | 9 | | | |
| H14-WT2/3 | | 0.05 | H14-WT2/4-W1 | 12 | 32 | 46 | 69% |
| H14-WT1 | | 0.07 | H14-WT1-V1 | 2 | 7 | 8 | 93% |
| H16-WT1/Create/ H11-WT1 ² | | 0.66 | H16-WT1/H11-WT1-V1 | 4 | 107 | 150 | 71% |
| | | | H16-Create-W1 | 3 | | | |
| | | | H16-Create-V1 | 4 | | | |
| | | | H16-Create-V2 | 2 | | | |
| H1-WT1 | | 0.06 | H1-WT1-V1 | 9 | 25 | 37 | 69% |
| H11-WT6 | | 0.09 | H11-WT6-V1 | 7 | 30 | 41 | 74% |
| | | | H11-WT6-W1 | 7 | | | |
| H11-WT2/3 | | 0.03 | H11-WT2/3-V1 | 12 | 16 | 25 | 63% |
| H11-Create | | 0.36 | H11-Create-W1 | 7 | 135 | 185 | 73% |
| | | | H11-Create-V1 | 8 | | | |
| H4-WT1/2 | | 0.02 | H4-WT1/2-V1 | 8 | 8 | 10 | 75% |
| H4-WT3 | | 0.04 | H4-WT3-V1 | 5 | 9 | 10 | 89% |
| H8-Create | | 0.13 | H8-Create-W1 | 4 | 26 | 30 | 85% |
| H13-WT1/1a/1b | | 0.06 | H13-WT1/1a/1b-W1 | 5 | 14 | 16 | 87% |
| H13-WT2 | | 0.18 | H13-WT2-V1 | 3 | 31 | 45 | 69% |
| | | | H13-WT2-V2 | 4 | | | |
| H13-WT3 | | 0.01 | H13-WT3-V1 | 12 | 15 | 16 | 94% |
| H15-WT1 | | 0.03 | H15-WT1-W1 | 11 | 23 | 25 | 92% |
| H6-TB1 | STREAMS | 0.26 | H6-TB1-V1 | 5 | 65 | 75 | 86% |
| H5-TB1 | | 0.17 | H5-TB1-V1 | 9 | 75 | 81 | 92% |
| H16-SC1 | | 0.18 | H16-SC1-V1 | 4 | 35 | 55 | 64% |
| H11-TB2 | | 0.19 | H11-TB2-V1 | 6 | 56 | 80 | 70% |
| H12-TB1u | | 0.15 | H12-TB1u-V1 | 6 | 44 | 45 | 97% |
| P2-TB1 | | 0.25 | P2-TB1-V1 | 4 | 50 | 54 | 92% |
| | | | P2-TB1-V2 | 4 | | | |
| | | AVERAGE SURVIVAL RATE OF PLANTED SHRUBS WITHIN WETLANDS: | | | | | 78% |
| | | AVERAGE SURVIVAL RATE OF PLANTED SHRUBS WITHIN RESTORED STREAM FLOODPLAINS: | | | | | 83% |
| | | TOTAL AVERAGE SURVIVAL RATE OF PLANTED SHRUBS: | | | | | 80% |

¹Total plantings as reported in the *Post Construction Report - Wetland/Stream Restoration - Jay Peak Golf Course*, by New England Environmental, Inc. (NEE), dated August 23, 2010; this assessment of planted shrub survival includes those shrubs planted for wetland and stream enhancement (winterberry holly (*Ilex verticillata*), elderberry (*Sambucus canadensis*), American cranberry (*Viburnum trilobum*), and red-osier dogwood (*Cornus sericea*)), but does not include the additional *Salix* sp. and *Cornus* sp. tubelings planted as part of the streambank stabilization plan.

²The shrub planting summary provided by NEE combined the wetlands areas H16-WT1/H11-WT1 and H16-Create, although for permitting purposes these were considered separate features.



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

H5-Create

| | | | | | |
|--|------------------------------------|---------------------------------------|----------------|-----------------|---------------|
| Project Site: | JPR Golf Course Wetland Mitigation | City/County: | Jay/Orleans | Samp. Date: | 8/13/2015 |
| Applicant/Owner: | Jay Peak Resort | State: | VERMONT | Sampling Point: | H5-Create |
| Investigator(s): | O. McEnroe | Section, Township, Range: | Jay | | |
| Landform (hillslope, terrace, etc.): | Terrace | Local relief (concave, convex, none): | Concave | Slope (%): | |
| Subregion (LRR or MLRA): | LRR | Lat: | 44°56'32.632"N | Long: | 72°29'0.229"W |
| Soil Map Unit: | Cabot | Datum: | NAD 83 | NWI Class: | PEM |
| Are climatic/hydrologic conditions on the site typical for this time of year? YES (If no, explain in Remarks.) | | | | | |
| Are Vegetation, Soil, or Hydrology significantly disturbed? NO Normal Circumstances? YES | | | | | |
| Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.) | | | | | |

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

| | | |
|---------------------------------|-----|---|
| Hydrophytic Vegetation Present? | YES | Is This Sample Area Within a Wetland? YES |
| Hydric Soil Present? | YES | |
| Wetland Hydrology Present? | YES | |
| Remarks: | | |

HYDROLOGY

| | | | |
|--|--|--|--|
| Wetland Hydrology Indicators: | | Secondary Indicators (minimum of two required) | |
| Primary Indicators (minimum of one is required; check all that apply) | | | |
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Water-Stained Leaves (B9) | <input type="checkbox"/> Surface Soil Cracks (B6) | |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Fauna (B13) | <input type="checkbox"/> Drainage Patterns (B10) | |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Marl Deposits (B13) | <input type="checkbox"/> Moss Trim Lines (B16) | |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Dry-Season Water Table (C2) | |
| <input type="checkbox"/> Sediment Deposits (B2) | <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) | <input type="checkbox"/> Crayfish Burrows (C8) | |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial (C9) | |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) | <input type="checkbox"/> Stunted or Stressed Plants (D1) | |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) | |
| <input type="checkbox"/> Inundation Visible on Aerial (B7) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> Shallow Aquitard (D3) | |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | | <input type="checkbox"/> Microtopographic Relief (D4) | |
| | | <input type="checkbox"/> FAC-Neutral Test (D5) | |
| Field Observations: | | | |
| Surface Water Present? | Depth (inches): | Wetland Hydrology Present? YES | |
| Water Table Present? | Depth (inches): Surface | | |
| Saturation Present? | Depth (inches): Surface | | |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: | | | |
| 1.3" in the last 5 days at Jay Peak (NOAA) | | | |
| Remarks: | | | |

SOIL

| | | | | | | | | |
|---|---------------|----|--|--|-------------------|------------------|--|---------------------------|
| Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) | | | | | | | | |
| Depth | Matrix | | Redox Features | | | | Texture | Remarks |
| (in) | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | | |
| 0-3 | 5Y 3/1 | 98 | 7.5YR 4/6 | 2 | C | M, PL | SANDY LOAM VERY FINE SANDY | Redox - Common, Prominent |
| 3-8 | 2.5Y 4/3 | 90 | 7.5YR 4/6 | 10 | C | M | LOAM | Redox - Common, Prominent |
| 8-12+ | 2.5Y 4/1 | 98 | 10YR 3/6 | 2 | C | M | VERY FINE SANDY LOAM | Redox - Common, Prominent |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| ¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. | | | | | | | ² Location: PL=Pore Lining, M=Matrix. | |
| Hydric Soil Indicators: | | | Indicators for Problematic Hydric Soils ³ : | | | | | |
| <input type="checkbox"/> Histosol (A1) | | | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR R, MLRA 149B) | <input type="checkbox"/> 2 cm Muck (A10) (LRR K, L, MLRA 149B) | | | | |
| <input type="checkbox"/> Histic Epipedon (A2) | | | <input type="checkbox"/> Thin Dark Surface (S9) (LRR R, MLRA 149B) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) | | | | |
| <input type="checkbox"/> Black Histic (A3) | | | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR K, L) | <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) | | | | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | | | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> Dark Surface (S9) (LRR K, L, M) | | | | |
| <input type="checkbox"/> Stratified Layers (A5) | | | <input checked="" type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR K, L) | | | | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | | | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Thin Dark Surface (S9) (LRR K, L) | | | | |
| <input type="checkbox"/> Thick Dark Surface (A12) | | | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) | | | | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | | | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149B) | | | | |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | | | | <input type="checkbox"/> Mesic Spodic (TA6) (MLRA 144A, 145, 149B) | | | | |
| <input type="checkbox"/> Sandy Redox (S5) | | | | <input type="checkbox"/> Red Parent Material (F21) | | | | |
| <input type="checkbox"/> Stripped Matrix (S6) | | | | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | | | | |
| <input type="checkbox"/> Dark Surface (S7) (LRR R, MLRA 149B) | | | | <input type="checkbox"/> Other (Explain in Remarks) | | | | |
| ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. | | | | | | | | |
| Restrictive Layer (if observed): | | | | | | | Hydric Soil Present? YES | |
| Type: | | | | | | | | |
| Depth (inches): | | | | | | | | |
| Remarks: | | | | | | | | |

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dom. Sp? | Indicator Status | |
|--|------------------------------------|------------------|---------------|------------------|--|
| 1. | | | | | Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>4</u> (A) # Dominants across all strata: <u>4</u> (B) % Dominants OBL, FACW, FAC: <u>100%</u> (A/B) |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | | = Total Cover | | Prevalence Index Worksheet: Total % Cover of: Multiply By: OBL <u>34</u> x 1 = <u>34</u> FACW <u>37</u> x 2 = <u>74</u> FAC _____ x 3 = _____ FACU _____ x 4 = _____ UPL _____ x 5 = _____ Sum: <u>71</u> (A) <u>108</u> (B) Prevalence Index = B/A = <u>1.52</u> |
| Sapling Stratum (Plot size: _____) | | | | | |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | | = Total Cover | | Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is <= 3.0 <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (explain) <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> Morphological Adaptations <small>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</small> |
| Shrub Stratum (Plot size: <u>15' RAD</u>) | | | | | |
| 1. | <u>Cornus alba</u> | <u>15</u> | <u>X</u> | <u>FACW</u> | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | <u>15</u> | = Total Cover | | Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height. Hydrophytic Vegetation Present? <u>YES</u> |
| Herb Stratum (Plot size: <u>5' RAD</u>) | | | | | |
| 1. | <u>Juncus effusus</u> | <u>15</u> | <u>X</u> | <u>OBL</u> | |
| 2. | <u>Carex vulpinoidea</u> | <u>15</u> | <u>X</u> | <u>OBL</u> | |
| 3. | <u>Eupatorium perfoliatum</u> | <u>15</u> | <u>X</u> | <u>FACW</u> | |
| 4. | <u>Verbena hastata</u> | <u>3</u> | | <u>FACW</u> | |
| 5. | <u>Mimulus ringens</u> | <u>3</u> | | <u>OBL</u> | |
| 6. | <u>Carex scoparia</u> | <u>3</u> | | <u>FACW</u> | |
| 7. | <u>Lycopus uniflorus</u> | <u>1</u> | | <u>OBL</u> | |
| 8. | <u>Symphotrichum novae-angliae</u> | <u>1</u> | | <u>FACW</u> | |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |
| | | <u>56</u> | = Total Cover | | |
| Woody Vines (Plot size: _____) | | | | | |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| | | | = Total Cover | | |

Remarks: (If observed, list morphological adaptations below).



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

H6-WT1

| | | | | | | | | |
|---|---|--|---------------------------------------|-----------------------|--|-----------------|----------------------|--|
| Project Site: | JPR Golf Course Wetland Mitigation | | City/County: | Jay/Orleans | | Samp. Date: | 8/14/2015 | |
| Applicant/Owner: | Jay Peak Resort | | State: | VERMONT | | Sampling Point: | H6-WT1 | |
| Investigator(s): | P. Werts-Kallfelz | | Section, Township, Range: | Jay | | | | |
| Landform (hillslope, terrace, etc.): | Terrace | | Local relief (concave, convex, none): | Concave | | Slope (%): | | |
| Subregion (LRR or MLRA): | LRR | | Lat: | 44°56'40.729"N | | Long: | 72°29'7.534"W | |
| Soil Map Unit: | Cabot | | Datum: | NAD 83 | | NWI Class: | PEM | |
| Are climatic/hydrologic conditions on the site typical for this time of year? | | | YES | | (If no, explain in Remarks.) | | | |
| Are Vegetation, Soil, or Hydrology significantly disturbed? | | | NO | | Normal Circumstances? YES | | | |
| Are Vegetation, Soil, or Hydrology naturally problematic? | | | NO | | (If needed, explain any answers in Remarks.) | | | |

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

| | | |
|---------------------------------|------------|--|
| Hydrophytic Vegetation Present? | YES | Is This Sample Area Within a Wetland? YES |
| Hydric Soil Present? | YES | |
| Wetland Hydrology Present? | YES | |
| Remarks: | | |

HYDROLOGY

| | | | | | |
|--|----------|---|----------------|--|------------|
| Wetland Hydrology Indicators: | | | | Secondary Indicators (minimum of two required) | |
| Primary Indicators (minimum of one is required; check all that apply) | | | | | |
| <input checked="" type="checkbox"/> Surface Water (A1) | | <input type="checkbox"/> Water-Stained Leaves (B9) | | <input type="checkbox"/> Surface Soil Cracks (B6) | |
| <input checked="" type="checkbox"/> High Water Table (A2) | | <input type="checkbox"/> Aquatic Fauna (B13) | | <input type="checkbox"/> Drainage Patterns (B10) | |
| <input checked="" type="checkbox"/> Saturation (A3) | | <input type="checkbox"/> Marl Deposits (B13) | | <input type="checkbox"/> Moss Trim Lines (B16) | |
| <input type="checkbox"/> Water Marks (B1) | | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | | <input type="checkbox"/> Dry-Season Water Table (C2) | |
| <input type="checkbox"/> Sediment Deposits (B2) | | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) | | <input type="checkbox"/> Crayfish Burrows (C8) | |
| <input type="checkbox"/> Drift Deposits (B3) | | <input type="checkbox"/> Presence of Reduced Iron (C4) | | <input type="checkbox"/> Saturation Visible on Aerial (C9) | |
| <input type="checkbox"/> Algal Mat or Crust (B4) | | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) | | <input type="checkbox"/> Stunted or Stressed Plants (D1) | |
| <input type="checkbox"/> Iron Deposits (B5) | | <input type="checkbox"/> Thin Muck Surface (C7) | | <input type="checkbox"/> Geomorphic Position (D2) | |
| | | small pockets of standing water (1- | | <input type="checkbox"/> Shallow Aquitard (D3) | |
| <input type="checkbox"/> Inundation Visible on Aerial (B7) | | Other (Explain in Remarks) | | <input type="checkbox"/> Microtopographic Relief (D4) | |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | | | | <input type="checkbox"/> FAC-Neutral Test (D5) | |
| Field Observations: | | | | | |
| Surface Water Present? | X | Depth (inches): | 1-2 | Wetland Hydrology Present? | YES |
| Water Table Present? | X | Depth (inches): | Surface | | |
| Saturation Present? | X | Depth (inches): | Surface | | |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: | | | | | |
| 1.8" in the last 5 days at Jay Peak (NOAA) | | | | | |
| Remarks: | | | | | |

SOIL

| | | | | | | | |
|---|---------------|-----|----------------|--|--|------------------|---|
| Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) | | | | | | | |
| Depth | Matrix | | Redox Features | | | Texture | Remarks |
| (in) | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | |
| 0-4 | 10YR 3/1 | 100 | | | | | SANDY LOAM |
| 4-8 | 10YR 4/1 | 90 | 10YR 4/6 | 10 | C | M | GRAVELLY SANDY LOAM |
| | | | | | | | Rock terusar at 8" ; Redox - Common, Prominent |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. | | | | | | | |
| ² Location: PL=Pore Lining, M=Matrix. | | | | | | | |
| Hydric Soil Indicators: | | | | Indicators for Problematic Hydric Soils ³ : | | | |
| <input type="checkbox"/> Histosol (A1) | | | | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR R, MLRA 149B) | <input type="checkbox"/> 2 cm Muck (A10) (LRR K, L, MLRA 149B) | | |
| <input type="checkbox"/> Histic Epipedon (A2) | | | | <input type="checkbox"/> Thin Dark Surface (S9) (LRR R, MLRA 149B) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) | | |
| <input type="checkbox"/> Black Histic (A3) | | | | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR K, L) | <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) | | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | | | | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> Dark Surface (S9) (LRR K, L, M) | | |
| <input type="checkbox"/> Stratified Layers (A5) | | | | <input checked="" type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR K, L) | | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | | | | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Thin Dark Surface (S9) (LRR K, L) | | |
| <input type="checkbox"/> Thick Dark Surface (A12) | | | | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) | | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | | | | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149B) | | |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | | | | | <input type="checkbox"/> Mesic Spodic (TA6) (MLRA 144A, 145, 149B) | | |
| <input type="checkbox"/> Sandy Redox (S5) | | | | | <input type="checkbox"/> Red Parent Material (F21) | | |
| <input type="checkbox"/> Stripped Matrix (S6) | | | | | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | | |
| <input type="checkbox"/> Dark Surface (S7) (LRR R, MLRA 149B) | | | | | <input type="checkbox"/> Other (Explain in Remarks) | | |
| ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. | | | | | | | |
| Restrictive Layer (if observed): | | | | Hydric Soil Present? YES | | | |
| Type: Gravel | | | | | | | |
| Depth (inches): 8 | | | | | | | |
| Remarks: | | | | | | | |

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dom. Sp? | Indicator Status | |
|---|-------------------------------------|--------------------------|-------------|---------------------|---|
| 1. | _____ | _____ | _____ | _____ | Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>4</u> (A) # Dominants across all strata: <u>4</u> (B) % Dominants OBL, FACW, FAC: <u>100%</u> (A/B) |
| 2. | _____ | _____ | _____ | _____ | |
| 3. | _____ | _____ | _____ | _____ | |
| 4. | _____ | _____ | _____ | _____ | |
| 5. | _____ | _____ | _____ | _____ | |
| 6. | _____ | _____ | _____ | _____ | |
| 7. | _____ | _____ | _____ | _____ | |
| | | = Total Cover | | | Prevalence Index Worksheet: Total % Cover of: _____ Multiply By: _____ OBL <u>79</u> x 1 = <u>79</u> FACW <u>21</u> x 2 = <u>42</u> FAC _____ x 3 = _____ FACU _____ x 4 = _____ UPL _____ x 5 = _____ Sum: <u>100</u> (A) <u>121</u> (B) Prevalence Index = B/A = <u>1.21</u> |
| | | | | | |
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| | | | | | |
| | | = Total Cover | | | Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is <= 3.0 _____ Problematic Hydrophytic Vegetation ¹ (explain) _____ Rapid Test for Hydrophytic Vegetation _____ Morphological Adaptations <small>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</small> |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | = Total Cover | | | Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height. Hydrophytic Vegetation Present? <u>YES</u> |
| Shrub Stratum | (Plot size: <u>15' RAD</u>) | | | | |
| 1. | _____ | _____ | _____ | _____ | |
| 2. | _____ | _____ | _____ | _____ | |
| 3. | _____ | _____ | _____ | _____ | |
| 4. | _____ | _____ | _____ | _____ | |
| 5. | _____ | _____ | _____ | _____ | |
| 6. | _____ | _____ | _____ | _____ | |
| 7. | _____ | _____ | _____ | _____ | |
| | | | | | |
| | | | | | |
| | | | | | |
| Herb Stratum | (Plot size: <u>5' RAD</u>) | | | | |
| 1. | <u>Carex vulpinoidea</u> | <u>38</u> | <u>X</u> | <u>OBL</u> | |
| 2. | <u>Eupatorium perfoliatum</u> | <u>15</u> | <u>X</u> | <u>FACW</u> | |
| 3. | <u>Carex comosa</u> | <u>15</u> | <u>X</u> | <u>OBL</u> | |
| 4. | <u>Juncus effusus</u> | <u>15</u> | <u>X</u> | <u>OBL</u> | |
| 5. | <u>Solidago gigantea</u> | <u>3</u> | | <u>FACW</u> | |
| 6. | <u>Symphyotrichum novae-angliae</u> | <u>3</u> | | <u>FACW</u> | |
| 7. | <u>Scirpus atrovirens</u> | <u>3</u> | | <u>OBL</u> | |
| 8. | <u>Scirpus cyperinus</u> | <u>3</u> | | <u>OBL</u> | |
| 9. | <u>Eutrochium maculatum</u> | <u>3</u> | | <u>OBL</u> | |
| 10. | <u>Mimulus ringens</u> | <u>1</u> | | <u>OBL</u> | |
| 11. | <u>Asclepias incarnata</u> | <u>1</u> | | <u>OBL</u> | |
| 12. | _____ | _____ | _____ | _____ | |
| | | <u>100</u> = Total Cover | | | |
| Woody Vines | (Plot size: _____) | | | | |
| 1. | _____ | _____ | _____ | _____ | |
| 2. | _____ | _____ | _____ | _____ | |
| 3. | _____ | _____ | _____ | _____ | |
| 4. | _____ | _____ | _____ | _____ | |
| 5. | _____ | _____ | _____ | _____ | |
| | | = Total Cover | | | |
| Remarks: (If observed, list morphological adaptations below). | | | | | |



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

H8-Create

| | | | | | |
|--|------------------------------------|---------------------------------------|----------------|-----------------|----------------|
| Project Site: | JPR Golf Course Wetland Mitigation | City/County: | Jay/Orleans | Sam. Date: | 8/14/2015 |
| Applicant/Owner: | Jay Peak Resort | State: | VERMONT | Sampling Point: | H8-Create |
| Investigator(s): | P. Werts-Kallfelz | Section, Township, Range: | Jay | | |
| Landform (hillslope, terrace, etc.): | Terrace | Local relief (concave, convex, none): | Concave | Slope (%): | |
| Subregion (LRR or MLRA): | LRR | Lat: | 44°56'21.345"N | Long: | 72°29'37.266"W |
| Soil Map Unit: | Dixfield | Datum: | NAD 83 | NWI Class: | PEM |
| Are climatic/hydrologic conditions on the site typical for this time of year? YES (If no, explain in Remarks.) | | | | | |
| Are Vegetation, Soil, or Hydrology significantly disturbed? NO Normal Circumstances? YES | | | | | |
| Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.) | | | | | |

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

| | | |
|---------------------------------|-----|---|
| Hydrophytic Vegetation Present? | YES | Is This Sample Area Within a Wetland? YES |
| Hydric Soil Present? | YES | |
| Wetland Hydrology Present? | YES | |
| Remarks: | | |

HYDROLOGY

| | | |
|--|--|--|
| Wetland Hydrology Indicators: | | Secondary Indicators (minimum of two required) |
| Primary Indicators (minimum of one is required; check all that apply) | | Surface Soil Cracks (B6) |
| Surface Water (A1) | Water-Stained Leaves (B9) | X Drainage Patterns (B10) |
| High Water Table (A2) | Aquatic Fauna (B13) | Moss Trim Lines (B16) |
| X Saturation (A3) | Marl Deposits (B13) | Dry-Season Water Table (C2) |
| Water Marks (B1) | Hydrogen Sulfide Odor (C1) | Crayfish Burrows (C8) |
| Sediment Deposits (B2) | X Oxidized Rhizospheres on Living Roots (C3) | Saturation Visible on Aerial (C9) |
| Drift Deposits (B3) | Presence of Reduced Iron (C4) | Stunted or Stressed Plants (D1) |
| Algal Mat or Crust (B4) | Recent Iron Reduction in Tilled Soils (C6) | Geomorphic Position (D2) |
| Iron Deposits (B5) | Thin Muck Surface (C7) | Shallow Aquitard (D3) |
| Inundation Visible on Aerial (B7) | Other (Explain in Remarks) | Microtopographic Relief (D4) |
| Sparsely Vegetated Concave Surface (B8) | | FAC-Neutral Test (D5) |
| Field Observations: | | |
| Surface Water Present? | Depth (inches): | Wetland Hydrology Present? YES |
| Water Table Present? | Depth (inches): | |
| Saturation Present? X | Depth (inches): Surface | |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: | | |
| 1.8" in the last 5 days at Jay Peak (NOAA) | | |
| Remarks: | | |

SOIL

| | | | | | | | | |
|---|---|----|--|---|-------------------|--|--------------------------|---------------------------|
| Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) | | | | | | | | |
| Depth | Matrix | | Redox Features | | | | Texture | Remarks |
| (in) | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | | |
| 0-4 | 10YR 3/2 | 97 | 10YR 4/6 | 3 | C | PL | SILT LOAM | Redox - Common, Prominent |
| 4-12+ | 2.5YR 5/2 | 93 | 10YR 5/6 | 7 | C | M | FINE SANDY LOAM | Redox - Common, Prominent |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |
| ¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. | | | | | | ² Location: PL=Pore Lining, M=Matrix. | | |
| Hydric Soil Indicators: | | | Indicators for Problematic Hydric Soils ³ : | | | | | |
| Histosol (A1) | Polyvalue Below Surface (S8) (LRR R, MLRA 149B) | | 2 cm Muck (A10) (LRR K, L, MLRA 149B) | | | | | |
| Histic Epipedon (A2) | Thin Dark Surface (S9) (LRR R, MLRA 149B) | | Coast Prairie Redox (A16) (LRR K, L, R) | | | | | |
| Black Histic (A3) | Loamy Mucky Mineral (F1) (LRR K, L) | | 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) | | | | | |
| Hydrogen Sulfide (A4) | Loamy Gleyed Matrix (F2) | | Dark Surface (S9) (LRR K, L, M) | | | | | |
| Stratified Layers (A5) | X Depleted Matrix (F3) | | Polyvalue Below Surface (S8) (LRR K, L) | | | | | |
| Depleted Below Dark Surface (A11) | Redox Dark Surface (F6) | | Thin Dark Surface (S9) (LRR K, L) | | | | | |
| Thick Dark Surface (A12) | Depleted Dark Surface (F7) | | Iron-Manganese Masses (F12) (LRR K, L, R) | | | | | |
| Sandy Mucky Mineral (S1) | Redox Depressions (F8) | | Piedmont Floodplain Soils (F19) (MLRA 149B) | | | | | |
| Sandy Gleyed Matrix (S4) | | | Mesic Spodic (TA6) (MLRA 144A, 145, 149B) | | | | | |
| Sandy Redox (S5) | | | Red Parent Material (F21) | | | | | |
| Stripped Matrix (S6) | | | Very Shallow Dark Surface (TF12) | | | | | |
| Dark Surface (S7) (LRR R, MLRA 149B) | | | Other (Explain in Remarks) | | | | | |
| ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. | | | | | | | | |
| Restrictive Layer (if observed): | | | | | | | Hydric Soil Present? YES | |
| Type: _____ | | | | | | | | |
| Depth (inches): _____ | | | | | | | | |
| Remarks: | | | | | | | | |

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dom. Sp? | Indicator Status | |
|--------------|--------------------|---------------------|-------------|---------------------|---|
| 1. | | | | | Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>2</u> (A) # Dominants across all strata: <u>2</u> (B) % Dominants OBL, FACW, FAC: <u>100%</u> (A/B) |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | = Total Cover | | | Prevalence Index Worksheet: Total % Cover of: OBL <u>112</u> x 1 = <u>112</u> FACW <u>21</u> x 2 = <u>42</u> FAC <u>3</u> x 3 = <u>9</u> FACU _____ x 4 = _____ UPL _____ x 5 = _____ Sum: <u>136</u> (A) <u>163</u> (B) Prevalence Index = B/A = <u>1.20</u> |
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| | | | | | |
| | | = Total Cover | | | Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is <= 3.0 _____ Problematic Hydrophytic Vegetation ¹ (explain) _____ Rapid Test for Hydrophytic Vegetation _____ Morphological Adaptations <small>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</small> |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | = Total Cover | | | Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height. |
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| | | | | | |
| | | = Total Cover | | | |
| | | | | | Hydrophytic Vegetation Present? <u>YES</u> |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |
| | | = Total Cover | | | |

Remarks: (If observed, list morphological adaptations below).



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

H11-Create

| | | | | | |
|---|---|---------------------------------------|-----------------------|-----------------|-----------------------|
| Project Site: | JPR Golf Course Wetland Mitigation | City/County: | Jay/Orleans | Samp. Date: | 8/13/2015 |
| Applicant/Owner: | Jay Peak Resort | State: | VERMONT | Sampling Point: | H11-Create |
| Investigator(s): | P. Werts-Kallfelz | Section, Township, Range: | Jay | | |
| Landform (hillslope, terrace, etc.): | Terrace | Local relief (concave, convex, none): | Concave | Slope (%): | |
| Subregion (LRR or MLRA): | LRR | Lat: | 44°56'29.849"N | Long: | 72°30'25.141"W |
| Soil Map Unit: | Cabot | Datum: | NAD 83 | NWI Class: | PEM |
| Are climatic/hydrologic conditions on the site typical for this time of year? YES (If no, explain in Remarks.) | | | | | |
| Are Vegetation, Soil, or Hydrology significantly disturbed? NO Normal Circumstances? YES | | | | | |
| Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.) | | | | | |

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

| | | |
|---------------------------------|------------|--|
| Hydrophytic Vegetation Present? | YES | Is This Sample Area Within a Wetland? YES |
| Hydric Soil Present? | YES | |
| Wetland Hydrology Present? | YES | |
| Remarks: | | |

HYDROLOGY

| | | | |
|--|---|--|--------------------------|
| Wetland Hydrology Indicators: | | Secondary Indicators (minimum of two required) | |
| Primary Indicators (minimum of one is required; check all that apply) | | | |
| <input type="checkbox"/> Surface Water (A1) | <input checked="" type="checkbox"/> Water-Stained Leaves (B9) | <input type="checkbox"/> Surface Soil Cracks (B6) | |
| <input checked="" type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Fauna (B13) | <input type="checkbox"/> Drainage Patterns (B10) | |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Marl Deposits (B13) | <input type="checkbox"/> Moss Trim Lines (B16) | |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Dry-Season Water Table (C2) | |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) | <input type="checkbox"/> Crayfish Burrows (C8) | |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial (C9) | |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) | <input type="checkbox"/> Stunted or Stressed Plants (D1) | |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) | |
| <input type="checkbox"/> Inundation Visible on Aerial (B7) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> Shallow Aquitard (D3) | |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | | <input type="checkbox"/> Microtopographic Relief (D4) | |
| | | <input type="checkbox"/> FAC-Neutral Test (D5) | |
| Field Observations: | | | |
| Surface Water Present? | <input checked="" type="checkbox"/> | Depth (inches): | <input type="checkbox"/> |
| Water Table Present? | <input checked="" type="checkbox"/> | Depth (inches): | 6 |
| Saturation Present? | <input checked="" type="checkbox"/> | Depth (inches): | Surface |
| Wetland Hydrology Present? YES | | | |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: | | | |
| 1.3" in the last 5 days at Jay Peak (NOAA) | | | |
| Remarks: | | | |

SOIL

| | | | | | | | |
|---|--|------------|-----------------|--|-------------------|------------------|----------------------------------|
| Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) | | | | | | | |
| Depth | Matrix | | Redox Features | | | | |
| (in) | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | Texture |
| 0-4 | 10YR 3/1 | 100 | | | | | SILT LOAM |
| 4-14+ | 2.5Y 5/2 | 93 | 2.5Y 5/6 | 7 | C | M | FINE SANDY LOAM |
| | | | | | | | Redox - Common, Prominent |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. | | | | | | | |
| ² Location: PL=Pore Lining, M=Matrix. | | | | | | | |
| Hydric Soil Indicators: | | | | Indicators for Problematic Hydric Soils ³ : | | | |
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR R, MLRA 149B) | | | <input type="checkbox"/> 2 cm Muck (A10) (LRR K, L, MLRA 149B) | | | |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Thin Dark Surface (S9) (LRR R, MLRA 149B) | | | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) | | | |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR K, L) | | | <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) | | | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | | | <input type="checkbox"/> Dark Surface (S9) (LRR K, L, M) | | | |
| <input type="checkbox"/> Stratified Layers (A5) | <input checked="" type="checkbox"/> Depleted Matrix (F3) | | | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR K, L) | | | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | | | <input type="checkbox"/> Thin Dark Surface (S9) (LRR K, L) | | | |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | | | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) | | | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | | | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149B) | | | |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | | | | <input type="checkbox"/> Mesic Spodic (TA6) (MLRA 144A, 145, 149B) | | | |
| <input type="checkbox"/> Sandy Redox (S5) | | | | <input type="checkbox"/> Red Parent Material (F21) | | | |
| <input type="checkbox"/> Stripped Matrix (S6) | | | | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | | | |
| <input type="checkbox"/> Dark Surface (S7) (LRR R, MLRA 149B) | | | | <input type="checkbox"/> Other (Explain in Remarks) | | | |
| ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. | | | | | | | |
| Restrictive Layer (if observed): | | | | Hydric Soil Present? YES | | | |
| Type: _____ | | | | | | | |
| Depth (inches): _____ | | | | | | | |
| Remarks: | | | | | | | |

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dom. Sp? | Indicator Status | |
|--|-------------------------------------|---------------------|-------------|---------------------|---|
| 1. | | | | | Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>6</u> (A) # Dominants across all strata: <u>7</u> (B) % Dominants OBL, FACW, FAC: <u>86%</u> (A/B) |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | = Total Cover | | | Prevalence Index Worksheet: Total % Cover of: OBL <u>16</u> x 1 = <u>16</u> FACW <u>83</u> x 2 = <u>166</u> FAC <u>15</u> x 3 = <u>45</u> FACU <u>9</u> x 4 = <u>36</u> UPL _____ x 5 = _____ Sum: <u>123</u> (A) <u>263</u> (B) Prevalence Index = B/A = <u>2.14</u> |
| Sapling Stratum (Plot size: _____) | | | | | |
| 1. | Prunus pensylvanica | 3 | X | FACU | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| | | = Total Cover | | | |
| Shrub Stratum (Plot size: <u>15' RAD</u>) | | | | | Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is <= 3.0 _____ Problematic Hydrophytic Vegetation ¹ (explain) _____ Rapid Test for Hydrophytic Vegetation _____ Morphological Adaptations ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 1. | Cornus alba | 15 | X | FACW | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| | | = Total Cover | | | |
| Herb Stratum (Plot size: <u>5' RAD</u>) | | | | | Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height. |
| 1. | Eupatorium perfoliatum | 38 | X | FACW | |
| 2. | Verbena hastata | 15 | X | FACW | |
| 3. | Euthamia graminifolia | 15 | X | FAC | |
| 4. | Calamagrostis canadensis | 15 | X | OBL | |
| 5. | Symphyotrichum novae-angliae | 15 | X | FACW | |
| 6. | Lolium perenne | 3 | | FACU | |
| 7. | Festuca rubra | 3 | | FACU | |
| 8. | Galium palustre | 1 | | OBL | |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |
| | | = Total Cover | | | |
| Woody Vines (Plot size: _____) | | | | | Hydrophytic Vegetation Present? <u>YES</u> |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| | | = Total Cover | | | |

Remarks: (If observed, list morphological adaptations below).



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

H11-WT6

| | | | | | |
|--|------------------------------------|---------------------------------------|----------------|-----------------|----------------|
| Project Site: | JPR Golf Course Wetland Mitigation | City/County: | Jay/Orleans | Samp. Date: | 8/13/2015 |
| Applicant/Owner: | Jay Peak Resort | State: | VERMONT | Sampling Point: | H11-WT6 |
| Investigator(s): | P. Werts-Kallfelz | Section, Township, Range: | Jay | | |
| Landform (hillslope, terrace, etc.): | Terrace | Local relief (concave, convex, none): | Concave | Slope (%): | |
| Subregion (LRR or MLRA): | LRR | Lat: | 44°56'37.815"N | Long: | 72°30'40.383"W |
| Soil Map Unit: | Cabot | Datum: | NAD 83 | NWI Class: | PEM |
| Are climatic/hydrologic conditions on the site typical for this time of year? YES (If no, explain in Remarks.) | | | | | |
| Are Vegetation, Soil, or Hydrology significantly disturbed? NO Normal Circumstances? YES | | | | | |
| Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.) | | | | | |

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

| | | |
|---------------------------------|-----|---|
| Hydrophytic Vegetation Present? | YES | Is This Sample Area Within a Wetland? YES |
| Hydric Soil Present? | YES | |
| Wetland Hydrology Present? | YES | |
| Remarks: | | |

HYDROLOGY

| | | | |
|--|--|--|--|
| Wetland Hydrology Indicators: | | Secondary Indicators (minimum of two required) | |
| Primary Indicators (minimum of one is required; check all that apply) | | | |
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Water-Stained Leaves (B9) | <input type="checkbox"/> Surface Soil Cracks (B6) | |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Fauna (B13) | <input type="checkbox"/> Drainage Patterns (B10) | |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Marl Deposits (B13) | <input type="checkbox"/> Moss Trim Lines (B16) | |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Dry-Season Water Table (C2) | |
| <input type="checkbox"/> Sediment Deposits (B2) | <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) | <input type="checkbox"/> Crayfish Burrows (C8) | |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial (C9) | |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) | <input type="checkbox"/> Stunted or Stressed Plants (D1) | |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) | |
| <input type="checkbox"/> Inundation Visible on Aerial (B7) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> Shallow Aquitard (D3) | |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | | <input type="checkbox"/> Microtopographic Relief (D4) | |
| | | <input type="checkbox"/> FAC-Neutral Test (D5) | |
| Field Observations: | | | |
| Surface Water Present? <input type="checkbox"/> | Depth (inches): <input type="text"/> | Wetland Hydrology Present? YES | |
| Water Table Present? <input type="checkbox"/> | Depth (inches): <input type="text"/> | | |
| Saturation Present? <input type="checkbox"/> | Depth (inches): <input type="text"/> | | |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: | | | |
| 1.3" in the last 5 days at Jay Peak (NOAA) | | | |
| Remarks: | | | |

SOIL

| | | | | | | | | |
|---|---------------|----|--|--|-------------------|------------------|--------------------------|---|
| Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) | | | | | | | | |
| Depth | Matrix | | Redox Features | | | | Texture | Remarks |
| (in) | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | | |
| 0-4 | 10YR 3/2 | 98 | 10YR 5/8 | 2 | C | PL | SANDY LOAM | Redox - Common, Prominent |
| 4-10 | 2.5Y 5/2 | 97 | 10YR 5/4 | 3 | C | M | FINE SANDY LOAM | Rock refusal at 10"; Redox - Common, Distinct |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| ¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. | | | | | | | | |
| ² Location: PL=Pore Lining, M=Matrix. | | | | | | | | |
| Hydric Soil Indicators: | | | Indicators for Problematic Hydric Soils ³ : | | | | | |
| <input type="checkbox"/> Histosol (A1) | | | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR R, MLRA 149B) | <input type="checkbox"/> 2 cm Muck (A10) (LRR K, L, MLRA 149B) | | | | |
| <input type="checkbox"/> Histic Epipedon (A2) | | | <input type="checkbox"/> Thin Dark Surface (S9) (LRR R, MLRA 149B) | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) | | | | |
| <input type="checkbox"/> Black Histic (A3) | | | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR K, L) | <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) | | | | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | | | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | <input type="checkbox"/> Dark Surface (S9) (LRR K, L, M) | | | | |
| <input type="checkbox"/> Stratified Layers (A5) | | | <input checked="" type="checkbox"/> Depleted Matrix (F3) | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR K, L) | | | | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | | | <input type="checkbox"/> Redox Dark Surface (F6) | <input type="checkbox"/> Thin Dark Surface (S9) (LRR K, L) | | | | |
| <input type="checkbox"/> Thick Dark Surface (A12) | | | <input type="checkbox"/> Depleted Dark Surface (F7) | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) | | | | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | | | <input type="checkbox"/> Redox Depressions (F8) | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149B) | | | | |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | | | | <input type="checkbox"/> Mesic Spodic (TA6) (MLRA 144A, 145, 149B) | | | | |
| <input type="checkbox"/> Sandy Redox (S5) | | | | <input type="checkbox"/> Red Parent Material (F21) | | | | |
| <input type="checkbox"/> Stripped Matrix (S6) | | | | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | | | | |
| <input type="checkbox"/> Dark Surface (S7) (LRR R, MLRA 149B) | | | | <input type="checkbox"/> Other (Explain in Remarks) | | | | |
| ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. | | | | | | | | |
| Restrictive Layer (if observed): | | | | | | | Hydric Soil Present? YES | |
| Type: Rock | | | | | | | | |
| Depth (inches): 10 | | | | | | | | |
| Remarks: | | | | | | | | |

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dom. Sp? | Indicator Status | |
|---------------|-------------------------------|-------------------------|-------------|---------------------|--|
| 1. | | | | | Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>4</u> (A) # Dominants across all strata: <u>4</u> (B) % Dominants OBL, FACW, FAC: <u>100%</u> (A/B) |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | = Total Cover | | | Prevalence Index Worksheet: Total % Cover of: OBL <u>19</u> x 1 = <u>19</u> FACW <u>30</u> x 2 = <u>60</u> FAC <u>38</u> x 3 = <u>114</u> FACU _____ x 4 = _____ UPL _____ x 5 = _____ Sum: <u>87</u> (A) <u>193</u> (B) Prevalence Index = B/A = <u>2.22</u> |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | = Total Cover | | | Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is <= 3.0 _____ Problematic Hydrophytic Vegetation ¹ (explain) _____ Rapid Test for Hydrophytic Vegetation _____ Morphological Adaptations <small>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</small> |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | = Total Cover | | | Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height. |
| Shrub Stratum | (Plot size: <u>15' RAD</u>) | | | | |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | = Total Cover | | | |
| Herb Stratum | (Plot size: <u>5' RAD</u>) | | | | |
| 1. | <u>Solidago rugosa</u> | <u>38</u> | <u>X</u> | <u>FAC</u> | |
| 2. | <u>Eupatorium perfoliatum</u> | <u>15</u> | <u>X</u> | <u>FACW</u> | |
| 3. | <u>Verbena hastata</u> | <u>15</u> | <u>X</u> | <u>FACW</u> | |
| 4. | <u>Carex crinita</u> | <u>15</u> | <u>X</u> | <u>OBL</u> | |
| 5. | <u>Eutrochium maculatum</u> | <u>3</u> | | <u>OBL</u> | |
| 6. | <u>Scirpus atrovirens</u> | <u>1</u> | | <u>OBL</u> | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |
| | | <u>87</u> = Total Cover | | | |
| Woody Vines | (Plot size: _____) | | | | |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| | | = Total Cover | | | |

Remarks: (If observed, list morphological adaptations below).



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

H13-
WT1/a/b

| | | | | | |
|--|------------------------------------|---------------------------------------|----------------|-----------------|----------------|
| Project Site: | JPR Golf Course Wetland Mitigation | City/County: | Jay/Orleans | Samp. Date: | 8/13/2015 |
| Applicant/Owner: | Jay Peak Resort | State: | VERMONT | Sampling Point: | H13-WT1/a/b |
| Investigator(s): | P. Werts-Kallfelz | Section, Township, Range: | Jay | | |
| Landform (hillslope, terrace, etc.): | Terrace | Local relief (concave, convex, none): | Concave | Slope (%): | |
| Subregion (LRR or MLRA): | LRR | Lat: | 44°56'40.283"N | Long: | 72°30'51.467"W |
| Soil Map Unit: | Cabot | Datum: | NAD 83 | NWI Class: | PEM |
| Are climatic/hydrologic conditions on the site typical for this time of year? YES (If no, explain in Remarks.) | | | | | |
| Are Vegetation, Soil, or Hydrology significantly disturbed? NO Normal Circumstances? YES | | | | | |
| Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.) | | | | | |

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

| | | |
|---------------------------------|-----|---|
| Hydrophytic Vegetation Present? | YES | Is This Sample Area Within a Wetland? YES |
| Hydric Soil Present? | YES | |
| Wetland Hydrology Present? | YES | |
| Remarks: | | |

HYDROLOGY

| | | | |
|--|---|--|---------|
| Wetland Hydrology Indicators: | | Secondary Indicators (minimum of two required) | |
| Primary Indicators (minimum of one is required; check all that apply) | | Surface Soil Cracks (B6) | |
| Surface Water (A1) | X | Water-Stained Leaves (B9) | X |
| High Water Table (A2) | | Aquatic Fauna (B13) | |
| X Saturation (A3) | | Marl Deposits (B13) | |
| Water Marks (B1) | | Hydrogen Sulfide Odor (C1) | |
| Sediment Deposits (B2) | X | Oxidized Rhizospheres on Living Roots (C3) | |
| Drift Deposits (B3) | | Presence of Reduced Iron (C4) | |
| Algal Mat or Crust (B4) | | Recent Iron Reduction in Tilled Soils (C6) | |
| Iron Deposits (B5) | | Thin Muck Surface (C7) | |
| Inundation Visible on Aerial (B7) | | Other (Explain in Remarks) | |
| Sparsely Vegetated Concave Surface (B8) | | | |
| Field Observations: | | Wetland Hydrology Present? YES | |
| Surface Water Present? | | Depth (inches): | |
| Water Table Present? | | Depth (inches): | |
| Saturation Present? | X | Depth (inches): | Surface |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: | | | |
| 1.3" in the last 5 days at Jay Peak (NOAA) | | | |
| Remarks: | | | |

SOIL

| | | | | | | | |
|---|---------------|----|---|--|-------------------|--|---|
| Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) | | | | | | | |
| Depth | Matrix | | Redox Features | | | Texture | Remarks |
| (in) | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | |
| 0-12 | 10YR 2/1 | 98 | 10YR 5/6 | 2 | C | PL | SILT LOAM |
| | | | | | | | Redox - Common, Prominent |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| ¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. | | | | | | ² Location: PL=Pore Lining, M=Matrix. | |
| Hydric Soil Indicators: | | | | Indicators for Problematic Hydric Soils ³ : | | | |
| Histosol (A1) | | | Polyvalue Below Surface (S8) (LRR R, MLRA 149B) | | | | 2 cm Muck (A10) (LRR K, L, MLRA 149B) |
| Histic Epipedon (A2) | | | Thin Dark Surface (S9) (LRR R, MLRA 149B) | | | | Coast Prairie Redox (A16) (LRR K, L, R) |
| Black Histic (A3) | | | Loamy Mucky Mineral (F1) (LRR K, L) | | | | 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) |
| Hydrogen Sulfide (A4) | | | Loamy Gleyed Matrix (F2) | | | | Dark Surface (S9) (LRR K, L, M) |
| Stratified Layers (A5) | | | Depleted Below Dark Surface (A11) | X | | | Polyvalue Below Surface (S8) (LRR K, L) |
| Thick Dark Surface (A12) | | | Redox Dark Surface (F6) | | | | Thin Dark Surface (S9) (LRR K, L) |
| Sandy Mucky Mineral (S1) | | | Depleted Dark Surface (F7) | | | | Iron-Manganese Masses (F12) (LRR K, L, R) |
| Sandy Gleyed Matrix (S4) | | | Redox Depressions (F8) | | | | Piedmont Floodplain Soils (F19) (MLRA 149B) |
| Sandy Redox (S5) | | | | | | | Mesic Spodic (TA6) (MLRA 144A, 145, 149B) |
| Stripped Matrix (S6) | | | | | | | Red Parent Material (F21) |
| Dark Surface (S7) (LRR R, MLRA 149B) | | | | | | | Very Shallow Dark Surface (TF12) |
| | | | | | | | Other (Explain in Remarks) |
| Restrictive Layer (if observed): | | | | Hydric Soil Present? YES | | | |
| Type: | | | | | | | |
| Depth (inches): | | | | | | | |
| Remarks: | | | | | | | |

| Tree Stratum | | (Plot size: _____) | Absolute % Cover | Dom. Sp? | Indicator Status |
|-----------------|---------------------------------------|-----------------------------|------------------|---------------|------------------|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | | | = Total Cover | |
| Sapling Stratum | | (Plot size: _____) | | | |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | | | = Total Cover | |
| Shrub Stratum | | (Plot size: <u>15'RAD</u>) | | | |
| 1. | <u>Salix bebbiana</u> | | <u>38</u> | <u>X</u> | <u>FACW</u> |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | | <u>38</u> | = Total Cover | |
| Herb Stratum | | (Plot size: <u>5' RAD</u>) | | | |
| 1. | <u>Glyceria grandis</u> | | <u>38</u> | <u>X</u> | <u>OBL</u> |
| 2. | <u>Eupatorium perfoliatum</u> | | <u>15</u> | <u>X</u> | <u>FACW</u> |
| 3. | <u>Juncus effusus</u> | | <u>15</u> | <u>X</u> | <u>OBL</u> |
| 4. | <u>Carex scoparia</u> | | <u>15</u> | <u>X</u> | <u>FACW</u> |
| 5. | <u>Carex lurida</u> | | <u>15</u> | <u>X</u> | <u>OBL</u> |
| 6. | <u>Impatiens capensis</u> | | <u>15</u> | <u>X</u> | <u>FACW</u> |
| 7. | <u>Glyceria canadensis</u> | | <u>3</u> | | <u>OBL</u> |
| 8. | <u>Eutrochium maculatum</u> | | <u>3</u> | | <u>OBL</u> |
| 9. | <u>Carex comosa</u> | | <u>3</u> | | <u>OBL</u> |
| 10. | <u>Calamagrostis canadensis</u> | | <u>3</u> | | <u>OBL</u> |
| 11. | <u>Schoenoplectus tabernaemontani</u> | | <u>1</u> | | <u>OBL</u> |
| 12. | | | | | |
| | | | <u>126</u> | = Total Cover | |
| Woody Vines | | (Plot size: _____) | | | |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| | | | | = Total Cover | |

| Dominance Test Worksheet: | |
|--------------------------------|-------------------|
| # Dominants OBL, FACW, FAC: | <u>7</u> (A) |
| # Dominants across all strata: | <u>7</u> (B) |
| % Dominants OBL, FACW, FAC: | <u>100%</u> (A/B) |

| Prevalence Index Worksheet: | |
|-----------------------------|------------------|
| Total % Cover of: | Multiply By: |
| OBL <u>81</u> | x 1 = <u>81</u> |
| FACW <u>83</u> | x 2 = <u>166</u> |
| FAC _____ | x 3 = _____ |
| FACU _____ | x 4 = _____ |
| UPL _____ | x 5 = _____ |
| Sum: <u>164</u> (A) | <u>247</u> (B) |
| Prevalence Index = B/A = | <u>1.51</u> |

| Hydrophytic Vegetation Indicators: | |
|--|---|
| <u>X</u> | Dominance Test is > 50% |
| <u>X</u> | Prevalence Index is <= 3.0 |
| | Problematic Hydrophytic Vegetation ¹ (explain) |
| | Rapid Test for Hydrophytic Vegetation |
| | Morphological Adaptations |
| ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. | |

| Definitions of Vegetation Strata: | |
|--|--|
| Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). | |
| Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. | |
| Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. | |
| Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. | |
| Woody vine - All woody vines, regardless of height. | |

| Hydrophytic Vegetation Present? | |
|---------------------------------|------------|
| | <u>YES</u> |

Remarks: (If observed, list morphological adaptations below).



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

H14-WT2/3

| | | | | | | | | |
|---|---|--|---------------------------------------|-----------------------|--|-----------------|-----------------------|--|
| Project Site: | JPR Golf Course Wetland Mitigation | | City/County: | Jay/Orleans | | Samp. Date: | 8/13/2015 | |
| Applicant/Owner: | Jay Peak Resort | | State: | VERMONT | | Sampling Point: | H14-WT2/3 | |
| Investigator(s): | P. Werts-Kalfelz | | Section, Township, Range: | Jay | | | | |
| Landform (hillslope, terrace, etc.): | Terrace | | Local relief (concave, convex, none): | Concave | | Slope (%): | | |
| Subregion (LRR or MLRA): | LRR | | Lat: | 44°56'39.392"N | | Long: | 72°31'12.522"W | |
| Soil Map Unit: | Cabot | | Datum: | NAD 83 | | NWI Class: | PEM | |
| Are climatic/hydrologic conditions on the site typical for this time of year? YES (If no, explain in Remarks.) | | | | | | | | |
| Are Vegetation, Soil, or Hydrology significantly disturbed? NO Normal Circumstances? YES | | | | | | | | |
| Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.) | | | | | | | | |

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

| | | |
|---------------------------------|------------|--|
| Hydrophytic Vegetation Present? | YES | Is This Sample Area Within a Wetland? YES |
| Hydric Soil Present? | YES | |
| Wetland Hydrology Present? | YES | |
| Remarks: | | |

HYDROLOGY

| | | | | | | | |
|--|---|-----------------|--|--|--|-----------------------------------|--|
| Wetland Hydrology Indicators: | | | | Secondary Indicators (minimum of two required) | | | |
| Primary Indicators (minimum of one is required; check all that apply) | | | | | | | |
| <input checked="" type="checkbox"/> Surface Water (A1) | <input checked="" type="checkbox"/> Water-Stained Leaves (B9) | | | | | Surface Soil Cracks (B6) | |
| <input checked="" type="checkbox"/> High Water Table (A2) | Aquatic Fauna (B13) | | | | | Drainage Patterns (B10) | |
| <input checked="" type="checkbox"/> Saturation (A3) | Marl Deposits (B13) | | | | | Moss Trim Lines (B16) | |
| Water Marks (B1) | Hydrogen Sulfide Odor (C1) | | | | | Dry-Season Water Table (C2) | |
| Sediment Deposits (B2) | Oxidized Rhizospheres on Living Roots (C3) | | | | | Crayfish Burrows (C8) | |
| Drift Deposits (B3) | Presence of Reduced Iron (C4) | | | | | Saturation Visible on Aerial (C9) | |
| Algal Mat or Crust (B4) | Recent Iron Reduction in Tilled Soils (C6) | | | | | Stunted or Stressed Plants (D1) | |
| Iron Deposits (B5) | Thin Muck Surface (C7) | | | | | Geomorphic Position (D2) | |
| Inundation Visible on Aerial (B7) | Other (Explain in Remarks) | | | | | Shallow Aquitard (D3) | |
| Sparsely Vegetated Concave Surface (B8) | | | | | | Microtopographic Relief (D4) | |
| | | | | | | FAC-Neutral Test (D5) | |
| Field Observations: | | | | | | | |
| Surface Water Present? | X | Depth (inches): | Ponded areas with water depth of 1" | | | Wetland Hydrology Present? | |
| Water Table Present? | X | Depth (inches): | 6" | | | YES | |
| Saturation Present? | X | Depth (inches): | Surface | | | | |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: | | | | | | | |
| 1.3" in the last 5 days at Jay Peak (NOAA) | | | | | | | |
| Remarks: | | | | | | | |

SOIL

| | | | | | | | | |
|---|----------------|-----------|--|----------|-------------------|------------------|----------------------|---|
| Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) | | | | | | | | |
| Depth (in) | Matrix | | Redox Features | | | | Texture | Remarks |
| 0-3 | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | SANDY LOAM | Redox - Few, Prominent |
| | 5Y 4/2 | 99 | 10YR 4/6 | 1 | C | M | | Rock refusal at 10"; Redox - Common, Prominent |
| 3-10 | 10Y 4/1 | 97 | 10YR 4/6 | 3 | C | M | SANDY LOAM | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| ¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. | | | | | | | | |
| ² Location: PL=Pore Lining, M=Matrix. | | | | | | | | |
| Hydric Soil Indicators: | | | | | | | | |
| <input type="checkbox"/> Histosol (A1) | | | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR R, MLRA 149B) | | | | | |
| <input type="checkbox"/> Histic Epipedon (A2) | | | <input type="checkbox"/> Thin Dark Surface (S9) (LRR R, MLRA 149B) | | | | | |
| <input type="checkbox"/> Black Histic (A3) | | | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR K, L) | | | | | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | | | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | | | | | |
| <input type="checkbox"/> Stratified Layers (A5) | | | <input checked="" type="checkbox"/> Depleted Matrix (F3) | | | | | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | | | <input type="checkbox"/> Redox Dark Surface (F6) | | | | | |
| <input type="checkbox"/> Thick Dark Surface (A12) | | | <input type="checkbox"/> Depleted Dark Surface (F7) | | | | | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | | | <input type="checkbox"/> Redox Depressions (F8) | | | | | |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | | | | | | | | |
| <input type="checkbox"/> Sandy Redox (S5) | | | | | | | | |
| <input type="checkbox"/> Stripped Matrix (S6) | | | | | | | | |
| <input type="checkbox"/> Dark Surface (S7) (LRR R, MLRA 149B) | | | | | | | | |
| ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. | | | | | | | | |
| Restrictive Layer (if observed): | | | | | | | Hydric Soil Present? | |
| Type: Rock | | | | | | | YES | |
| Depth (inches): 10 | | | | | | | | |
| Remarks: | | | | | | | | |

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dom. Sp? | Indicator Status | |
|---|-------------------------------|------------------|---------------|------------------|--|
| 1. | _____ | _____ | _____ | _____ | Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>1</u> (A) # Dominants across all strata: <u>1</u> (B) % Dominants OBL, FACW, FAC: <u>100%</u> (A/B) |
| 2. | _____ | _____ | _____ | _____ | |
| 3. | _____ | _____ | _____ | _____ | |
| 4. | _____ | _____ | _____ | _____ | |
| 5. | _____ | _____ | _____ | _____ | |
| 6. | _____ | _____ | _____ | _____ | |
| 7. | _____ | _____ | _____ | _____ | |
| | | | = Total Cover | | Prevalence Index Worksheet: Total % Cover of: _____ Multiply By: _____ OBL <u>93</u> x 1 = <u>93</u> FACW <u>6</u> x 2 = <u>12</u> FAC <u>18</u> x 3 = <u>54</u> FACU <u>1</u> x 4 = <u>4</u> UPL _____ x 5 = _____ Sum: <u>118</u> (A) <u>163</u> (B) Prevalence Index = B/A = <u>1.38</u> |
| Sapling Stratum (Plot size: _____) | | | | | |
| 1. | _____ | _____ | _____ | _____ | |
| 2. | _____ | _____ | _____ | _____ | |
| 3. | _____ | _____ | _____ | _____ | |
| 4. | _____ | _____ | _____ | _____ | |
| 5. | _____ | _____ | _____ | _____ | |
| 6. | _____ | _____ | _____ | _____ | |
| 7. | _____ | _____ | _____ | _____ | |
| | | | = Total Cover | | Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is <= 3.0 <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (explain) <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> Morphological Adaptations <small>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</small> |
| Shrub Stratum (Plot size: <u>15' RAD</u>) | | | | | |
| 1. | _____ | _____ | _____ | _____ | |
| 2. | _____ | _____ | _____ | _____ | |
| 3. | _____ | _____ | _____ | _____ | |
| 4. | _____ | _____ | _____ | _____ | |
| 5. | _____ | _____ | _____ | _____ | |
| 6. | _____ | _____ | _____ | _____ | |
| 7. | _____ | _____ | _____ | _____ | |
| | | | = Total Cover | | Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height. Hydrophytic Vegetation Present? <u>YES</u> |
| Herb Stratum (Plot size: <u>5' RAD</u>) | | | | | |
| 1. | Carex vulpinoidea | 63 | X | OBL | |
| 2. | Juncus effusus | 15 | | OBL | |
| 3. | Solidago rugosa | 15 | | FAC | |
| 4. | Eupatorium perfoliatum | 3 | | FACW | |
| 5. | Eutrochium maculatum | 3 | | OBL | |
| 6. | Carex comosa | 3 | | OBL | |
| 7. | Mimulus ringens | 3 | | OBL | |
| 8. | Carex scoparia | 3 | | FACW | |
| 9. | Juncus tenuis | 3 | | FAC | |
| 10. | Carex crinita | 3 | | OBL | |
| 11. | Chelone glabra | 3 | | OBL | |
| 12. | Ageratina altissima | 1 | | FACU | |
| | | | = Total Cover | | |
| Woody Vines (Plot size: _____) | | | | | |
| 1. | _____ | _____ | _____ | _____ | |
| 2. | _____ | _____ | _____ | _____ | |
| 3. | _____ | _____ | _____ | _____ | |
| 4. | _____ | _____ | _____ | _____ | |
| 5. | _____ | _____ | _____ | _____ | |
| | | | = Total Cover | | |

Remarks: (If observed, list morphological adaptations below).
Festuca rubra observed at 1%



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

H15-WT1

| | | | | | | | | |
|---|---|--|---------------------------------------|-----------------------|--|-----------------|-----------------------|--|
| Project Site: | JPR Golf Course Wetland Mitigation | | City/County: | Jay/Orleans | | Samp. Date: | 8/13/2015 | |
| Applicant/Owner: | Jay Peak Resort | | State: | VERMONT | | Sampling Point: | H15-WT1 | |
| Investigator(s): | P. Werts-Kallfelz | | Section, Township, Range: | Jay | | | | |
| Landform (hillslope, terrace, etc.): | Terrace | | Local relief (concave, convex, none): | Concave | | Slope (%): | | |
| Subregion (LRR or MLRA): | LRR | | Lat: | 44°56'35.358"N | | Long: | 72°30'46.838"W | |
| Soil Map Unit: | Cabot | | Datum: | NAD 83 | | NWI Class: | PEM | |
| Are climatic/hydrologic conditions on the site typical for this time of year? YES (If no, explain in Remarks.) | | | | | | | | |
| Are Vegetation, Soil, or Hydrology significantly disturbed? NO Normal Circumstances? YES | | | | | | | | |
| Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.) | | | | | | | | |

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

| | | |
|---------------------------------|------------|--|
| Hydrophytic Vegetation Present? | YES | Is This Sample Area Within a Wetland? YES |
| Hydric Soil Present? | YES | |
| Wetland Hydrology Present? | YES | |
| Remarks: | | |

HYDROLOGY

| | | | | | | | |
|--|----------|--|----------|--|------------|--|--|
| Wetland Hydrology Indicators: | | | | Secondary Indicators (minimum of two required) | | | |
| Primary Indicators (minimum of one is required; check all that apply) | | | | | | | |
| Surface Water (A1) | X | Water-Stained Leaves (B9) | | Surface Soil Cracks (B6) | | | |
| High Water Table (A2) | | Aquatic Fauna (B13) | | Drainage Patterns (B10) | | | |
| Saturation (A3) | X | Marl Deposits (B13) | | Moss Trim Lines (B16) | | | |
| Water Marks (B1) | | Hydrogen Sulfide Odor (C1) | | Dry-Season Water Table (C2) | | | |
| Sediment Deposits (B2) | | Oxidized Rhizospheres on Living Roots (C3) | | Crayfish Burrows (C8) | | | |
| Drift Deposits (B3) | | Presence of Reduced Iron (C4) | | Saturation Visible on Aerial (C9) | | | |
| Algal Mat or Crust (B4) | | Recent Iron Reduction in Tilled Soils (C6) | | Stunted or Stressed Plants (D1) | | | |
| Iron Deposits (B5) | | Thin Muck Surface (C7) | | Geomorphic Position (D2) | | | |
| Inundation Visible on Aerial (B7) | | Other (Explain in Remarks) | | Shallow Aquitard (D3) | | | |
| Sparsely Vegetated Concave Surface (B8) | | | | Microtopographic Relief (D4) | | | |
| | | | | FAC-Neutral Test (D5) | | | |
| Field Observations: | | | | | | | |
| Surface Water Present? | | Depth (inches): | | Wetland Hydrology Present? | YES | | |
| Water Table Present? | | Depth (inches): | | | | | |
| Saturation Present? | X | Depth (inches): | 6 | | | | |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: | | | | | | | |
| 1.3" in the last 5 days at Jay Peak (NOAA) | | | | | | | |
| Remarks: | | | | | | | |

SOIL

| | | | | | | | | |
|---|-----------------|-----------|---|--|-------------------|------------------|--|---|
| Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) | | | | | | | | |
| Depth | Matrix | | Redox Features | | | | Texture | Remarks |
| (in) | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | | |
| 0-8 | 10YR 2/1 | 97 | 7.5YR 3/4 | 3 | C | M | FINE SANDY LOAM | Additional Redox Color - 5Y 4/1 - D/M at 3%; Redox - Common, Prominent |
| 8-14+ | 5Y 5/2 | 95 | 10YR 3/6 | 5 | C | M | FINE SANDY LOAM | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| ¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. | | | | | | | ² Location: PL=Pore Lining, M=Matrix. | |
| Hydric Soil Indicators: | | | | Indicators for Problematic Hydric Soils ³ : | | | | |
| Histosol (A1) | | | Polyvalue Below Surface (S8) (LRR R, MLRA 149B) | | | | 2 cm Muck (A10) (LRR K, L, MLRA 149B) | |
| Histic Epipedon (A2) | | | Thin Dark Surface (S9) (LRR R, MLRA 149B) | | | | Coast Prairie Redox (A16) (LRR K, L, R) | |
| Black Histic (A3) | | | Loamy Mucky Mineral (F1) (LRR K, L) | | | | 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) | |
| Hydrogen Sulfide (A4) | | | Loamy Gleyed Matrix (F2) | | | | Dark Surface (S9) (LRR K, L, M) | |
| Stratified Layers (A5) | | | X Depleted Matrix (F3) | | | | Polyvalue Below Surface (S8) (LRR K, L) | |
| Depleted Below Dark Surface (A11) | | | Redox Dark Surface (F6) | | | | Thin Dark Surface (S9) (LRR K, L) | |
| Thick Dark Surface (A12) | | | Depleted Dark Surface (F7) | | | | Iron-Manganese Masses (F12) (LRR K, L, R) | |
| Sandy Mucky Mineral (S1) | | | Redox Depressions (F8) | | | | Piedmont Floodplain Soils (F19) (MLRA 149B) | |
| Sandy Gleyed Matrix (S4) | | | | | | | Mesic Spodic (TA6) (MLRA 144A, 145, 149B) | |
| Sandy Redox (S5) | | | | | | | Red Parent Material (F21) | |
| Stripped Matrix (S6) | | | | | | | Very Shallow Dark Surface (TF12) | |
| Dark Surface (S7) (LRR R, MLRA 149B) | | | | | | | Other (Explain in Remarks) | |
| ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. | | | | | | | | |
| Restrictive Layer (if observed): | | | | | | | Hydric Soil Present? | |
| Type: _____ | | | | | | | YES | |
| Depth (inches): _____ | | | | | | | | |
| Remarks: | | | | | | | | |

| Tree Stratum | (Plot size: _____) | Absolute % Cover | Dom. Sp? | Indicator Status | |
|---|--------------------------------------|---------------------|---------------|---------------------|--|
| 1. | | | | | Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>6</u> (A) # Dominants across all strata: <u>6</u> (B) % Dominants OBL, FACW, FAC: <u>100%</u> (A/B) |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | | = Total Cover | | Prevalence Index Worksheet: Total % Cover of: _____ Multiply By: _____ OBL <u>71</u> x 1 = <u>71</u> FACW <u>31</u> x 2 = <u>62</u> FAC <u>3</u> x 3 = <u>9</u> FACU <u>1</u> x 4 = <u>4</u> UPL _____ x 5 = _____ Sum: <u>106</u> (A) <u>146</u> (B) Prevalence Index = B/A = <u>1.38</u> |
| Sapling Stratum (Plot size: _____) | | | | | |
| 1. | Betula alleghaniensis | 3 | X | FAC | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | 3 | = Total Cover | | Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is > 50% <input checked="" type="checkbox"/> Prevalence Index is <= 3.0 <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (explain) <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> Morphological Adaptations <small>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</small> |
| Shrub Stratum (Plot size: 15'RAD) | | | | | |
| 1. | Cornus alba | 15 | X | FACW | |
| 2. | Salix bebbiana | 15 | X | FACW | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| | | 30 | = Total Cover | | Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height. Hydrophytic Vegetation Present? <u>YES</u> |
| Herb Stratum (Plot size: 5' RAD) | | | | | |
| 1. | Carex comosa | 38 | X | OBL | |
| 2. | Carex crinita | 15 | X | OBL | |
| 3. | Eutrochium maculatum | 15 | X | OBL | |
| 4. | Asclepias incarnata | 3 | | OBL | |
| 5. | Ageratina altissima | 1 | | FACU | |
| 6. | Symphytotrichum novae-angliae | 1 | | FACW | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |
| | | 73 | = Total Cover | | |
| Woody Vines (Plot size: _____) | | | | | |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| | | | = Total Cover | | |

Remarks: (If observed, list morphological adaptations below).
Epilobium sp. Observed at 1%



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

H16-Create

| | | | | | |
|--|------------------------------------|---------------------------------------|----------------|-----------------|----------------|
| Project Site: | JPR Golf Course Wetland Mitigation | City/County: | Jay/Orleans | Samp. Date: | 8/13/2015 |
| Applicant/Owner: | Jay Peak Resort | State: | VERMONT | Sampling Point: | H16-Create |
| Investigator(s): | P. Werts-Kallfelz | Section, Township, Range: | Jay | | |
| Landform (hillslope, terrace, etc.): | Terrace | Local relief (concave, convex, none): | Concave | Slope (%): | |
| Subregion (LRR or MLRA): | LRR | Lat: | 44°56'32.121"N | Long: | 72°30'40.583"W |
| Soil Map Unit: | Cabot | | | Datum: | NAD 83 |
| | | | | NWI Class: | PEM |
| Are climatic/hydrologic conditions on the site typical for this time of year? YES (If no, explain in Remarks.) | | | | | |
| Are Vegetation, Soil, or Hydrology significantly disturbed? NO Normal Circumstances? YES | | | | | |
| Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.) | | | | | |

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

| | | |
|---------------------------------|-----|---|
| Hydrophytic Vegetation Present? | YES | Is This Sample Area Within a Wetland? YES |
| Hydric Soil Present? | YES | |
| Wetland Hydrology Present? | YES | |
| Remarks: | | |

HYDROLOGY

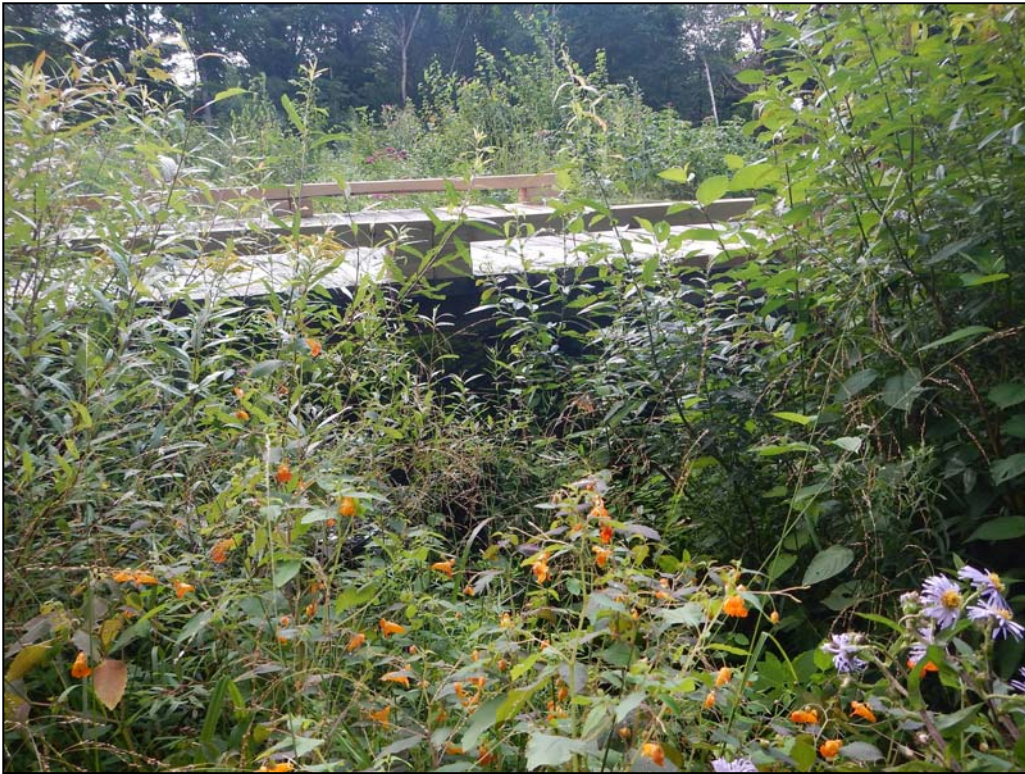
| | | | |
|--|---|--|--|
| Wetland Hydrology Indicators: | | Secondary Indicators (minimum of two required) | |
| Primary Indicators (minimum of one is required; check all that apply) | | | |
| <input checked="" type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Water-Stained Leaves (B9) | <input type="checkbox"/> Surface Soil Cracks (B6) | |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Aquatic Fauna (B13) | <input type="checkbox"/> Drainage Patterns (B10) | |
| <input checked="" type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Marl Deposits (B13) | <input type="checkbox"/> Moss Trim Lines (B16) | |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) | <input type="checkbox"/> Dry-Season Water Table (C2) | |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) | <input type="checkbox"/> Crayfish Burrows (C8) | |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) | <input type="checkbox"/> Saturation Visible on Aerial (C9) | |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) | <input type="checkbox"/> Stunted or Stressed Plants (D1) | |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Thin Muck Surface (C7) | <input type="checkbox"/> Geomorphic Position (D2) | |
| <input type="checkbox"/> Inundation Visible on Aerial (B7) | <input type="checkbox"/> Other (Explain in Remarks) | <input type="checkbox"/> Shallow Aquitard (D3) | |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | | <input type="checkbox"/> Microtopographic Relief (D4) | |
| | | <input type="checkbox"/> FAC-Neutral Test (D5) | |
| Field Observations: | | | |
| <input checked="" type="checkbox"/> Surface Water Present? | Depth (inches): | Wetland Hydrology Present? YES | |
| <input type="checkbox"/> Water Table Present? | Depth (inches): | | |
| <input checked="" type="checkbox"/> Saturation Present? | Depth (inches): | | |
| Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: | | | |
| 1.3" in the last 5 days at Jay Peak (NOAA) | | | |
| Remarks: | | | |

SOIL

| | | | | | | | | |
|---|--|-----|----------------|--|-------------------|------------------|-----------------|---------------------------|
| Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) | | | | | | | | |
| Depth | Matrix | | Redox Features | | | | Texture | Remarks |
| (in) | Color (moist) | % | Color (moist) | % | Type ¹ | Loc ² | | |
| 0-8 | 10YR 3/2 | 100 | | | | | SILT LOAM | |
| 8-14+ | 2.5Y 5/2 | 97 | 10YR 4/6 | 3 | C | M | FINE SANDY LOAM | Redox - Common, Prominent |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| ¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. | | | | | | | | |
| ² Location: PL=Pore Lining, M=Matrix. | | | | | | | | |
| Hydric Soil Indicators: | | | | Indicators for Problematic Hydric Soils ³ : | | | | |
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR R, MLRA 149B) | | | <input type="checkbox"/> 2 cm Muck (A10) (LRR K, L, MLRA 149B) | | | | |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Thin Dark Surface (S9) (LRR R, MLRA 149B) | | | <input type="checkbox"/> Coast Prairie Redox (A16) (LRR K, L, R) | | | | |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR K, L) | | | <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) | | | | |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) | | | <input type="checkbox"/> Dark Surface (S9) (LRR K, L, M) | | | | |
| <input type="checkbox"/> Stratified Layers (A5) | <input checked="" type="checkbox"/> Depleted Matrix (F3) | | | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR K, L) | | | | |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) | | | <input type="checkbox"/> Thin Dark Surface (S9) (LRR K, L) | | | | |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) | | | <input type="checkbox"/> Iron-Manganese Masses (F12) (LRR K, L, R) | | | | |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) | | | <input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 149B) | | | | |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | | | | <input type="checkbox"/> Mesic Spodic (TA6) (MLRA 144A, 145, 149B) | | | | |
| <input type="checkbox"/> Sandy Redox (S5) | | | | <input type="checkbox"/> Red Parent Material (F21) | | | | |
| <input type="checkbox"/> Stripped Matrix (S6) | | | | <input type="checkbox"/> Very Shallow Dark Surface (TF12) | | | | |
| <input type="checkbox"/> Dark Surface (S7) (LRR R, MLRA 149B) | | | | <input type="checkbox"/> Other (Explain in Remarks) | | | | |
| ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic. | | | | | | | | |
| Restrictive Layer (if observed): | | | | Hydric Soil Present? YES | | | | |
| Type: _____ | | | | | | | | |
| Depth (inches): _____ | | | | | | | | |
| Remarks: | | | | | | | | |

Northcentral and Northeast Region - Version 2.0
(Adapted By: Douglas A. DeBerry, PhD, PWS, PWD)

Jay Peak Resort Golf Course – Jay, Vermont



Photograph 1: H5-TB3 from Station H5-TB3-P1, facing east (P. Werts, 8/14/15)



Photograph 2: H5-TB1 from Station H5-TB1-P1, facing south (P. Werts, 8/14/15)

Jay Peak Resort Golf Course – Jay, Vermont



Photograph 3: H5-Create from Station H5-Create-P1, facing northeast (P. Werts, 8/14/15)



Photograph 4: H6-WT1, from Station H6-WT1-P1, facing southeast (P. Werts, 8/14/15)

Jay Peak Resort Golf Course – Jay, Vermont



Photograph 5: H6-WT1, from Station H6-WT1-P2, facing east (P. Werts, 8/14/15)



Photograph 6: H6-TB1 from Station H6-TB1-P1, facing south (P. Werts, 8/14/15)

Jay Peak Resort Golf Course – Jay, Vermont



Photograph 7: H6-TB1 from Station H6-TB1-P2, facing northwest (P. Werts, 8/14/15)



Photograph 8: WH-WT1 from Station WH-WT1-P1, facing northeast (P. Werts, 8/14/15)

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Photograph 9: WH-WT2 from Station WH-WT2-P1, facing southwest (P. Werts, 8/14/15)



Photograph 10: H7-SC1 from Station H7-SC1-P1, facing southeast (P. Werts, 8/14/15)

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Photograph 11: H4-WT1/2 from Station H4-WT1-P1, facing southeast (P. Werts, 8/14/15)



Photograph 12: H4-WT3 from Station H4-WT3-P1, facing east (P. Werts, 8/14/15)

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Photograph 13: H8-SC3 from Station H8-SC3-P1, facing east (P. Werts, 8/14/15)



Photograph 14: H8-SC1 from Station H8-SC1-P1, facing northeast (P. Werts, 8/14/15)

Jay Peak Resort Golf Course – Jay, Vermont



Photograph 15: H8-Create from Station H8-Create-P1, facing northeast (P. Werts, 8/14/15)



Photograph 16: H1-WT1 from Station H1-WT1-P1, facing north (P. Werts, 8/14/15)

Jay Peak Resort Golf Course – Jay, Vermont



Photograph 17: P2-TB1 looking upstream from Station P2-TB1-P1, facing southwest (P. Werts, 8/14/15)



Photograph 18: P2-TB1 looking downstream from Station P2-TB1-P1, facing northeast (P. Werts, 8/14/15)

Jay Peak Resort Golf Course – Jay, Vermont



Photograph 19: P2-TB1 looking upstream from Station P2-TB1-P2, facing southwest (P. Werts, 8/14/15)



Photograph 20: P2-TB1 looking upstream from Station P2-TB1-P3, facing southwest (P. Werts, 8/14/15)

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Photograph 21: H11-WT2/3 from Station H11-WT2/3-P1, facing southwest (P. Werts, 8/13/15)



Photograph 22: H11-TB1 from Station H11-TB1-P1, facing northwest (P. Werts, 8/13/15)

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Photograph 23: H11-Create from Station H11-Create-P1, facing northwest (P. Werts, 8/13/15)



Photograph 24: H11-Create from Station H11-Create-P2, facing southeast (P. Werts, 8/13/15)

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Photograph 25: H11-TB2 from Station H11-TB2-P1 facing north (P. Werts, 8/13/15)



Photograph 26: H11-WT6 from Station H11-WT6-P1, facing northeast (P. Werts, 8/13/15)

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Photograph 27: H12-TB1u from Station H12-TB1u-P1, facing south (P. Werts, 8/13/15)



Photograph 28: H13-TB1u from Station H13-TB1u-P1, facing north (P. Werts, 8/13/15)

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Photograph 29: H13-TB2 from Station H13-TB2-P1, facing south (P. Werts, 8/13/15)



Photograph 30: H13-SC/TB3 from Station H13-SC/TB3-P1, facing north (P. Werts, 8/13/15)

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Photograph 31: H13-WT1/a/b from Station H13-WT1/a/b-P1, facing north (P. Werts, 8/13/15)



Photograph 32: H13-WT2-from Station H13-WT2-P1, facing west (P. Werts, 8/13/15)

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Photograph 33: H13-WT3 from Station H13-WT3-P1, facing southwest (P. Werts, 8/13/15)



Photograph 34: H14-WT1u from Station H14-WT1u-P1, facing southeast (P. Werts, 8/13/15)

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Photograph 35: H14-SC1 from Station H14-SC1-P1, facing northwest (P. Werts, 8/13/15)



Photograph 36: H14-WT2/3 from Station H14-WT2/3-P1, facing west (P. Werts, 8/13/15)

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Photograph 37: H14-WT1d from Station H14-WT1d-P1, facing southeast (P. Werts, 8/13/15)



Photograph 38: H15-TB1 from Station H15-TB1-P1, facing south (P. Werts, 8/13/15)

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Photograph 39: H15-WT1 from Station H15-WT1-P1, facing south (P. Werts, 8/13/15)



Photograph 40: H13-TB1d from Station H15-TB1d-P1, facing north (P. Werts, 8/13/15)

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Photograph 41: H12-TB1d from Station H12-TB1d-P1, facing south (P. Werts, 8/13/15)



Photograph 42: H16-Create from Station H16-Create-P1, facing southwest (P. Werts, 8/13/15)

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Photograph 43: H16-Create from Station H16-Create-P2, facing northwest (P. Werts, 8/13/15)



Photograph 44: H16-SC1 from Station H16-SC1-P1, facing northwest (P. Werts, 8/13/15)

APPENDIX E

**MITIGATION REPORT
TRANSMITTAL AND SELF-CERTIFICATION**

DEPARTMENT OF THE ARMY PERMIT NUMBER: NAE-2008-1314
PROJECT TITLE: Jay Peak Resort Golf Course

PERMITTEE: 4850 VT Route 242
MAILING ADDRESS: Jay, VT 05859

TELEPHONE: 802-988-2726

AUTHORIZED AGENT: Vanasse Hangen Brustlin, Inc.
MAILING ADDRESS: 40 IDX Drive, Building 100, Suite 200
South Burlington, VT 05403

TELEPHONE: 802-497-6100

ATTACHED MITIGATION REPORT TITLE: Jay Peak Resort Golf Course Mitigation - Fifth Annual (2015)
Mitigation Monitoring Report

PREPARERS: Vanasse Hangen Brustlin, Inc.
DATE: February 4, 2015

CERTIFICATION OF COMPLIANCE: I certify that the attached report is accurate and discloses that the mitigation required by the Department of the Army Permit is is not in full compliance with the terms and conditions of that permit.

CORRECTIVE ACTION: A need for corrective action is is not identified in the attached report.

CONSULTATION: I do do not request consultation with the Corps of Engineers to discuss a corrective strategy or permit modification.

CERTIFIED: _____

(Signature of permittee)

2/11/16
Date