January 10, 2014

Ref: 57276.03

Ms. Martha Abair
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
Third Annual (2013) Monitoring Report

Dear Marty:

On behalf of Jay Peak Resort ("JPR"), Vanasse Hangen Brustlin, Inc. ("VHB") has prepared the enclosed report and supporting documentation to summarize the results of the third 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, and

- 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, Third Annual (2013) Mitigation Report* and Appendix with supporting documentation, as well as a complete electronic copy on compact disc.

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On behalf of JPR, VHB would like to thank you for your continued collaboration with JPR and VHB for the ongoing golf course monitoring efforts, and for reviewing this monitoring report. Please do not hesitate to contact me if you have any questions or comments.

Sincerely,
VANASSE HANGEN BRUSTLIN, INC.

Patti B. Kallfelz-Werts
Environmental Scientist

PBW/jkw

cc: Denise Leonard, U. S. Environmental Protection Agency
Policy Analyst/ Technical Support Branch ("PATS"), USACE
Robert Moore, JPR (electronic copy only)

Enclosure:

- *Jay Peak Resort – Golf Course Wetland and Stream Mitigation – Third Annual (2013) Mitigation Monitoring Report* (one hardcopy and one electronic copy)

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Third Annual (2013) Mitigation Monitoring Report

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

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

Prepared by: **Vanasse Hangen Brustlin, Inc.**
7056 U.S. Route 7
North Ferrisburgh, VT 05473

January 10, 2014

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1.0 Introduction

On behalf of Jay Peak Resort ("JPR"), Vanasse Hangen Brustlin, Inc. ("VHB") has prepared this report to present the findings of the third year of post-construction monitoring of the restoration work which was 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, page 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), 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, in addition to the creation of 1.86 acres of wetland (VHB 2010). The first two years of annual monitoring conducted by VHB in July 2011 and 2012, indicated that all performance standards were being met in 2011, and most of the performance standards were being met in 2012 (see Table 1 below). The results of the Year Three (2013) monitoring indicate that all but one of the performance standards are being met at this time. The one performance standard which is not currently being met involves the presence of vernal pool indicator amphibian species within a select number of restored or created wetlands. The absence of the vernal pool species does not indicate an

oversight on the part of JPR or failure to comply with the conditions of the IP since JPR has not undertaken any changes to these features that would affect their ability to support vernal pool, or any, biota. The field activities for the Year Three (2013) monitoring took place on August 15 and 16, 2013, and were conducted by VHB Environmental Scientists. A summary description of each standard and Year Three (2013) 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 (?) Year 1 (2011)	Performance Standard Met (?) Year 2 (2012)	Performance Standard Met (?) Year 3 (2013)
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%
	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%
	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

Table 1: Performance Standard Outline and Success Measure

Performance Standard	Success Criteria	Monitoring Method	Performance Standard Met (?) Year 1 (2011)	Performance Standard Met (?) Year 2 (2012)	Performance Standard Met (?) Year 3 (2013)
2. Re-establish (or establish in the created wetlands) wetland hydrology	Clear evidence of hydrology based on the criteria in the R*egional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Regional Supplement) (USACE 2012)	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
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
	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)

Table 1: Performance Standard Outline and Success Measure

Performance Standard	Success Criteria	Monitoring Method	Performance Standard Met (?) Year 1 (2011)	Performance Standard Met (?) Year 2 (2012)	Performance Standard Met (?) Year 3 (2013)
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.
	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

A site visit was conducted, prior to the Year Three monitoring, with representatives from USACE, U.S. Environmental Protection Agency ("EPA"), JPR, and VHB on June 20, 2013, in order to review the overall condition of the mitigation areas, and to determine if any features required repair after the spring snow melt or early precipitation events. Overall, the mitigation features were found to be in good condition following winter 2012/2013, with remedial repairs needed in certain locations. The problem areas and the repairs are discussed below in Section 6 (Stream Assessments) and Section 8 (Remedial Actions).

2.0 Summary and Monitoring Methodologies

The mitigation features are, in general, performing consistent with expectations. The wetland vegetation communities continue to develop (including new species observed

to be colonizing from adjacent previously undisturbed wetlands), all of the mitigation wetland features show evidence of wetland hydrology, all of the wetland features demonstrates groundwater recharge/ discharge function, several of the wetland features are also providing wildlife habitat function; at the time of the Year Three monitoring data collection, the restored streams are stable and developing 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 5-year monitoring period, VHB conducted the Year Three monitoring in approximately the same locations (using the same data plot designations) and using the same methodologies that were established in Year One. As stated above, the Year Three monitoring 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 first two 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 the one-meter square plots or wetland determination data plots, established during the Year One monitoring (see Mitigation Monitoring Map Set on pages 2 through 9 of the Appendix for plot locations). Data collection for Year Three monitoring was repeated at approximately the same points as in Year One.

   VHB also completed USACE Wetland Determination Data Forms for a selection of restored or created wetland features (see pages 13 through 28 of the Appendix). Those wetlands which were determined to need full wetland data collection to monitor the

development of the three wetland criteria, prior to the Year One monitoring (2011), were again the subject of full wetland data collection during 2013. These features include: H11-Create, H11-WT6, H13-WT1/1a/1b, H14-WT2/3, 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 survival of the planted shrubs. For features that are close to, or smaller in size than, the 0.02-acre monitoring plots used, all the planted shrubs within the feature were counted. Natural recruits will be included in the shrub tally as they become established.

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 3 (2013) Monitoring Photographs on pages 29 through 50 of the Appendix) to ensure the restored and created features are developing naturally and blending with the adjacent, undisturbed features.

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 data determination data collection 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.

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 monitoring activities. VHB previously identified the functions and values of Groundwater Recharge/ Discharge and Wildlife Habitat as the target functions to be restored. The results of this assessment are provided in Table 2 in Section 4.0.

   Because no evidence of use by vernal pool indicator species was found during the Year Two monitoring in wetlands WH-WT1, H13-WT2, and H14-WT1, no formal vernal pool survey was conducted. Although VHB did not conduct a formal vernal pool assessment for any of the restored or created wetlands in Year Three, during the June 2013 site visit, the three target wetlands were observed for the presence of vernal pool species, but none were found.

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 problems to be addressed, such as bank erosion, grade control structure instability, incursion by golfers, course maintenance operations, etc. 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). A pre-monitoring site visit conducted with the USACE and the EPA on June 20, 2013, showed two streams had sustained erosional damage during a storm event that occurred in late May 2013, including bank scouring, and in one case, bank failure. Streams P2-TB1 and H8-TB 2 (which was not part of the golf course mitigation activities) had previously eroded and

been repaired in 2012. The follow-up repairs discussed with the USACE and EPA were made prior to the August monitoring activities. The repairs undertaken to Stream P2-TB1 were minor in nature, and involved re-establishing a small area of stream bank, which had been previously repaired (see "June 20, 2013 Golf Course Field Inspection with USACE and EPA" meeting summary on pages 51 through 52 of the Appendix); seed and erosion control blanket were applied in July, prior to the official Year Three monitoring activities. During the August monitoring, it was observed that this feature had been stabilized with the growth of the seed that had been applied and showed no further areas of instability or erosion.

3.0 Vegetation Data Results

3.1 Herbaceous

Monitoring efforts found that the total average relative herbaceous cover within the wetlands and within the floodplains of the restored streams is over 100 percent, and is approximately 129 percent overall (see Herbaceous Species and Cover Summary Data from $1m^2$ Plots and Wetland Data Plots table on pages 10 and 11 of the Appendix), all of which exceeds 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, that 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*).

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, these were not included in the shrub survival assessments. Very few dead tubelings were observed during the various site visits conducted in 2013. Rather, the tubelings were observed to be thriving, with the large majority of the stems showing significant added height and/or areal coverage during the 2013 growing season.

Based on the data obtained from the permanent vegetation monitoring plots, the overall shrub survival rate for the restored and created wetlands is 80 percent, and within the larger stream segment restorations is approximately 82 percent (see Woody Stem Survival Assessment Based on 0.02-acre Permanent Vegetation Monitoring Plots and Wetland Data Plots summary table on page 12 of the Appendix), which continues to meet the performance standards of 80 percent survival rate of planted shrubs.

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 2012. It is anticipated that additional species will continue to "volunteer" from the surrounding, undisturbed woodlands. VHB noted such volunteer species as yellow birch (*Betula alleghaniensis*) , pin cherry (*Prunus pensylvanica*), and red maple (*Acer rubrum*) within a number of the restored and created wetlands, including Wetlands H6-WT1, H11-WT6, H13-WT3, and H15-WT1. It is expected that these and

[1] The 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 2013).

other volunteer species will continue to naturally propagate and may be represented within the permanent vegetations 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 success criterion 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 Hydrology[2]	Principal Functions and Values[3]
H5-Create	5	1	A3 (Saturated); B4 (Algal mat or crust); B9 (Water-stained leaves)	Groundwater recharge/ discharge and Floodflow alteration (evidence of water retention and adjacent to perennial stream); Wildlife habitat (pickerel frogs (*Rana palustris*)) and various songbirds observed
H6-WT1	6	1	A3 (Saturated); B4 (Algal mat or crust); B9 (Water-stained leaves)	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 (*Rana palustris*))
WH-WT2	6	1	A1 (Surface water); 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)

[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 Hydrology[2]	Principal Functions and Values[3]
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	A3 (Saturation); B9 (Water-stained leaves); B10 (Drainage patterns)	Groundwater recharge/ discharge (evidence of standing water)
H8-Create	8	3	A3 (Saturation); B1 (Water marks); B9 (Water-stained leaves); B10 (Drainage patterns)	Groundwater recharge/ discharge and Floodflow alteration (adjacent to intermittent stream with dense vegetation)
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	A3 (Saturation); B10 (Drainage patterns)	Groundwater recharge/ discharge (adjacent to small perennial stream)
H11-Create	11	6	B9 (Water-stained leaves); [A1 (Surface water); A2 (High water table); A3 (Saturation); B10 (Drainage patterns) present in other areas of wetland]	Groundwater recharge/ discharge (evidence of water retention)
H11-WT6	11	6	A3 (Saturation); B9 (Water-stained leaves; B10 (Drainage patterns)	Groundwater recharge/ discharge (evidence of water retention and ground water discharge)
H16-WT1/ H11-WT1	16	6	A3 (Saturation); B4 (Algal mat or crust); 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	B4 (Algal mat or crust); B9 (Water-stained leaves); B10 (Drainage patterns); [A1 (Surface water); A2 (High water table): A3 (Saturation) present in other portions of the wetland]	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)	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); B13 (Aquatic fauna)	Groundwater recharge/ discharge and Wildlife habitat (groundwater discharge points observed; pickerel frog and green frog (*Lithobates clamitans*) tadpoles observed
H13-WT3	13	7	A1 (Surface water); A2 (High water table); A3 (Saturation); B10 (Drainage patterns)	Groundwater recharge/ discharge (standing water at the time of monitoring)

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

Feature	Hole #	VHB Map #	Evidence of Hydrology[2]	Principal Functions and Values[3]
H14-WT2/3	14	7	A3 (Saturation); B4 (Algal mat or crust); B9 (Water-stained leaves); B10 (Drainage patterns)	Groundwater recharge/ discharge (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); 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 Three 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 2013, all of the restored and created wetlands are providing the function of Groundwater Recharge/ Discharge and/or Wildlife Habitat, thus meeting performance standards; in addition, several of the restored or created wetlands showed evidence of functioning for Floodflow Alteration. The results of this assessment are listed, by feature, above in Table 2.

5.1 Vernal Pool Biology Assessment

Based on the negative results of a vernal pool assessment for biological indicator species conducted in Year Two, VHB did not conduct a similar assessment in Year Three. In 2013, during the June site visit, observations were made at the three target wetlands to determine the presence or absence of those indicator species. If there had been breeding activity by the known vernal pool indicator species in the three target wetlands, the young would have still occupied the wetlands. As in Year Two, there was no evidence of use by vernal pool indicator species, although there had been evidence, in both Years Two and Three of use by other amphibian species in two wetlands (H5-Create and H13-WT2). 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. VHB does not recommend continuing to conduct separate surveys for vernal pool species during the remaining monitoring years, however observations during the typical late spring field visits should show if any of the target wetlands are used by vernal pool indicator species.

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 continue to develop and naturalize 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.

As described above, prior to the August monitoring activities, during a June site visit with USACE and EPA, one stream, P2-TB1, exhibited further signs of erosion which required follow up repair. The banks of Stream P2-TB1 had been severely eroded, and one grade control structure compromised during a high precipitation event in Spring 2012. As part of the normal photograph collection for monitoring, each restored stream was photographed to show representative conditions (see Golf Course Mitigation Monitoring – Year Three Photographs on pages 29 through 50 of the Appendix).

7.0 Invasive Plant Species

In 2013, VHB observed the same 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 is was approximately the same dimensions. During the Year Three monitoring, it was noted that this population of common reed shows signs of stress, (i.e., looking less dense and vigorous than in previous years), and indicates that the continued cutting and targeted treatment with herbicide is having an effect. It has not spread within the wetland, or to other features, it should continue to be monitored and treated as necessary to ensure that it does not spread to other restored or created features.

During the 2013 monitoring, VHB observed a small population of reed canary grass (*Phalaris arundinacea*) in Wetland H13-WT3. This population, which was not present in 2012, was approximately two-feet by two-feet in size. Because the seed had already dispersed by the time of the 2013 monitoring, the small population was hand removed

for disposal off-site, but no further treatment was conducted or recommended for 2013. This area should be monitored in the future to ensure the reed canary grass does not spread to other wetland features; if it re-emerges in 2014, the plants should be hand-pulled and treatment with herbicide considered if the population is significantly larger than in 2013.

During Year Two monitoring, VHB observed three small populations of invasive species, (in addition to the common reed in Wetland H4-WT1/2): reed canary grass in Wetland H11-WT6, and purple loosestrife (*Lythrum salicaria*) within wetlands H8-Create and H11-Create. At the time of the 2012 monitoring, the reed canary grass had already released seeds, so it was not treated; the two small populations of purple loosestrife, which were both in flower, were hand-pulled for disposal off-site. These three small populations were not found during the Year Three monitoring.

8.0 Remedial Actions

As discussed above and detailed in the June 20, 2013 USACE Meeting minutes (Appendix pages 51 through 52), JPR undertook minor, follow-up repairs in summer 2013, in Stream P2-TB1, which had sustained three areas of bank failure in 2012. This stream was originally repaired in Fall 2012, during a relatively dry time of year, and the follow up work consisted of the re-application of seed in order to ensure the repaired slope remains stable. This area will continue to be monitored in the future to ensure the repair is stable. The other remedial repairs undertaken in 2012, which are summarized in the "June 20, 2013 Golf Course Field Inspection with USACE and EPA" (Appendix pages 51 through 52) were inspected to ensure stability of the repairs.

9.0 Conclusions/ Recommendations

Overall, the JPR golf course mitigation areas are meeting or exceeding performance standards. Field monitoring efforts identified average, overall herbaceous vegetation cover of over 100 percent; and overall shrub survival rates of approximately 80 percent. Both of these results meet or exceed the 80 percent herbaceous cover and meet the 80 percent shrub survival rate performance standards which were set in the Mitigation Plan. Based on the 2013 results, VHB anticipates that both the herbaceous cover and shrub survival rates within the various restoration and creation areas should continue to meet or surpass the performance criteria. Although the shrub survival rate was found to be at the lower end of the acceptable 80 percent survival performance standard in 2013, this should not be a significant 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 2013 have been observed to be thriving and natural recruits have begun to emerge in a portion of the features, the overall goal of shrubs providing structure to the vegetation communities including a minimum of areal coverage and prevention of soil erosion, would be met should the survival rate fall below the performance standard.

Based on the three years of data and observations collected and analyzed by VHB, and the success of the restored streams and the restored/created wetlands, VHB would recommend a reduction in the quantity of data collected for the mitigation monitoring, starting in 2014. Although JPR and VHB understand that a reduction in the minimum duration of monitoring (five years) is not possible, based on the success of the restored streams and restored/created wetlands, the full suite of quantitative data collection may not be necessary to prove that these features are meeting the minimum performance standards. Prior to the Year Four (2014) monitoring activities, JPR and VHB would recommend revisions to the required data collection standards to either an overall qualitative review of each feature method; or to a combination of qualitative

observations and reduced quantitative data collection. VHB understands that any changes to the current, approved system of monitoring data collection would need to be approved by the USACE.

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 on page 53 of the Appendix.

10.0 References

Lichvar, Robert W. 2013. "The National Wetland Plant List: 2013 Wetland Ratings". *Phytoneuron 2013-49: 1 – 241*. Published July 2013. ISSN 2153 733X.

New England Environmental, Inc. (NEE). 2010. *Post Construction Report – Wetland/Stream Restoration – Jay Peak Golf Course*. NEE File #: 10-3758.

U.S. Army Corps of Engineers (USACE). 2011. Permit Number: NAE-2008-1314. Department of the Army - New England District – Regulatory Division.

USACE. 2011. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*, ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-09-19. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

USACE 1999. U.S. Army Corps of Engineers – New England District. 1999. *The Highway Methodology Workbook: Supplement: Wetland Functions and Values – A Descriptive Approach*. NAEEP-360-1-30a.

USACE 2010. New *England District Compensatory Mitigation Guidance.* USACE – New England district – Regulatory Division.

VHB Pioneer (VHBP). 2009. *Jay Peak Resort Golf Course 2009 Restoration and Mitigation Implementation Plan*.

VHBP. 2010. *Jay Peak Resort – 2009 Golf Course Restoration Monitoring Report*.

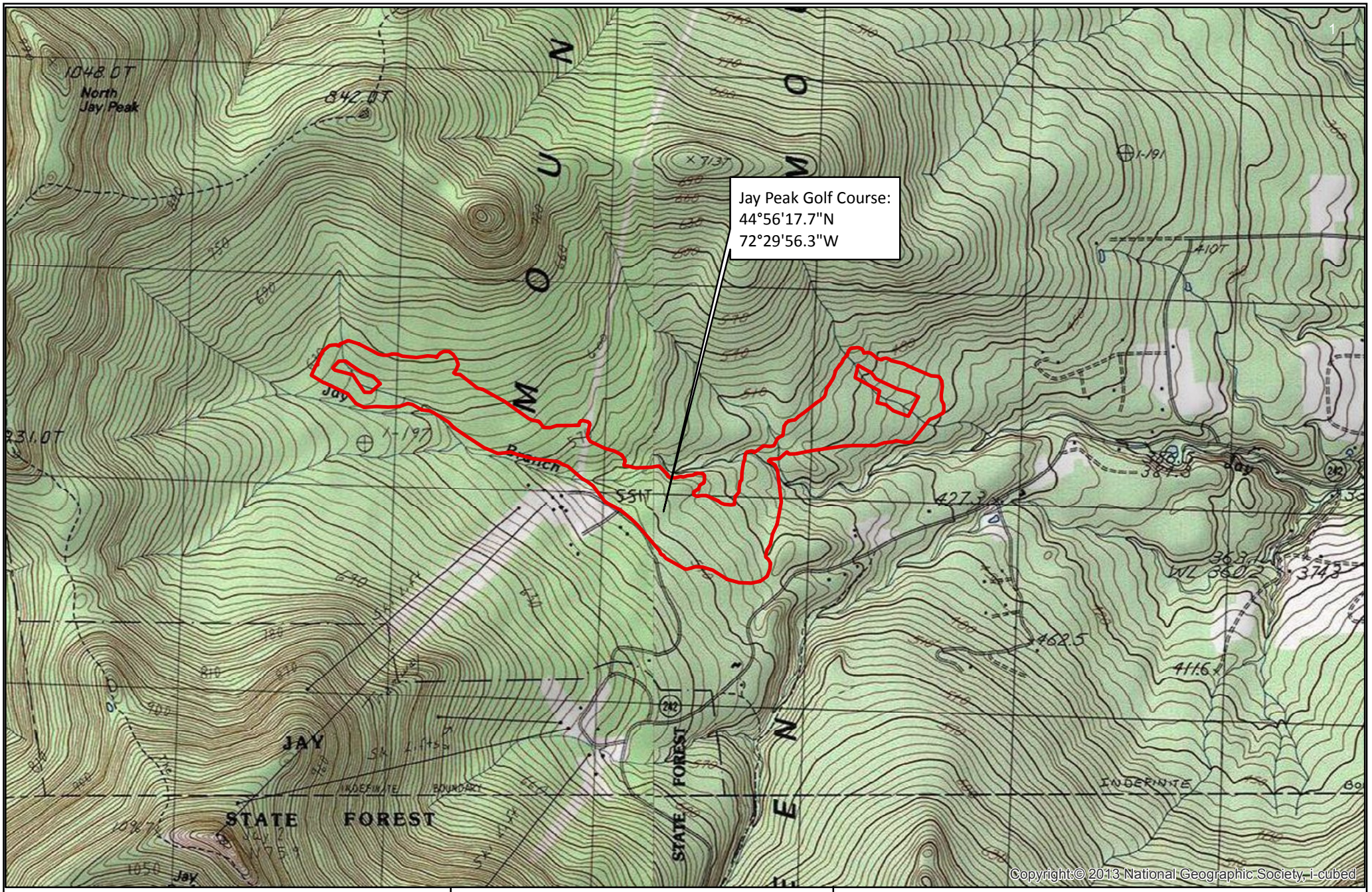
VHB 2010. *Jay Peak Resort Golf Course 2010 Restoration and Mitigation Implementation Plan*.

VHB. 2010. *2010 Golf Course Restoration Monitoring Report – Jay Peak Resort*.

VHB 2012. *Jay Peak Resort – Golf Course Wetland and Stream Mitigation – First Annual (2011) Mitigation Monitoring Report*.

VHB 2013. *Jay Peak Resort – Golf Course Wetland and Stream Mitigation – Second Annual (2012) Mitigation Monitoring Report*.

APPENDIX



Legend

Golf Course Investigation Area

N

Jay Peak Resort Golf Course
Jay, Vermont
Site Location Map

December 16, 2013

2,000 1,000 0 2,000

Feet

Sources: USGS Topos Jay Peak (2010) and North Troy (2010) Quads from VCGI; Investigation area digitized by VHB (2008).

VHB *Vanasse Hangen Brustlin, Inc.*

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Map 7
Map 6
Map 5
Map 4
Map 3
Map 2
Map 1
Hole 13
Hole 14
Hole 15
Hole 12
Hole 11
Hole 16
Hole 17
Hole 10
Hole 18
Driving Range
Hole 8
Hole 3
Hole 9
Hole 1
Hole 2
Hole 7
Hole 6
Hole 5
Hole 4
W BOWL RD
CLUBHOUSE RD
TRAILSIDE RD
SLOPESIDE RD
JAY PEAK VILLAGE
SHORTCUT
JAY PEAK RD
N VILLAGE RD
BRIDGE RD
S VILLAGE RD
STONEY PATH RD
ACCESS RD
ROUTE 242
VT ROUTE 242
OLD JAY MONTGOMERY RD
POPLAR DR
RESERVOIR RD
bing™
© 2012 DigitalGlobe Image courtesy of USGS State of Michigan

Legend

- Approximate Golf Course Investigation Area
- Sheet Index
- Roads

700 350 0 700
Feet

Jay Peak Resort Golf Course
Jay, Vermont
Golf Course Mitigation Monitoring Index Map

December 13, 2013

N

Sources: Ortho from BingI (2011); VTrans Roads from VCGI (2008); Sheet Index of VHB Maps and VHB Investigation Area (2010).

VHB Vanasse Hangen Brustlin, Inc.

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)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 1 of 7
December 13, 2013

150 75 0 150
Feet

N

VHB *Vanasse Hangen Brustlin, Inc.*

Sources: Background: Ortho from Bing (2011); VHDStreams 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)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 2 of 7
December 13, 2013

150 75 0 150
Feet

N

Prepared by: PBW

VHB *Vanasse Hangen Brustlin, Inc.*

Sources: Background: Ortho from Bing (2011); VHDStreams 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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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)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 3 of 7
December 13, 2013

150 75 0 150
Feet

N

Prepared by: PBW

VHB *Vanasse Hangen Brustlin, Inc.*

Sources: Background: Ortho from Bing (2011); VHDStreams 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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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)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 4 of 7
December 13, 2013

150 75 0 150
Feet

N

Prepared by: PBW

VHB *Vanasse Hangen Brustlin, Inc.*

Sources: Background: Ortho from Bing (2011); VHDStreams 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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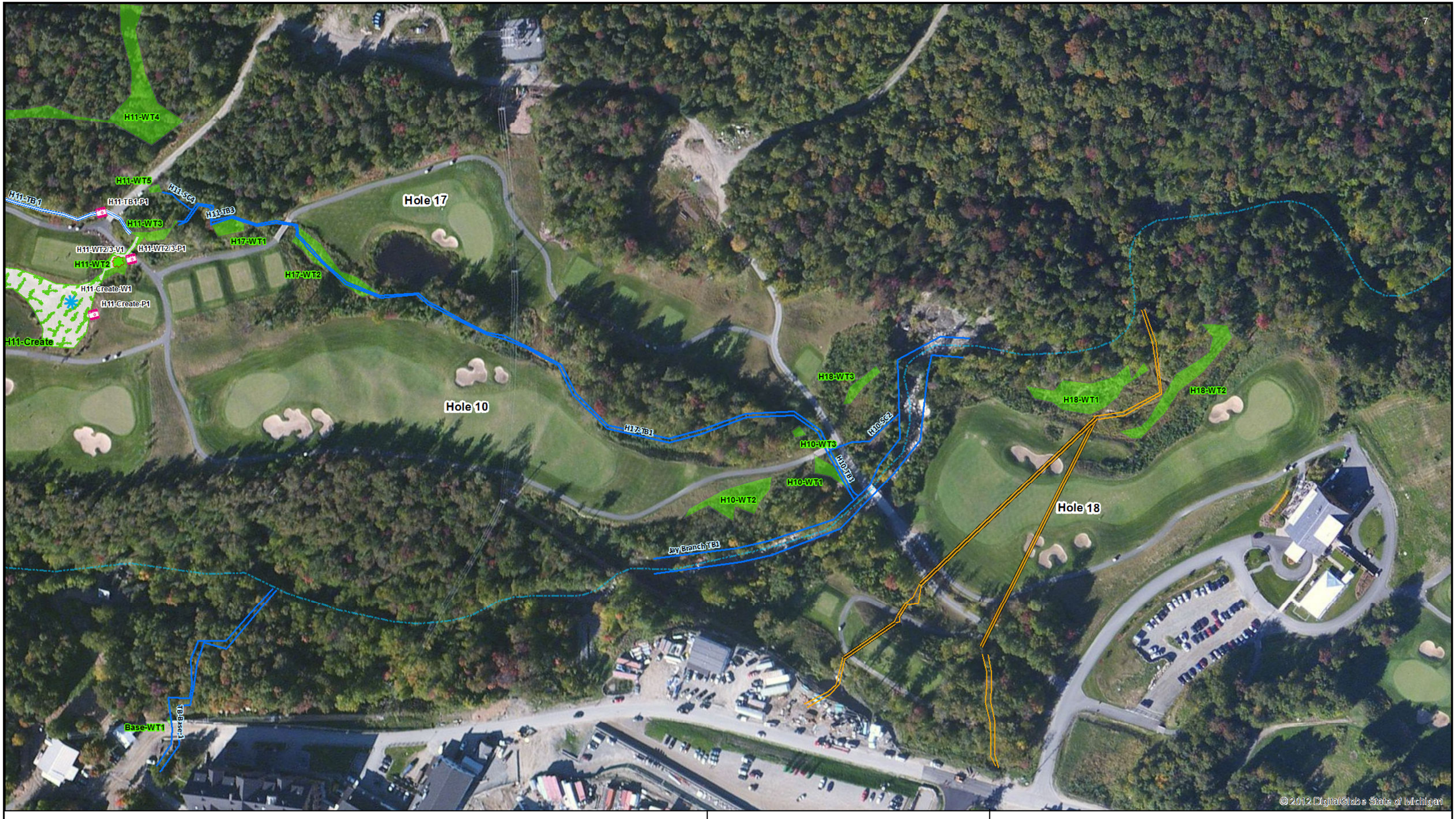

Legend

Permanent Monitoring Points
- Wetland Data Plot
- Vegetation Plot
- Photo Point

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

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 5 of 7
December 13, 2013

150 75 0 150
Feet

N

Prepared by: PBW

VHB *Vanasse Hangen Brustlin, Inc.*

Sources: Background: Ortho from Bing (2011); VHDStreams 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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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)
- VHD Streams Layer

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 6 of 7
December 13, 2013

150 75 0 150
Feet

N

Prepared by: PBW

VHB *Vanasse Hangen Brustlin, Inc.*

Sources: Background: Ortho from Bing (2011); VHDStreams 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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Legend

Permanent Monitoring Points
- Wetland Data Plot
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- Photo Point

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

Culverts
- New Culvert
- Remaining Culvert
- Stormwater Drainage Culvert

Jay Peak Resort - Jay, Vermont
Golf Course Mitigation Monitoring
Map 7 of 7
December 13, 2013

150 75 0 150
Feet

N

Prepared by: PBW

VHB *Vanasse Hangen Brustlin, Inc.*

Sources: Background: Ortho from Bing (2011); VHDStreams 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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Jay Peak Resort Golf Course Mitigation
Year Three (2013) Mitigation Monitoring Report
Herbaceous Species and Cover Summary Data from 1m^2 Plots and Wetland Data Plots
January 10, 2014

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		Wetland	Stream	Wetland		Wetland		Stream	Wetland	Wetland			Stream	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]																																
Agrostis stolonifera L.	creeping bentgrass	FACW														15																			
Asclepias incarnata L. ssp. incarnata	swamp milkweed	OBL						15	3	3																									
Bidens cernua L.	nodding beggartick	OBL										3				3																			
Carex comosa Boott	longhair sedge	OBL	3	15		15	38	15		15	38	15	15	15	15		15	38	3	3	3	15	38	15				15	15	15		15	3	15	38
Carex crinita Lam.	fringed sedge	OBL		15			15				15	15		3			3				15	3	3					15	15	15	15	38	15		15
Carex scoparia Schkuhr ex Willd.	broom sedge	FACW		3					15	3	3	3	3	3	3	3	15	15	3	3		3							15	15					
Carex vulpinoidea Michx.	fox sedge	OBL	38	15	38	38	15	15	38	38		15	38	15	15		15	15	15	38	15		15		15	38	15		15		3		38	3	
Carex utriculata Boott	Beaked sedge	OBL										3																							
Chelone glabra L.	white turtlehead	OBL																						15											
Cyperus esculentus L.	chufa flatsedge	FACW														3																			
Eleocharis obtusa (Willd.) J.A. Schultes	blunt spikerush	OBL																													3				
Elymus virginicus L.	Virginia wildrye	FACW														15		3	15									15				3			
Equisetum arvense L.	field horsetail	FAC				3								3																					
Eragrostis pectinacea (Michx.) Nees ex Steud. var. pectinacea	tufted lovegrass	FAC	3	15	3			3		3		15			3				15	15		15	15		15			38							
Eupatorium perfoliatum L.	common boneset	FACW	15	15	15	15	15	15	38	15	3			15	15		15	15	15	15	15		3		15	15	3	15	3	15	3		15	3	
Euthamia graminifolia (L.) Nutt.	flat-top goldentop	FAC		3			3	3	3		3	3	15	15	3	3	3		3	3	3	15		3	3				15	3	3				15
Eutrochium maculatum (L.) E.E. Lamont	spotted joepyeweed	OBL			3		3	3	15	3		3		3	3	15	15				3	3	3	3		15	3			3	3				15
Festuca rubra L.	red fescue	FACU														38			15																
Galium mollugo	false baby's breath	NI														3																			
Galinsoga parviflora Cav.	gallant-soldier	OBL													3																				
Glyceria canadensis (Michx.) Trin.	rattlesnake mannagrass	OBL																														15			
Glyceria melicaria (Michx.) F.T. Hubbard	melic mannagrass	OBL										15																		15			15		
Hieracium canadense Michx.	Canadian hawkweed	NI														3																			
Hypericum canadense L.	lesser Canadian St. Johnswort	FACW	5												3	3																			3
Impatiens capensis Meerb.	jewelweed	FACW	3					3			15		15				15	3					3					15		15	15	15		15	
Juncus effusus L.	common rush	OBL	3	3	15	38	15	15	15	15	38		38	38	38	3	38	15	15	38		15	15	38	15	38	15		15	15	3			15	15
Juncus tenuis Willd.	poverty rush	FAC			15	3			15					15		3		3	15	15			15	3										3	
Leersia oryzoides (L.) Sw.	rice cutgrass	OBL												15		3															38				
Lotus corniculatus L.	birdfoot deervetch	FACU																	3																

Jay Peak Resort Golf Course Mitigation
Year Three (2013) Mitigation Monitoring Report
Herbaceous Species and Cover Summary Data from 1m^2 Plots and Wetland Data Plots
January 10, 2014

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		Wetland	Stream	Wetland				Stream	Wetland	Wetland			Stream	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]																																
Lycopus americanus Muhl. ex W. Bart.	American water horehound	OBL							3																			3						
Lysimachia ciliata L.	fringed loosestrife	FACW		15		3																												
Mimulus ringens L.	Allegheny monkeyflower	OBL		3	3			3	3					3				3	3	3			3	3			3							
Nepeta cataria L.	catnip	FACU				3																												
Phleum pratense L.	timothy	FACU														15												3						
Plantago major L.	common plantain	FACU																3																
Polygonum sagittatum L.	arrowleaf tearthumb	OBL						15					3																15	15				
Ranunculus acris L.	tall buttercup	FAC																																3
Schoenoplectus acutus (Muhl. ex Bigelow) A.& D. Löve var. acutus	hardstem bulrush	OBL																															15	
Schoenoplectus tabernaemontani (K.C. Gmel.)	softstem bulrush	OBL		15																														
Scirpus atrovirens Willd.	green bulrush	OBL	3		3	3		3					3	3				3				3		3			3	3		3	3		3	3	
Scirpus cyperinus (L.) Kunth	woolgrass	OBL	3			3	15	15		3	15	38	15	3		15	15				15	15	3	15		15	38		3	15	15			15	
Solidago canadensis L.	Canada goldenrod	FACU																			15													
Solidago gigantea	giant goldenrod	FACW					3				3	3	3		15			3				3	15	3	15		3						3		
Solidago rugosa P. Mill.	wrinkleleaf goldenrod	FAC											3	15							3	3				3			15				3		
Solanum dulcamara L.	climbing nightshade	FAC																																3
Symphyotrichum novae-angliae (L.) Nesom	New England aster	FACW	3	15	3	15	15		3	3	3	3		3	15		3	3	3		15		15		15	3	15								15
Taraxacum officinale G.H. Weber ex Wiggers	common dandelion	FACU														3																		
Thalictrum pubescens Pursh	king of the meadow	FACW																						3										
Trifolium pratense L.	red clover	FACU													3																			
Trifolium repens L.	white clover	FACU			3											15		3																
Typha angustifolia L.	narrowleaf cattail	OBL		15				15			38																			3		3			
Typha latifolia L.	broadleaf cattail	OBL											3																					
Verbena hastata L.	swamp verbena	FACW		3		3		3		3	3		15				3		3	3	3	3	15		3	3	15		3	3	3		3		15
Vicia sativa L.	garden vetch	FACU														15		3	3		3	3						3						
Phalaris arundinacea L.	*reed canarygrass*	*FACW*																														3		
% Cover/Sampling Plot[4]			**79**	**150**	**101**	**142**	**137**	**141**	**151**	**104**	**177**	**134**	**169**	**167**	**134**	**176**	**155**	**128**	**129**	**136**	**108**	**99**	**161**	**104**	**96**	**130**	**113**	**125**	**114**	**150**	**122**	**86**	**101**	**87**	**137**
Average % Cover/ Feature			**79**	**126**		**140**		**141**	**151**	**104**	**177**	**134**	**169**	**167**	**155**		**155**	**128**	**133**		**104**		**161**	**104**	**113**			**125**	**114**	**136**		**86**	**101**	**87**	**137**

Total Average % Cover for All Mitigation Wetlands:	**128**
Total Average % Cover for Restored Stream Floodplains:	**133**
TOTAL Average % Herbaceous Cover:	**129**

Notes:

[1] Species nomenclature follows the USDA Plants Database (USDA - NRCS 2013)

[2] Species identification follows Haines, Arthur. 2011. *Flora Novae Angliae: A Manual for the Identificaiton of Native and Naturalized Higher Vascular Plants of New England* . New England Wildflower Society.

[3] Indicator status follows The National Wetland Plant List (Robert W. Lichvar. 2012. ERDC/CRREL TR-12-11. U.S. Army Corps of Engineers (USACE) - Engineer Research and Development Center - Cold Regions Research and Engineering Laboratory.

[4] Cover class percentages from visual assessment of 1m^2 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.

[5] Mapping refers to Jay Peak Resort Golf Course Mitigation Monitoring Set, prepared by VHB, and dated December 17, 2013

[6] Plot names including "V" refer to 1m2 plots used to assess herbaceous vegetation only; plot names incluing "W" refer to data from wetland data plots.

[7] Italics indicate invasive species per the Vermont Class A or B Noxious Weed list (Quarantine #3-Noxious Weeds)

Jay Peak Resort Golf Course Mitigation
Year Three (2013) Mitigation Monitoring Report
Woody Stem Survival Assessment Based on 0.02-acre (5-meter radius) Permanent Vegetation Monitoring Plots and Wetland Data Plots
December 18, 2013

Mitigation Feature	Feature Type	Mitigation Feature Size (acres)	Mitigation Feature Plot	Planted Shrubs within 0.02-acre (5m-radius) Plots	Approximate Total Planted Shrubs Within Feature	Total Shrubs Planted[1]	Approximate Survival Rate of Shrubs/ Feature (%)
H6-WT1	WETLANDS	0.31	H6-WT1-V1	7	115	150	77%
			H6-WT1-W1	8			
WH-WT2		0.10	WH-WT2-V1	4	20	20	98%
WH-WT1		0.03	WH-WT1-V1	15	24	35	69%
H5-Create		0.24	H5-Create-V1	11	122	152	80%
			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	10	28	37	76%
H11-WT6		0.09	H11-WT6-V1	7	30	41	74%
			H11-WT6-W1	7			
H11-WT2/3		0.03	H11-WT2/3-V1	13	17	25	68%
H11-Create		0.36	H11-Create-W1	7	126	185	68%
			H11-Create-V1	7			
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	12	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	43	54	80%
			P2-TB1-V2	3			
					AVERAGE SURVIVAL RATE OF PLANTED SHRUBS WITHIN WETLANDS:		80%
					AVERAGE SURVIVAL RATE OF PLANTED SHRUBS WITHIN RESTORED STREAM FLOODPLAINS:		82%
					TOTAL AVERAGE SURVIVAL RATE OF PLANTED SHRUBS:		**80%**

[1]Total 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*), elderbery (*Sambucus canadensis*), American cranberry (*Viburnum trilobum*), and red-osier dogwood (*Cornus sericea*)), but does not include the additional *Salix* sp. and *Cornus* sp. tublelings planted as part of the streambank stabilization plan.

[2] The 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: **8/15/2013**
Applicant/Owner: **Jay Peak Resort** State: **VERMONT** Sampling Point: **H5-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°56'32.632"N** Long: **72°29'0.229"W** Datum: **NAD 83**
Soil Map Unit: **Cabot** 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**
Hydric Soil Present? **YES**
Wetland Hydrology Present? **YES**
Is This Sample Area Within a Wetland? **YES**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	X	Water-Stained Leaves (B9)
	High Water Table (A2)		Aquatic Fauna (B13)
X	Saturation (A3)		Marl Deposits (B13)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)
	Drift Deposits (B3)		Presence of Reduced Iron (C4)
X	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)		

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Depth (inches):
Water Table Present? Depth (inches):
Saturation Present? **X** Depth (inches): **6"**
Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
0.46" 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	Remarks
0-4	**10YR 3/2**	**100**					**SILT LOAM**	
4-8	**2.5Y 4/2**	**97**	**10YR 4/6**	**3**	**c**	**m**	**SILT LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)	X	Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)		
	Sandy Redox (S5)		
	Stripped Matrix (S6)		
	Dark Surface (S7) (LRR R, MLRA 149B)		

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10) (LRR K, L, MLRA 149B)
	Coast Prairie Redox (A16) (LRR K, L, R)
	5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Dark Surface (S9) (LRR K, L, M)
	Polyvalue Below Surface (S8) (LRR K, L)
	Thin Dark Surface (S9) (LRR K, L)
	Iron-Manganese Masses (F12) (LRR K, L, R)
	Piedmont Floodplain Soils (F19) (MLRA 149B)
	Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
	Red Parent Material (F21)
	Very Shallow Dark Surface (TF12)
	Other (Explain in Remarks)

Restrictive Layer (if observed):
Type:
Depth (inches):
Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **H5-Create**

	Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum (Plot size:)			
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: **15'RAD**)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: **5' RAD**)			
1. **Carex vulpinoidea**	**38**	**X**	**OBL**
2. **Juncus effusus**	**15**	**X**	**OBL**
3. **Eupatorium perfoliatum**	**15**	**X**	**FACW**
4. **Juncus tenuis**	**15**	**X**	**FAC**
5. **Eragrostis pectinacea**	**3**		**FAC**
6. **Symphyotrichum novae-angliae**	**3**		**FACW**
7. **Scirpus atrovirens**	**3**		**OBL**
8. **Trifolium repens**	**3**		**FACU**
9. **Eutrochium maculatum**	**3**		**OBL**
10. **Mimulus ringens**	**3**		**OBL**
11.			
12.			
	101 = Total Cover		
Woody Vines (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **4** (A)

Dominants across all strata: **4** (B)

% Dominants OBL, FACW, FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:
OBL	**62** x 1 =	**62**
FACW	**18** x 2 =	**36**
FAC	**18** x 3 =	**54**
FACU	**3** x 4 =	**12**
UPL	x 5 =	
Sum:	**101** (A)	**164** (B)

Prevalence Index = B/A = **1.62**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** 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? **YES**

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: **8/15/2013**

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** Datum: **NAD 83**

Soil Map Unit: **Cabot** 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**

Hydric Soil Present? **YES**

Wetland Hydrology Present? **YES**

Is This Sample Area Within a Wetland? **YES**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	Water-Stained Leaves (B9)
	High Water Table (A2)	Aquatic Fauna (B13)
X	Saturation (A3)	Marl Deposits (B13)
	Water Marks (B1)	Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)	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)	

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Depth (inches):

Water Table Present? Depth (inches):

Saturation Present? **X** Depth (inches): **8"**

Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.46" 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	Remarks
0-6	**2.5Y 3/2**	**100**					**SILT LOAM**	
6-10+	**2.5Y 4/1**	**95**	**10YR 4/6**	**5**	**C**	**M**	**SILT LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)	Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)	Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)	Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)	Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)	Redox Dark Surface (F6)
	Thick Dark Surface (A12)	Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)	Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)	
	Sandy Redox (S5)	
	Stripped Matrix (S6)	
	Dark Surface (S7) (LRR R, MLRA 149B)	

X = Depleted Matrix (F3)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10) (LRR K, L, MLRA 149B)
	Coast Prairie Redox (A16) (LRR K, L, R)
	5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Dark Surface (S9) (LRR K, L, M)
	Polyvalue Below Surface (S8) (LRR K, L)
	Thin Dark Surface (S9) (LRR K, L)
	Iron-Manganese Masses (F12) (LRR K, L, R)
	Piedmont Floodplain Soils (F19) (MLRA 149B)
	Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
	Red Parent Material (F21)
	Very Shallow Dark Surface (TF12)
	Other (Explain in Remarks)

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **H6-WT1**

	Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum (Plot size:)			
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: **15'RAD**)			
1. **Betula alleghaniensis**	**3**	**X**	**FAC**
2.			
3.			
4.			
5.			
6.			
7.			
	3 = Total Cover		
Herb Stratum (Plot size: **5' RAD**)			
1. **Carex comosa**	**38**	**X**	**OBL**
2. **Carex vulpinoidea**	**15**	**X**	**OBL**
3. **Carex crinita**	**15**	**X**	**OBL**
4. **Eupatorium perfoliatum**	**15**	**X**	**FACW**
5. **Juncus effusus**	**15**	**X**	**OBL**
6. **Scirpus cyperinus**	**15**	**X**	**OBL**
7. **Symphyotrichum novae-angliae**	**15**	**X**	**FACW**
8. **Solidago gigantea**	**3**		**FACW**
9. **Euthamia graminifolia**	**3**		**FAC**
10. **Eutrochium maculatum**	**3**		**OBL**
11.			
12.			
	137 = Total Cover		
Woody Vines (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **8** (A)

Dominants across all strata: **8** (B)

% Dominants OBL, FACW, FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:
OBL	**101** x 1 =	**101**
FACW	**33** x 2 =	**66**
FAC	**6** x 3 =	**18**
FACU	x 4 =	
UPL	x 5 =	
Sum:	**140** (A)	**185** (B)

Prevalence Index = B/A = **1.32**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** 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? **YES**

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

VHB

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

H8-Create

Project Site: **JPR Golf Course Wetland Mitigation** City/County: **Jay/Orleans** Samp. Date: **8/15/2013**

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** Datum: **NAD 83**

Soil Map Unit: **Dixfield** 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:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	X	Water-Stained Leaves (B9)
	High Water Table (A2)		Aquatic Fauna (B13)
X	Saturation (A3)		Marl Deposits (B13)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)		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)		

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
X	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Depth (inches):

Water Table Present? Depth (inches):

Saturation Present? **X** Depth (inches): **Surface**

Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.46" 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	Remarks
0-6	**10YR 3/2**	**100**					**SILT LOAM**	
6-10	**2.5Y 4/1**	**93**	**10YR 4/6**	**7**	**C**	**M**	**SILT LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)	X	Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)		
	Sandy Redox (S5)		
	Stripped Matrix (S6)		
	Dark Surface (S7) (LRR R, MLRA 149B)		

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10) (LRR K, L, MLRA 149B)
	Coast Prairie Redox (A16) (LRR K, L, R)
	5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Dark Surface (S9) (LRR K, L, M)
	Polyvalue Below Surface (S8) (LRR K, L)
	Thin Dark Surface (S9) (LRR K, L)
	Iron-Manganese Masses (F12) (LRR K, L, R)
	Piedmont Floodplain Soils (F19) (MLRA 149B)
	Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
	Red Parent Material (F21)
	Very Shallow Dark Surface (TF12)
	Other (Explain in Remarks)

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **H8-Create**

	Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum (Plot size:)			
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: **15'RAD**)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: **5' RAD**)			
1. **Juncus effusus**	**38**	**X**	**OBL**
2. **Carex vulpinoidea**	**38**	**X**	**OBL**
3. **Carex comosa**	**15**	**X**	**OBL**
4. **Verbena hastata**	**15**	**X**	**FACW**
5. **Euthamia graminifolia**	**15**	**X**	**FAC**
6. **Scirpus cyperinus**	**15**	**X**	**OBL**
7. **Impatiens capensis**	**15**	**X**	**FACW**
8. **Solidago gigantea**	**3**		**FACW**
9. **Solidago rugosa**	**3**		**FAC**
10. **Eutrochium maculatum**	**3**		**OBL**
11. **Typha latifolia**	**3**		**OBL**
12. **Persicaria sagittata**	**3**		**OBL**
	166	= Total Cover	
Woody Vines (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **7** (A)

Dominants across all strata: **7** (B)

% Dominants OBL, FACW, FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:
OBL	**115**	x 1 = **115**
FACW	**33**	x 2 = **66**
FAC	**18**	x 3 = **54**
FACU		x 4 =
UPL		x 5 =
Sum:	**166** (A)	**235** (B)

Prevalence Index = B/A = **1.42**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** 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? **YES**

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

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

I11-Create

Project Site: **JPR Golf Course Wetland Mitigation** City/County: **Jay/Orleans** Samp. Date: **8/15/2013**
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** Datum: **NAD 83**
Soil Map Unit: **Cabot** 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**
Hydric Soil Present? **YES**
Wetland Hydrology Present? **YES**
Is This Sample Area Within a Wetland? **YES**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	X	Water-Stained Leaves (B9)
	High Water Table (A2)		Aquatic Fauna (B13)
	Saturation (A3)		Marl Deposits (B13)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)		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)		

Secondary Indicators (minimum of two required)

X	Surface Soil Cracks (B6)
	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Depth (inches):
Water Table Present? Depth (inches):
Saturation Present? Depth (inches):
Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
0.46" 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	Remarks
0-4	**2.5Y 3/2**	**100**					**SILT LOAM**	
4-10+	**5Y 4/1**	**98**	**10YR 4/4**	**2**	**C**	**M**	**SILT LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.
[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)	X	Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)		
	Sandy Redox (S5)		
	Stripped Matrix (S6)		
	Dark Surface (S7) (LRR R, MLRA 149B)		

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10) (LRR K, L, MLRA 149B)
	Coast Prairie Redox (A16) (LRR K, L, R)
	5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Dark Surface (S9) (LRR K, L, M)
	Polyvalue Below Surface (S8) (LRR K, L)
	Thin Dark Surface (S9) (LRR K, L)
	Iron-Manganese Masses (F12) (LRR K, L, R)
	Piedmont Floodplain Soils (F19) (MLRA 149B)
	Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
	Red Parent Material (F21)
	Very Shallow Dark Surface (TF12)
	Other (Explain in Remarks)

Restrictive Layer (if observed):
Type:
Depth (inches):
Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **H11-Create**

		Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum	(Plot size:)			
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: **15'RAD**)			
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum	(Plot size: **5' RAD**)			
1.	**Eupatorium perfoliatum**	**15**	**X**	**FACW**
2.	**Elymus virginicus**	**15**	**X**	**FACW**
3.	**Eragrostis pectinacea**	**15**	**X**	**FAC**
4.	**Juncus tenuis**	**15**	**X**	**FAC**
5.	**Carex vulpinoidea**	**15**	**X**	**OBL**
6.	**Festuca rubra**	**15**	**X**	**FACU**
7.	**Juncus effusus**	**3**		**OBL**
8.	**Euthamia graminifolia**	**3**		**FAC**
9.	**Verbena hastata**	**3**		**FACW**
10.	**Carex scoparia**	**3**		**FACW**
11.	**Symphyotrichum novae-angliae**	**3**		**FACW**
12.	**Carex comosa**	**3**		**OBL**
		108	= Total Cover	
Woody Vines	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **5** (A)

Dominants across all strata: **6** (B)

% Dominants OBL, FACW, FAC: **83%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	**21**	x 1 =	**21**
FACW	**39**	x 2 =	**78**
FAC	**33**	x 3 =	**99**
FACU	**15**	x 4 =	**60**
UPL		x 5 =	
Sum:	**108** (A)		**258** (B)

Prevalence Index = B/A = **2.39**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** 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? **YES**

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: **8/15/2013**

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** Datum: **NAD 83**

Soil Map Unit: **Cabot** 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:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	Water-Stained Leaves (B9)
	High Water Table (A2)	Aquatic Fauna (B13)
X	Saturation (A3)	Marl Deposits (B13)
	Water Marks (B1)	Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)	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)	

Secondary Indicators (minimum of two required)

Surface Soil Cracks (B6)
Drainage Patterns (B10)
Moss Trim Lines (B16)
Dry-Season Water Table (C2)
Crayfish Burrows (C8)
Saturation Visible on Aerial (C9)
Stunted or Stressed Plants (D1)
Geomorphic Position (D2)
Shallow Aquitard (D3)
Microtopographic Relief (D4)
FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Depth (inches):

Water Table Present? Depth (inches):

Saturation Present? **X** Depth (inches): **10"**

Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.46" 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	Remarks
0-9	**10YR 3/2**	**100**					**SILT LOAM**	
9-13+	**5Y 4/1**	**98**	**10YR 4/6**	**2**	**C**	**M**	**SILT LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)	Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)	Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)	Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)	Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)	Redox Dark Surface (F6)
	Thick Dark Surface (A12)	Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)	Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)	
	Sandy Redox (S5)	
	Stripped Matrix (S6)	
	Dark Surface (S7) (LRR R, MLRA 149B)	

X = Depleted Matrix (F3)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

2 cm Muck (A10) (LRR K, L, MLRA 149B)
Coast Prairie Redox (A16) (LRR K, L, R)
5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
Dark Surface (S9) (LRR K, L, M)
Polyvalue Below Surface (S8) (LRR K, L)
Thin Dark Surface (S9) (LRR K, L)
Iron-Manganese Masses (F12) (LRR K, L, R)
Piedmont Floodplain Soils (F19) (MLRA 149B)
Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
Red Parent Material (F21)
Very Shallow Dark Surface (TF12)
Other (Explain in Remarks)

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **H11-WT6**

		Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum	(Plot size:)			
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: **15'RAD**)			
1.				
2.				
3.				
4.				
5.				
6.				
7.				
			= Total Cover	
Herb Stratum	(Plot size: **5' RAD**)			
1.	**Eupatorium perfoliatum**	**15**	**X**	**FACW**
2.	**Carex crinita**	**15**	**X**	**OBL**
3.	**Solidago canadensis**	**15**	**X**	**FACU**
4.	**Scirpus cyperinus**	**15**	**X**	**OBL**
5.	**Carex vulpinoidea**	**15**	**X**	**OBL**
6.	**Eutrochium purpureum**	**3**		**FAC**
7.	**Carex comosa**	**3**		**OBL**
8.	**Verbena hastata**	**3**		**FACW**
9.	**Euthamia graminifolia**	**3**		**FAC**
10.	**Solidago rugosa**	**3**		**FAC**
11.	**Vicia sativa**	**3**		**FACU**
12.				
		93	= Total Cover	
Woody Vines	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **4** (A)

Dominants across all strata: **5** (B)

% Dominants OBL, FACW, FAC: **80%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply By:
OBL	**48**	x 1 =	**48**
FACW	**18**	x 2 =	**36**
FAC	**9**	x 3 =	**27**
FACU	**18**	x 4 =	**72**
UPL		x 5 =	
Sum:	**93** (A)		**183** (B)

Prevalence Index = B/A = **1.97**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** 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? **YES**

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

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

I16-Create

Project Site: **JPR Golf Course Wetland Mitigation** City/County: **Jay/Orleans** Samp. Date: **8/16/2013**
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** Datum: **NAD 83**
Soil Map Unit: **Cabot** 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**
Hydric Soil Present? **YES**
Wetland Hydrology Present? **YES**
Is This Sample Area Within a Wetland? **YES**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	X	Water-Stained Leaves (B9)
	High Water Table (A2)		Aquatic Fauna (B13)
X	Saturation (A3)		Marl Deposits (B13)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)		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)		

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Depth (inches):
Water Table Present? Depth (inches):
Saturation Present? **X** Depth (inches): **4"**
Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
0.46" 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	Remarks
0-6	**10YR 3/2**	**100**					**SILT LOAM**	
6-12	**10YR 4/1**	**95**	**10YR 4/6**	**5**	**C**	**M**	**SILT LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.
[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)	X	Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)		
	Sandy Redox (S5)		
	Stripped Matrix (S6)		
	Dark Surface (S7) (LRR R, MLRA 149B)		

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10) (LRR K, L, MLRA 149B)
	Coast Prairie Redox (A16) (LRR K, L, R)
	5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Dark Surface (S9) (LRR K, L, M)
	Polyvalue Below Surface (S8) (LRR K, L)
	Thin Dark Surface (S9) (LRR K, L)
	Iron-Manganese Masses (F12) (LRR K, L, R)
	Piedmont Floodplain Soils (F19) (MLRA 149B)
	Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
	Red Parent Material (F21)
	Very Shallow Dark Surface (TF12)
	Other (Explain in Remarks)

Restrictive Layer (if observed):
Type:
Depth (inches):
Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **H16-Create**

	Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum (Plot size:)			
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: **15'RAD**)			
1. **Viburnum opulus**	**15**	**X**	**FACW**
2.			
3.			
4.			
5.			
6.			
7.			
	15 = Total Cover		
Herb Stratum (Plot size: **5' RAD**)			
1. **Carex vulpinoidea**	**15**	**X**	**OBL**
2. **Eragrostis pectinacea**	**15**	**X**	**FAC**
3. **Juncus effusus**	**15**	**X**	**OBL**
4. **Eupatorium perfoliatum**	**15**	**X**	**FACW**
5. **Symphyotrichum novae-angliae**	**15**	**X**	**FACW**
6. **Solidago gigantea**	**15**	**X**	**FACW**
7. **Verbena hastata**	**3**		**FACW**
8. **Euthamia graminifolia**	**3**		**FAC**
9.			
10.			
11.			
12.			
	96 = Total Cover		
Woody Vines (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **7** (A)

Dominants across all strata: **7** (B)

% Dominants OBL, FACW, FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:
OBL	**30** x 1 =	**30**
FACW	**63** x 2 =	**126**
FAC	**18** x 3 =	**54**
FACU	x 4 =	
UPL	x 5 =	
Sum:	**111** (A)	**210** (B)

Prevalence Index = B/A = **1.89**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** 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? **YES**

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: **8/16/2013**

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** Datum: **NAD 83**

Soil Map Unit: **Cabot** 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:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	**X**	Water-Stained Leaves (B9)
	High Water Table (A2)		Aquatic Fauna (B13)
X	Saturation (A3)		Marl Deposits (B13)
	Water Marks (B1)		Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)		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)		

Secondary Indicators (minimum of two required)

	Surface Soil Cracks (B6)
	Drainage Patterns (B10)
	Moss Trim Lines (B16)
	Dry-Season Water Table (C2)
	Crayfish Burrows (C8)
	Saturation Visible on Aerial (C9)
	Stunted or Stressed Plants (D1)
	Geomorphic Position (D2)
	Shallow Aquitard (D3)
	Microtopographic Relief (D4)
	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Depth (inches):

Water Table Present? Depth (inches):

Saturation Present? **X** Depth (inches): **2"**

Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.46" 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	Remarks
0-8	**10YR 3/2**						**SILT LOAM**	
8-12	**5Y 5/2**	**95**	**10YR 4/6**	**5**	**C**	**M**	**SILT LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)		Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)		Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)		Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)	**X**	Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)		
	Sandy Redox (S5)		
	Stripped Matrix (S6)		
	Dark Surface (S7) (LRR R, MLRA 149B)		

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

	2 cm Muck (A10) (LRR K, L, MLRA 149B)
	Coast Prairie Redox (A16) (LRR K, L, R)
	5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
	Dark Surface (S9) (LRR K, L, M)
	Polyvalue Below Surface (S8) (LRR K, L)
	Thin Dark Surface (S9) (LRR K, L)
	Iron-Manganese Masses (F12) (LRR K, L, R)
	Piedmont Floodplain Soils (F19) (MLRA 149B)
	Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
	Red Parent Material (F21)
	Very Shallow Dark Surface (TF12)
	Other (Explain in Remarks)

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **H13-WT1/a/b**

	Absolute % Cover	Dom. Sp?	Indicator Status
Tree Stratum (Plot size:)			
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: **15'RAD**)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: **5' RAD**)			
1. **Juncus effusus**	**15**	**X**	**OBL**
2. **Euthamia graminifolia**	**15**	**X**	**FAC**
3. **Carex crinita**	**15**	**X**	**OBL**
4. **Carex vulpinoidea**	**15**	**X**	**OBL**
5. **Solidago rugosa**	**15**	**X**	**FAC**
6. **Carex comosa**	**15**	**X**	**OBL**
7. **Carex scoparia**	**15**	**X**	**FACW**
8. **Scirpus cyperinus**	**3**		**OBL**
9. **Eupatorium perfoliatum**	**3**		**FACW**
10. **Verbena hastata**	**3**		**FACW**
11.			
12.			
	114	= Total Cover	
Woody Vines (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **7** (A)

Dominants across all strata: **7** (B)

% Dominants OBL, FACW, FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:
OBL	**63**	x 1 = **63**
FACW	**21**	x 2 = **42**
FAC	**30**	x 3 = **90**
FACU		x 4 =
UPL		x 5 =
Sum:	**114** (A)	**195** (B)

Prevalence Index = B/A = **1.71**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** 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? **YES**

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

VHB

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

H15-WT1

Project Site: **JPR Golf Course Wetland Mitigation** City/County: **Jay/Orleans** Samp. Date: **8/16/2013**

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** Datum: **NAD 83**

Soil Map Unit: **Cabot** 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:

Primary Indicators (minimum of one is required; check all that apply)

	Surface Water (A1)	Water-Stained Leaves (B9)
	High Water Table (A2)	Aquatic Fauna (B13)
X	Saturation (A3)	Marl Deposits (B13)
	Water Marks (B1)	Hydrogen Sulfide Odor (C1)
	Sediment Deposits (B2)	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)	

Secondary Indicators (minimum of two required)

Surface Soil Cracks (B6)
Drainage Patterns (B10)
Moss Trim Lines (B16)
Dry-Season Water Table (C2)
Crayfish Burrows (C8)
Saturation Visible on Aerial (C9)
Stunted or Stressed Plants (D1)
Geomorphic Position (D2)
Shallow Aquitard (D3)
Microtopographic Relief (D4)
FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Depth (inches):

Water Table Present? Depth (inches):

Saturation Present? **X** Depth (inches): **10"**

Wetland Hydrology Present? **YES**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

0.46" 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	Remarks
0-10	**10YR 4/1**	**100**					**SILT LOAM**	
10-14+	**10YR 4/1**	**97**	**10YR 5/4**	**3**	**CACM?**	**M**	**SILT LOAM**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

	Histosol (A1)	Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
	Histic Epipedon (A2)	Thin Dark Surface (S9) (LRR R, MLRA 149B)
	Black Histic (A3)	Loamy Mucky Mineral (F1) (LRR K, L)
	Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)
	Stratified Layers (A5)	Depleted Matrix (F3)
	Depleted Below Dark Surface (A11)	Redox Dark Surface (F6)
	Thick Dark Surface (A12)	Depleted Dark Surface (F7)
	Sandy Mucky Mineral (S1)	Redox Depressions (F8)
	Sandy Gleyed Matrix (S4)	
	Sandy Redox (S5)	
	Stripped Matrix (S6)	
	Dark Surface (S7) (LRR R, MLRA 149B)	

X = Depleted Matrix (F3)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils[3]:

2 cm Muck (A10) (LRR K, L, MLRA 149B)
Coast Prairie Redox (A16) (LRR K, L, R)
5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
Dark Surface (S9) (LRR K, L, M)
Polyvalue Below Surface (S8) (LRR K, L)
Thin Dark Surface (S9) (LRR K, L)
Iron-Manganese Masses (F12) (LRR K, L, R)
Piedmont Floodplain Soils (F19) (MLRA 149B)
Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
Red Parent Material (F21)
Very Shallow Dark Surface (TF12)
Other (Explain in Remarks)

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? **YES**

Remarks:

VEGETATION - Use scientific names of plants.

Sampling Point: **H15-WT1**

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: 15'RAD)			
1. **Cornus alba**	**15**	**X**	**FACW**
2. **Betula alleghaniensis**	**3**		**FAC**
3.			
4.			
5.			
6.			
7.			
	18 = Total Cover		
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. **Juncus effusus**	**15**	**X**	**OBL**
5. **Symphyotrichum novae-angliae**	**15**	**X**	**FACW**
6. **Euthamia graminifolia**	**15**	**X**	**FAC**
7. **Verbena hastata**	**15**	**X**	**FACW**
8. **Solanum dulcamara**	**3**		**FAC**
9. **Ranunculus acris**	**3**		**FAC**
10. **Hypericum canadense**	**3**		**FACW**
11.			
12.			
	137 = Total Cover		
Woody Vines (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **8** (A)

Dominants across all strata: **8** (B)

% Dominants OBL, FACW, FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:
OBL	**83** x 1 =	**83**
FACW	**48** x 2 =	**96**
FAC	**24** x 3 =	**72**
FACU	x 4 =	
UPL	x 5 =	
Sum:	**155** (A)	**251** (B)

Prevalence Index = B/A = **1.62**

Hydrophytic Vegetation Indicators:

- **X** Dominance Test is > 50%
- **X** 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? **YES**

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

Photograph 1: H5-TB3 from Station H5-TB3-P1, facing east (P. Werts, 8/15/13)

Photograph 2: H5-TB1 from Station H5-TB1-P1, facing south (P. Werts, 8/15/13)

Photograph 3: H5-Create from Station H5-Create-P1, facing northeast (P. Werts, 8/15/13)

Photograph 4: H6-WT1, from Station H6-WT1-P1, facing southeast (P. Werts, 8/15/13)

Photograph 5: H6-WT1, from Station H6-WT1-P2, facing east (P. Werts, 8/15/13)

Photograph 6: H6-TB1 from Station H6-TB1-P1, facing south (P. Werts, 8/15/13)

Photograph 7: H6-TB1 from Station H6-TB1-P2, facing northwest (P. Werts, 8/15/13)

Photograph 8: WH-WT1 from Station WH-WT1-P1, facing northeast (P. Werts, 8/15/13)

Photograph 9: WH-WT2 from Station WH-WT2-P1, facing southwest (P. Werts, 8/15/13)

Photograph 10: H7-SC1 from Station H7-SC1-P1, facing southeast (P. Werts, 8/15/13)

Photograph 11: H4-WT1/2 from Station H4-WT1-P1, facing southeast (P. Werts, 8/15/13)

Photograph 12: H4-WT3 from Station H4-WT3-P1, facing southeast (P. Werts, 8/15/13)

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

Photograph 14: H8-SC1 from Station H8-SC1-P1, facing northeast (P. Werts, 8/15/13)

Photograph 15: H8-Create from Station H8-Create-P1, facing northeast (P. Werts, 8/15/13)

Photograph 16: H1-WT1 from Station H1-WT1-P1, facing north (P. Werts, 8/15/13)

Photograph 17: P2-TB1 looking upstream from Station P2-TB1-P1, facing southwest (P. Werts, 8/15/13)

Photograph 18: P2-TB1 looking downstream from Station P2-TB1-P1, facing northeast (P. Werts, 8/15/13)

Photograph 19: P2-TB1 looking upstream from Station P2-TB1-P2, facing southwest (P. Werts, 8/15/13)

Photograph 20: P2-TB1 looking upstream from Station P2-TB1-P3, facing southwest (P. Werts, 8/15/13)

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

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

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

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

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

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

Photograph 27: H12-TB1u from Station H12-TB1u-P1, facing south (P. Werts, 8/16/13)

Photograph 28: H13-TB1u from Station H13-TB1u-P1, facing north (P. Werts, 8/16/13)

Photograph 29: H13-TB2 from Station H13-TB2-P1, facing south (P. Werts, 8/16/13)

Photograph 30: H13-SC/TB3 from Station H13-SC/TB3-P1, facing north (P. Werts, 8/16/13)

Photograph 31: H13-WT1/a/b from Station H13-WT1/a/b-P1, facing north (P. Werts, 8/16/13)

Photograph 32: H13-WT2-from Station H13-WT2-P1, facing west (P. Werts, 8/16/13)

Photograph 33: H13-WT3 from Station H13-WT3-P1, facing southwest (P. Werts, 8/16/13)

Photograph 34: H14-WT1u from Station H14-WT1u-P1, facing southeast (P. Werts, 8/16/13)

Photograph 35: H14-SC1 from Station H14-SC1-P1, facing northwest (P. Werts, 8/16/13)

Photograph 36: H14-WT2/3 from Station H14-WT2/3-P1, facing southwest (P. Werts, 8/16/13)

Photograph 37: H14-WT1d from Station H14-WT1d-P1, facing southeast (P. Werts, 8/16/13)

Photograph 38: H15-TB1 from Station H15-TB1-P1, facing south (P. Werts, 8/16/13)

Photograph 39: H15-WT1 from Station H15-WT1-P1, facing south (P. Werts, 8/16/13)

Photograph 40: H13-TB1d from Station H15-TB1d-P1, facing north (P. Werts, 8/16/13)

Photograph 41: H12-TB1d from Station H12-TB1d-P1, facing south (P. Werts, 8/16/13)

Photograph 42: H16-Create from Station H16-Create-P1, facing southwest (P. Werts, 8/16/13)

Photograph 43: H16-Create from Station H16-Create-P2, facing northwest (P. Werts, 8/16/13)

Photograph 44: H16-SC1 from Station H16-SC1-P1, facing northwest (P. Werts, 8/16/13)

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Memorandum

To: Jay Peak Golf Course Mitigation Project File

Date: July 22, 2013

Project No.: 57276.03

From: Patti B. Kallfelz-Werts

Re: June 20, 2013 Golf Course Field Inspection with USACE and EPA

This memorandum has been prepared to summarize the site meeting/ field inspection conducted with the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) held on June 20, 2013 to inspect the Jay Peak Golf Course Restoration and Mitigation sites. Because the large majority of the restored and/or created wetlands and streams have stabilized and are developing well, the site inspection focused on those few features that required repairs in 2012, as well as small "touch-ups" in early 2013. Overall, the restored and created features are developing extremely well. Streams are stable and naturalized, with well vegetated banks, including a noticeable increase in the size of the stream side shrubs. Wetlands are also becoming more naturalized, with species of plants that were not part of the original seed mix; and visible evidence of hydrology (evidence of hydric soils will be investigated during the annual data collection, which supports the annual monitoring report).

The features which were reviewed more closely included:

- P2-TB1 (above Hole 1),
- H8-TB2 (not part of the golf course mitigation activities),
- H14-WT1d, and
- H12-TB1u.

P2-TB1 was repaired after an area of bank failure was found in spring 2012. The repair was made in fall 2012, and given a "touch-up" in spring 2013. This repaired area remains stable despite the higher than average rainfall so far in spring and early summer 2013. Seed mix and mulch will be re-applied no later than early July.

H8-TB2 was originally crossed via a bridge, and so was not part of the golf course mitigation efforts. A section of right bank (looking downstream) where the bridge ends, suffered a severe failure in spring 2012, with a failure of the original repair later in 2012. This area was repaired again in early 2013 and has been stable. This area would need to have erosion control fabric applied as well as seed, to ensure the soil/ grubbing remains in place.

H14-WT1d had an area of material wash out due to the high volume of water that moves through this system. A small head cut formed where H14-SC1 comes into this feature. This was repaired in fall 2012 by the addition of rock "steps" under the headcut to prevent it from deteriorating further. These steps were reinforced (a small number of additional rocks) in spring 2013 and are stable and preventing the cut from migrating upstream.

H12-TB1u, specifically a small area upstream of the bridge and the restored stretch, may have been mildly affected by "drifting" of herbicide applied to the area of golf play in the vicinity of the restoration. USACE and EPA have advised extra care should be taken when applying herbicide in proximity to any wetland or stream. [*It is noteworthy to add that inspections of that area since the June 20, 2013 meeting have shown that the vegetation, affected by the "drifting" of herbicides, has fully recovered.*]

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:	
MAILING ADDRESS:	4850 VT Route 242 Jay, VT 05859
TELEPHONE:	802-988-2726
AUTHORIZED AGENT:	Vanasse Hangen Brustlin, Inc.
MAILING ADDRESS:	7056 US Route 7, P.O. Box 120 North Ferrisburgh, VT 05473
TELEPHONE:	802-497-6100

ATTACHED MITIGATION REPORT TITLE:	Jay Peak Resort Golf Course Mitigation - Third Annual (2013) Mitigation Monitoring Report
PREPARERS:	Vanasse Hangen Brustlin, Inc.
DATE:	January 10, 2014

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: Howard Mudd (FOR JAY PEAK INC.) 1-10-14

(Signature of permittee) Date