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Conservation Biology Institute

136 SW Washington Avenue
Suite 202
Corvallis, Oregon 97333

www.consbio.org

Ms. Laurel L. Impett, AICP, Urban Planner
Shute, Mihaly & Weinberger LLP
396 Hayes Street
San Francisco, CA 94102-4421

RE: Village at Squaw Valley Specific Plan DEIR—review of impacts to sensitive habitats

Dear Laurel:

The Conservation Biology Institute (CBI) is a 501(c)3 organization that works collaboratively to conserve biological diversity in its natural state through applied research, education, planning, and community service. CBI's extensive partner network includes academic institutions, state and federal agencies, and other non-profit environmental organizations. CBI combines strengths across multiple disciplines ranging from conservation planning to habitat management and monitoring to ecological modeling of species populations, landscape connectivity, climate change, and fire.

We have reviewed the Village at Squaw Valley Specific Plan Draft Environmental Impact Report (DEIR) (Ascent Environmental, Inc. 2015) and submit these comments regarding impacts to and mitigation for sensitive riparian and wetland habitats (Section 6, Biological Resources). We comment on other sections and issues when relevant to these habitats. Our analyses have been informed through discussion with Dr. Tom Myers, hydrological consultant, and review of his Technical Memorandum on impacts to the Olympic Valley aquifer. Other documents or data reviewed are included in the reference section of this letter. 08b-1

Sincerely,

Patricia Gordon Reedy

Patricia Gordon-Reedy
Vegetation Ecologist/Botanist

Summary

Our review of sensitive habitats assessed whether (1) existing conditions are adequately described, (2) direct and indirect impacts are adequately addressed and analyzed and (3) proposed mitigation is adequate to compensate for project impacts. Based on our review, we find that the DEIR has several deficiencies:

- The description of sensitive habitats onsite is incomplete, ambiguous, and not consistently accounted for in the impacts assessment. Thus, it is unclear if the proposed restoration adequately mitigates for the project's impacts.
- As the level of groundwater drawdown has not been accurately assessed, impacts to vegetation may be more widespread than calculated, and the proposed creek restoration will likely not be successful. 08b-2
- The DEIR does not consider or adequately address all impacts to sensitive habitat from project implementation (including direct, indirect, or cumulative impacts).
- Proposed mitigation measures are insufficiently detailed to determine their adequacy to offset project impacts.
- Groundwater drawdown will be exacerbated by climate change, which cumulatively will cause greater changes in vegetation communities, and may contribute to greenhouse gases.

We elaborate on these issues below. It is our recommendation that deficiencies be addressed and the DEIR revised and recirculated for further review prior to certifying the document.

Comments

The description of sensitive habitats onsite is incomplete, ambiguous, and not consistently accounted for in the impacts assessment.

Section 6.1.3 Biological Communities

Table 6-1. This table indicates 4.16 acres of riparian habitat onsite, with 1.9 acres of this total (46%) impacted by project implementation. However, riparian habitat in perennial and intermittent streams has not been quantified. Therefore, the DEIR underestimates total riparian acreage and impacts to riparian habitat onsite. 08b-3

Alderleaf Coffeeberry Scrub. The DEIR (p. 6-10) indicates that 0.10 acre of alderleaf coffeeberry scrub occurs on the East Parcel and sewer line corridor near the western edge of the project site. An additional 0.25 acre of alderleaf coffeeberry scrub occurs onsite but is included under 08b-4

seep vegetation. The DEIR should provide the rationale for separating alderleaf coffeeberry scrub into two categories. O8b-4 cont.

Intermittent Stream. The DEIR (p. 6-11) indicates that fairly dense willows occur in association with downstream portions of a 'small, unnamed intermittent stream' onsite. Table 6-1 indicates that riparian vegetation (which would include dense willows) within intermittent streams has not been quantified. It is unclear whether the acreage of these dense willows has been calculated or considered in project impacts (see Table 6-1). Likewise, it is unclear whether hydrophytic and willow riparian scrub in intermittent streams in the Village Core area or water tank parcel have been calculated or considered in project impacts (see Table 6-1). If these acreages have not been quantified, the DEIR underestimates total riparian acreage and impacts to riparian habitat onsite. O8b-5

Seep. See comments above related to alderleaf coffeeberry scrub. O8b-6

Perennial Stream. The DEIR (p. 6-12) indicates that willow and alder line the channel of the perennial Truckee River on the most eastern section of the sewer line corridor. It is unclear whether this riparian habitat has been calculated or considered in project impacts (see Table 6-1). If not, the DEIR underestimates total riparian acreage and impacts to riparian habitat onsite. O8b-7

Riparian. The DEIR (p. 6-12) indicates that riparian vegetation on the project site (4.16 acres) is 'slightly underrepresented' in acreage calculations because it was not always delineated separately from perennial or intermittent stream in biological resource reports. The DEIR should provide a more precise accounting of riparian vegetation in perennial or intermittent streams so that impacts and mitigation ratios can be accurately assessed.

The DEIR's description of "riparian" identifies (1) riparian vegetation, which includes black cottonwood (*Populus trichocarpa*), mountain alder (*Alnus incana* ssp. *tenuifolia*), and shining willow (*Salix lucida*), and (2) riparian scrub, which includes mountain alder, mountain ash (*Sorbus californica*), mountain dogwood (*Cornus sericea*), and willows (*Salix* spp.). The DEIR should identify whether riparian vegetation, as described, constitutes woodland or scrub habitat, since this may have implications for mitigation ratios and restoration planning. O8b-8

Seasonal Wetland. Seasonal wetlands (p. 6-13) include habitat dominated by both willow scrub and herbaceous perennial vegetation. The DEIR should provide the rational for including willow scrub in this category rather than in the willow scrub category. O8b-9

Wet Meadow. The DEIR (p. 6-13) indicates that no wetland delineation has been conducted for wet meadow habitat along the sewer line corridor. Thus, wet meadow acreages and impacts may be underestimated. O8b-10

Willow Alder Scrub. As with alderleaf coffeeberry scrub, willow alder scrub is recognized as a stand-alone sensitive habitat, but some willow alder scrub acreage is included in a seep category (DEIR, p. 6-14). The DEIR should provide the rationale for separating this association into two categories. 08b-11

Willow Scrub. This sensitive habitat is also recognized as a stand-alone sensitive habitat, but some of its acreage is included in a wet meadow category (DEIR, p. 6-14). The DEIR should provide the rationale for separating this association into two categories. 08b-12

Section 6.17 Waters of the U.S.

General Comment. The DEIR (p. 6-25) indicates that the wetland delineation and constraints map was conducted for portions of the project site only. The DEIR should indicate whether additional waters of the U.S. may be present onsite that may be impacted by project implementation. 08b-13

Table 6-4. The DEIR should separate wet meadow from seasonal wetlands in this table, and provide a total acreage for wet meadows.

Table 6-4 indicates that acreage discrepancies between Tables 6-1 and 6-4 are due to rounding. However, this "rounding" results in a fairly sizeable acreage discrepancy between the two tables with respect to sensitive habitats (12.54 acres in Table 6-1 versus 8.233 acres in Table 6-4). The DEIR should resolve these discrepancies because they may have implications for mitigation. 08b-14

Total acreage of intermittent stream is listed as 5.229 acres in Table 6-4 and 5.32 acres in Table 6-1. The DEIR should clarify whether this discrepancy is due to rounding or reflects acreage that is not jurisdictional waters of the U.S.

Impacts to vegetation may be more widespread than calculated due to groundwater drawdown; the DEIR does not consider all impacts to sensitive habitats from project implementation

Section 6.3.4 Impact Analysis

General Comment. The impact analysis should include a table of impacted acres by habitat that differentiates between impacts to sensitive habitats at creek bed level versus impacts above creek bed levels. This is important because groundwater modeling is specific to the creek bed of Squaw Creek or areas where the creek bed is less than one foot from the bank (DEIR, p. 6-41). 08b-15

Impact 6-1: Removal or Degradation of Sensitive Habitats (Operations)

General Comments. Groundwater pumping and drawdown can lower groundwater levels below the depth that sensitive riparian and wetland habitats need to survive (Konikow 2013). The assessment of impacts to sensitive habitats (e.g., jurisdictional wetlands, wet meadows, and riparian vegetation) is based on simulated groundwater elevations in the Water Supply Assessment (WSA) (DEIR, pp. 6-42-6-43). Myers (2015a,b) has indicated there are inaccuracies in the WSA groundwater modeling that affect future groundwater projections. In addition, groundwater modeling results apply only to sensitive habitats in the creek bed of Squaw Creek and areas where the creek bed is less than one foot from the bank, and does not factor in climate change projections that could affect future groundwater drawdown levels. Because of the relationship between groundwater levels and these sensitive habitats, accurate groundwater modeling is critical to the impact analysis. Based on current modeling, the DEIR likely underestimates impacts to sensitive habitats. **08b-16**

Riparian Vegetation. The DEIR (p. 6-42) states that most literature on groundwater decline impacts is associated with riparian species that are not present onsite, including Fremont cottonwood (*Populus fremontii*) and black willow (*Salix gooddingii*). However, a number of studies have assessed impacts in the eastern Sierra Nevada to black cottonwood (*Populus trichocarpa*), a riparian tree species that occurs onsite. These studies documented higher mortality, lower density, and lower canopy foliage density for black cottonwoods under water stress, although some of these effects were not apparent over the short-term (e.g., 5 years) (Stromberg and Patten 1990, 1992, 1996, DiSalvo and Hart 2002). Because these studies are available, the DEIR could have and should consider both short- and long-term direct (mortality) and indirect (reduced health and vigor) impacts to riparian vegetation from groundwater drawdown. **08b-17**

The impact analysis for riparian vegetation used an absolute depth <10 feet from the surface as a threshold to determine potential mortality of established and shallow-rooted riparian trees (DEIR, p. 6-42). Cottonwood mortality has been reported from depths of 3-8 feet from the surface, and at shallower depths (1.5-3 feet from the surface) riparian trees may experience reduced growth or crown dieback that could impact tree health and vigor over the long-term or reduce resiliency to climate change and other disturbances (Lite and Stromberg 2005, Shafroth et al. 2000, Scott et al. 1999, Rood and Mahoney 1990, Condra 1944). The threshold depth should be reevaluated to assess whether it is appropriate for riparian species onsite, particularly in view of changing climatic conditions. Further, the impact analysis should consider both direct (mortality) and indirect (reduced health and vigor) impacts to riparian vegetation from groundwater drawdown. **08b-18**

The DEIR (pp. 6-42-43) states that 'any declines in groundwater depth resulting from water use for the proposed project and other development in Olympic Valley would be gradual, occurring slowly over many years...' However, this assessment uses inaccurate groundwater modeling (Myers 2015a,b), does not consider the compounding effects of climate change on the amount or timing of available surface or groundwater (Null et al. 2010), and does not consider long-term, sub-lethal stress to riparian vegetation from lowered groundwater depths (e.g., Lite and Stromberg 2005, Shafroth et al. 2000, Scott et al. 1999, Stromberg and Patten 1992). These stressors could result in diminished habitat quality and persistence. The analysis of project impacts to riparian vegetation should consider all potential impacts. 08b-19

The DEIR (p. 6-43) states that 'riparian tree seedlings from species such as cottonwood and willow require water tables within 3.3 feet of the ground surface (Shafroth et al 2000).' However, cottonwood seed germination requires moist seed beds (soil surface) up to a month after seed deposition for germination and seedling survival (Steinberg 2001, Braatne et al. 1996, Haeussler et al. 1990, DeBell 1990). By focusing only on what seedlings need and ignoring germination requirements, the DEIR underestimates impacts on riparian persistence, maintenance, and restoration potential. The DEIR should consider all conditions required for seedling germination, establishment, and survival. Further, the DEIR should provide evidence that hydrological conditions (soil moisture, depth to groundwater) will be present at the appropriate time of year and for a sufficient duration to support riparian seed germination and seedling establishment. 08b-20

The DEIR (p. 6-43) states that 'black cottonwood regenerates primarily through suckering from adult trees.' This statement discounts the importance of seed germination and establishment to long-term riparian persistence. Seed is a primary mode of reproduction for cottonwoods (Hines 1999). For many cottonwood species, suckering/sprouting ability declines as trees age (Read 1958 *in* Rood and Mahoney 1990). While suckering/sprouting can benefit habitat by providing additional structure, long-term riparian maintenance requires recruitment of new individuals through seed germination and seedling establishment. 08b-21

The DEIR (p. 6-43) states that while 'the number of years with suitable conditions would be reduced slightly with future groundwater withdrawals for East cells, conditions are likely to remain adequate to support a multi-aged riparian system since many perennial riparian species reproduce through clones, suckers, or intermittent periods of seedling establishment every 5-10 years (Steinberg 2001).' The DEIR concludes that 'changes to East Cells A and B groundwater levels should therefore continue to allow for enough years of potential establishment and survival and long-term maintenance of riparian vegetation within the upper meadow reach without restoration.' However, the analysis does not provide evidence to support the 08b-22

contention that a 10-20% increase in years with unsuitable conditions for seedling germination/survival would not affect riparian health/persistence, nor does the assessment consider the compounding effects of climate change on conditions for establishment and survival of perennial riparian species. O8b-22 cont.

Seedling establishment is episodic and requires complementary seed production and hydrologic events (Rood and Mahoney 1990, Steinberg 2001, Braatne et al. 1996, Haeussler et al. 1990). Rates of seedling establishment may become less frequent in the future due to a reduction in the snowpack, increased precipitation and runoff earlier in the season, and an elongated dry period. In addition, the sprouting ability of black cottonwood declines with age (Rood and Mahoney 1990). Long-term persistence of riparian vegetation depends on establishment of new trees to compensate for those that senesce or die (Rood and Mahoney 1990). Accordingly, the assessment of impacts to riparian vegetation should use revised groundwater modeling results (see first comment under Impact 6-1) and factor in climate change simulations to determine future site conditions under project implementation, including the ability to support riparian vegetation. O8b-23

The DEIR (pp. 6-43-44) states that 'groundwater withdrawals to support the Specific Plan and other development, if managed as currently modelled, are unlikely to result in mortality to established perennial riparian vegetation within the western channel or upper meadow reach of Squaw Creek - the areas most affected by groundwater withdrawal.' However, the DEIR also acknowledges that groundwater withdrawals will lower groundwater elevations relative to baseline conditions (DEIR, p. 13-64) and project-related drawdown will be greater in the summer months (DEIR p. 13-13), which already experience the lowest flow/groundwater levels. Further, groundwater drawdown is expected to be exacerbated by changing climatic conditions (e.g., Myers 2015a,b, Sierra Nevada Alliance 2010). The DEIR should include revised groundwater modeling with climate change simulations to provide a more accurate assessment of future groundwater conditions (including drawdown and recharge) and allow for a more accurate analysis of impacts to established perennial vegetation, including mortality and reduced health/vigor. O8b-24

The DEIR (p. 6-44) states that riparian vegetation above creek level may potentially die from groundwater drawdown or experience a significant degradation of suitable conditions for seedling/sapling establishment and survival. This conclusion is made with inaccurate groundwater modeling and without consideration of the potential effects of climate change. Impacts to riparian vegetation above creek level should be quantified using revised groundwater modeling that considers climate change with future simulations. O8b-25

The DEIR does not address other indirect impacts to riparian habitat (at or above from creek level) from groundwater drawdown. For example, loss or degradation of riparian habitat could affect streambank stability, since the root systems of riparian trees and shrubs stabilize soils and reduce erosion. 08b-26

The DEIR (p. 6-44) states that 'lowered groundwater elevations could also affect planting and restoration success during any creek restoration undertaken in the project area.' Because the project will cause increased drawdown beyond that predicted by the current groundwater modeling, and these drawdown effects will be further compounded by climate change (Myers 2015a), restoration potential and success must be reevaluated using revised groundwater modeling that considers climate change with future simulations. In addition, reference sites should be selected to determine suitable conditions or targets for riparian restoration, if this information is not otherwise available. Reference sites serve as models for restoration planning, design, and implementation by providing information on vegetation succession, structure, and ecosystem functions. Reference sites should be similar to the target site with respect to existing physical conditions (e.g., soils, topography) and projected restoration outcomes (e.g., hydrology, ecosystem functions, vegetation composition/structure). Reference sites should be in proximity to the project site (e.g., stream corridor, watershed), and support minimally disturbed conditions (Stillwater Sciences 2012). 08b-27

Meadow Vegetation. The DEIR (p. 6-44) indicates that baseline and non-project groundwater depths in the upper meadow reaches of the Squaw Creek (East Cells A-C) only drop below 3.3 feet (1 m) during the driest months of some years. The DEIR further states that these cells would continue to have groundwater within 3.3 feet of the surface during the *majority of growing season months* during most years, although the number of years that the threshold would be exceeded would increase. In the driest years (10-20% of years), there would be seasons where groundwater levels drop below the threshold of meadow functionality for the majority of the growing season near Squaw Creek. As stated previously, current estimations of groundwater levels as a result of project implementation are inaccurate and do not consider the compounding effects of climate change on groundwater drawdown or recharge; thus, impacts to meadow vegetation are likely underestimated. 08b-28

The DEIR (p. 6-44) states that 'since meadows are composed of annual plants that have adapted to variable water conditions, reduced vegetation productivity or earlier die off of annual vegetation due to lower water levels or dry years is a regular part of ecosystem function' and 'meadow vegetation will return in wetter years.' Based on habitat descriptions (Section 6.1.3), it appears that the majority of plants in wet and dry meadows onsite are herbaceous, *perennial* 08b-29

species rather than *annual* species. Annual and perennial herbaceous species may be subject to different types of impacts, as discussed below.

The DEIR (p. 6-44) concludes that 'impacts to meadow vegetation in the upper reaches of Squaw Creek meadows would not be substantial since any reduction in meadow vegetation or vegetation productivity during dry years would be minimal and temporary.' The DEIR indicates that baseline and non-project groundwater depths only drop below 3.3 feet during *the driest months* of *some years*, while groundwater depths with project implementation will drop below 3.3 feet during the *growing season months*. This is an important distinction because increased drawdowns that lengthen the dry period during the growing season could result in plant mortality over time. Evidence suggests that impacts to meadow vegetation from groundwater drawdown in summer are greatest following a dry winter (Cooper et al. 2015). Further, changes in baseline groundwater levels, even if within 3.3 feet of the surface, could result in shifts in meadow species composition, since species or species-groups have different water requirements (e.g., Allen-Diaz 1991). Many perennial herbaceous meadow plants are rhizomatous species that may experience above-ground die-off during dry periods, but regenerate from below-ground root stock under favorable conditions. Although these species are adapted to natural fluctuations in climatic conditions that affect growth in some years, a permanent change in condition to more frequent years of lower groundwater levels would constitute an additional stress that could result in plant mortality over time. **08b-29 cont.**

Habitat descriptions (Section 6.1.3) list a few annual plants species in meadows onsite. Many annual plants rely on soil seed banks for germination and growth. Changes in groundwater levels during the growing season could result in annual plant mortality prior to seed set, which would reduce inputs to the soil seed bank and adversely affect long-term species persistence and native meadow species diversity. **08b-30**

The impact analysis does not provide evidence to support the contention that groundwater drawdown during the growing season months will not result in direct or indirect impacts to meadow vegetation. Of particular importance is the timing and duration of the drawdown. Further, the impact analysis should be based on revised groundwater modeling that considers the compounding effects of climate change on groundwater drawdown. **08b-31**

Loss of both annual and perennial herbaceous meadow species would provide gaps for colonization by species adapted to drier conditions, including upland trees, shrubs (e.g., Darrouzet-Nardi et al. 2006), and invasive plant species. Colonization by invasive annual grasses could increase fire potential per the grass-fire cycle (D'Antonio and Vitousek 1992). One invasive annual grass observed in disturbed areas onsite, cheatgrass (*Bromus tectorum*), contributes to increased fire frequency in sagebrush communities (Baker 2006) and has already **08b-32**

altered the fire season in some areas of the eastern Sierra Nevada (Slaton and Stone 2013). The DEIR should consider these potential indirect impacts to meadow vegetation. 08b-32 cont.

Restoration Potential. The DEIR (p. 6-45) indicates that proposed restoration would result in a net increase of wetted habitat and seasonal wetlands, but provides no indication of what types of habitats would be restored or whether the target restoration acreages are feasible or sustainable in the long-term. The anticipated wetland habitat increases are based on inaccurate groundwater modeling and do not consider the compounding effects of climate change on groundwater drawdown. An assessment of restoration feasibility and success should be based on (1) revised groundwater modeling that incorporates climate change simulations, (2) hydrologic modeling that incorporates plant species distribution models (e.g., Hammersmark et al. 2010), and (3) wetland species-specific data from literature or reference sites. 08b-33

A goal of the conceptual restoration plan is to 'offset current and historical impacts to the channel through improvement of aquatic, riparian, and wetland habitat.' (Balance Hydrologics, Inc. 2014). However, the restoration plan focuses primarily on aquatic rather than riparian or wetland habitat, and does not provide evidence that impacts to sensitive habitats would be mitigated.

Proposed mitigation measures are insufficiently detailed to determine their adequacy to offset project impacts

Section 6.3.4 Impact Analysis

Mitigation Measure 6-1a: Wetland Delineations

The DEIR (p. 6-46) calls for surveys of sensitive natural communities and a delineation of waters of the U.S. prior to the start of onsite construction activities, and further indicates that impacted habitat shall be replaced on a 1:1 no net loss basis. Deferring identification of sensitive natural communities and additional waters of the U.S. (potentially including wetlands) precludes analysis of all project impacts and reduces the potential for project redesign to avoid potentially significant biological resources. All project impacts should be quantified as part of the EIR process. 08b-34

The DEIR (p. 6-47) states that 'this project plans to construct all or a portion of replacement wetlands onsite.' However, there is no indication of which riparian/wetland species/habitats will be replaced, whether the proposed project hydrology (including groundwater levels with project implementation) will support wetland replacement on a short- or long-term basis, whether supplemental irrigation will be required, and what the demands of that irrigation may 08b-35

be on groundwater levels. In the absence of these details, the DEIR lacks evidence for its conclusion that the project's impacts to wetlands would be mitigated to a less than significant level. O8b-35 cont.

The DEIR (p. 6-47) further indicates that all or a part of wetland or riparian mitigation may occur offsite, presumably through a mitigation bank. The DEIR should identify County-qualified mitigation banks in the project area with mitigation credits available for in-kind habitat compensation or potential offsite areas suitable for wetland/riparian habitat construction. O8b-36

Mitigation Measure 6-1b: Ecological Performance Standards

In addition to the ecological performance standards listed in the DEIR (p. 6-49), monitoring of riparian restoration success should include indicators of riparian tree stress, such as reduced density, growth, and crown die-back. O8b-37

Mitigation Measure 6-1c: Monitor and Respond to Groundwater Effects

This mitigation measure calls for a 5-year monitoring period to record responses of riparian and meadow vegetation to groundwater level declines (DEIR, p. 6-49). Groundwater level declines may result in a range of impacts to sensitive habitats that can manifest over short- or long timeframes, depending on level, timing, and duration of the drawdown (Stromberg and Patten 1990, 1992, 1996, Scott et al. 1999, DiSalvo and Hart 2002). For example, rapid and sustained drawdowns may result in immediate vegetation mortality, whereas more gradual drawdowns that cause sustained or repeated stress to vegetation may result in reduced growth, reduced reproductive output, and eventual mortality over a longer time period (>5 years). Accordingly, monitoring of vegetation responses to groundwater level declines should occur over a longer time period (e.g., >6-10 years or longer). O8b-38

Significance after Mitigation (Mitigation Measures 6-1a – 6-1d)

The DEIR (p. 6-50) indicates that with implementation of mitigation measures 6-1a through 6-1d, impacts to sensitive habitats would be less than significant. However, the DEIR (1) has not addressed or quantified all potential impacts to sensitive habitats onsite, (2) does not provide evidence that the built project will support restored wetland and riparian habitat onsite, and (3) has not identified potential offsite mitigation banks or restoration sites. Given these shortcomings, the DEIR lacks the necessary evidence to conclude that impacts to sensitive habitats would be less than significant. O8b-39

Groundwater drawdown will be exacerbated by climate change and may contribute to greenhouse gases; the DEIR does not consider or adequately address all impacts to sensitive habitat from project implementation (including direct, indirect, or cumulative impacts)

Section 16: Greenhouse Gases and Climate Change

General Comment. The DEIR does not consider the effects of climate change on groundwater modeling or biological resources. As a result, potential impacts to sensitive biological resources from project implementation are likely underestimated. For example, project impacts from groundwater drawdown may be intensified as a result of climate change due to global warming. Vegetation communities such as riparian and wetland habitats that are already stressed by historic groundwater drawdowns and that will be further impacted by project-related drawdowns will be particularly vulnerable to climate change stressors (Cummings and Nydick 2013). Climate change projections should be incorporated into groundwater modeling and considered in the analysis of biological impacts and restoration plan design. Without an assessment of all potential impacts, proposed mitigation measures may not be sufficient to offset the combined effects of project implementation and climate change on biological resources (Siegel et al. 2007). 08b-40

Greenhouse Gas Emissions. The DEIR (p. 16-13) estimated the loss of sequestered carbon based on types and amounts of vegetation that would be removed permanently due to construction, per Table 6-1. As discussed above, impacts to biological resources are likely underestimated based on inaccurate groundwater modeling and failure to consider the compounding effects of climate change. Therefore, sequestered carbon losses are likely underestimated.

It is unclear whether estimates of sequestered carbon losses considered impacts to wet meadows at or above streambed level. Wet meadows store large amounts of soil organic carbon compared with surrounding uplands and function as important carbon sinks (Norton et al. 2014). This function is dependent on the maintenance of wet or saturated conditions. Deteriorating or drying meadows act as a carbon source, releasing sequestered carbon into the atmosphere where it contributes to greenhouse gas emissions and exacerbates global warming (Kayranli et al. 2010, Norton et al. 2011, Badiou et al. 2011, Norton et al. 2014). The DEIR must consider potential impacts to wet meadows with respect to loss of sequestered carbon. 08b-41

Impact 16-3: Impacts of Climate Change on the Project

The DEIR (pp. 16-20-16-21) states that 'although there is a strong scientific consensus that global climate change is occurring and is influenced by human activity, there is less certainty as 08b-42

to the timing, severity, and potential consequences of the climate phenomena, particularly at specific locations.' Note that scientists are in agreement that the Sierra Nevada will experience increased temperatures. Existing climate data and climate change modeling projections indicate a decreased snow pack, earlier and more rapid snowmelt, longer and more severe droughts during the growing season, shifts in plant species composition, increases in invasive plant populations, increases in fire probability, and increased flooding and erosive events (Cummings and Nydick 2013, Stillwater Sciences 2012, Das et al. 2011, Sierra Nevada Alliance 2010, Young et al. 2009; Cayan et al. 2008; Peterson et al. 2008, Vicuna et al. 2007, Mote 2005, Dettinger et al. 2004, Hayhoe et al. 2004, and others). The DEIR should consider existing climate data and climate change projections in groundwater modeling, biological impact analysis, and restoration plan design. 08b-42 cont.

The DEIR (pp. 16-20-16-21) addresses potential climate change impacts to land uses and facilities, but does not address potential climate change impacts to biological resources. Project impacts that will be intensified by climate change include hydrological changes (e.g., groundwater drawdown, timing and duration of surface flows) that will affect sensitive habitats, habitat type conversions (and potential loss of wildlife habitat) due to drying conditions or repeated wildfire, and increased erosion following wildfire (e.g., Pauseus and Keeley 2014, Stillwater Sciences 2012, Sierra Nevada Alliance 2010, Westerling 2006). Climate change is also expected to facilitate the spread of invasive plant species as thermal barriers to invasion are removed. Invasive plants may out-compete native plants for resources, draw down water tables, alter food web dynamics for animals, and result in a shift in species composition, altered hydrology, and wetland structure (Sierra Nevada Alliance 2010, Belnap et al. 2005, Ehrenfeld 2003, Evans et al. 2001, Cox 1999, Wilcove et al. 1998, D'Antonio and Vitousek 1992, Huenneke et al. 1990, Vitousek et al. 1990, and many others). The DEIR fails to address all potential impacts to biological resources from climate change. 08b-43

Section 18-1: Cumulative Impacts

Cumulative impacts result from past, present, and reasonably foreseeable future actions. The DEIR (p. 18-10) mentions historic losses to meadows in the region but does not adequately discuss existing or future impacts to this habitat onsite. Sierra Nevada meadows have been identified as one of the most altered, impacted, and at-risk landscapes in the range (Viers et al. 2013). In this context, any additional meadow losses or degradation could constitute significant cumulative impacts. 08b-44

Impact 18-6: Cumulative Effects on Sensitive Habitats

The DEIR (p. 18-10) states that 'Mitigation Measures 6-1a through 6-1d would reduce cumulative project impacts to sensitive habitats to less-than significant because these measures would ensure that the Specific Plan results in no net loss of sensitive habitats.' However, the DEIR has not addressed or quantified all potential impacts to sensitive habitats. The cumulative impact analysis must consider the combined effect of direct and indirect impacts from all project components, and then identify feasible mitigation for the combined impacts.

The DEIR (p. 18-10) concludes that the Specific Plan would not contribute considerably to the overall significant cumulative effect on sensitive habitats in the Tahoe-Truckee region because of proposed mitigation measures. As discussed above, there are substantial flaws in the DEIR's proposed mitigation measures for the porject's impacts to sensitive habitats. For this reason, the DEIR cannot rely on these measures to conclude that impacts would be less than significant. In addition, this assessment of impacts to sensitive habitats is based on current groundwater modeling that is inaccurate and does not consider the compounding effects of climate change. The DEIR should assess impacts based on revised groundwater modeling that considers the compounding effects of climate change and reach a conclusion regarding the project's contribution to cumulative impacts based on that analysis. 08b-45

The DEIR (p. 18-10) identifies several probable future projects in the region (DEIR, Table 18-2, pp. 18-3-18-5) but does not actually evaluate the combined effects of these projects. At a minimum, the analysis should consider cumulative impacts to sensitive habitats for those projects that are approved, under construction, or finalized, and evaluate the combined effects of those projects. 08b-46

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08b

Sierra Watch, Attachment 2
Patricia Gordon-Reedy, Vegetation Ecologist/Botanist with Conservation Biology Institute
July 13, 2015

08b-1 The comment is an introductory statement and does not address the content, analysis, or conclusions in the DEIR. Detailed responses to the detailed comments are provided below.

08b-2 The comment provides a summary of detailed comments within the comment letter. See responses to the detailed comments below.

08b-3 The comment states that riparian vegetation is underestimated because riparian habitat in perennial and intermittent streams have not been quantified. As stated in Table 6-1 of the DEIR, mapping of habitat occurrences, including riparian habitat, was conducted by Salix Consulting, with the mapping information presented in various Biological Assessment Reports cited in the DEIR and available from the County (A CD with all biological resources reports can be requested at http://www.placer.ca.gov/departments/community development/envcoordsvcs/eir/villageatsquawvalley/references). As stated in Section 6.1.3 on page 6-2 of the DEIR, data from various written sources used to support the EIR analysis were supplemented by additional information collected during a site visit conducted by an Ascent Environmental biologist in August 2013. A general comparison of available reports to on-the-ground conditions was also conducted during the site visit. Further ground truthing and data collection was conducted by Mr. Sean Bechta (EIR project manager, B.S. in Wildlife Biology from U.C. Davis, 25 years experience) during various visits to the project site through 2014 and 2015.

As indicated in Note #2 in Table 6-1, and in the discussion of riparian habitat on page 6-12, the habitat mapped as perennial stream in Lot 4 (0.43 acre) and some areas mapped as intermittent stream (particularly within the Squaw Creek restoration corridor in Lot 23) contain riparian habitat. Riparian vegetation was not mapped separately from the perennial/intermittent stream communities in these locations. This approach to the vegetation mapping is clearly identified in the DEIR; however, it does not result in impacts to sensitive habitats being underestimated. Impacts to riparian habitat are included in the overall effects to sensitive habitats identified in the discussion of Impact 6-1 beginning on page 6-40 of the DEIR. As stated on page 6-41,

> Approximately 6.33 acres of sensitive habitats (including approximately 4.2 acres of habitats considered waters of the United States) would be potentially disturbed or removed during proposed construction of Specific Plan facilities, including the Squaw Creek restoration.

The sensitive habitats include riparian vegetation as well as perennial and intermittent stream. Therefore, any riparian habitat that may be included within the perennial and intermittent stream habitats identified in Table 6-1 would be included in the description of effects in Impact 6-1, and no impacts to riparian vegetation would be “lost” in the DEIR.

Impact 6-1 adequately discloses the scale of effects to sensitive habitats that may occur from project implementation, and Mitigation Measures 6-1a and 61-b ensure that actual significant effects, once project design is complete and construction is implemented, are adequately mitigated. Mitigation Measure 6-1a requires that any acres of jurisdictional wetlands or waters of the U.S. in the project area will be verified by U.S. Army Corp of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), and California Department of Fish and Wildlife (CDFW) prior to the Final Subdivision Map(s), and once specific effects are

known, that mitigation sufficient for compliance with the Clean Water Act (CWA) be implemented. Mitigation Measure 6-1b requires the project applicant to obtain a Streambed Alteration Agreement from CDFW. This permitting process will require the quantification of, and mitigation for, effects on riparian habitat. Both of these mitigation measures will ensure that any impacts to sensitive habitats will be avoided, minimized, and compensated for consistent with applicable established permitting processes and legal requirements.

08b-4 Potential jurisdictional wetlands and habitat categories, as stated in Table 6-1 of the DEIR, were estimated in Salix Consulting's Biological Assessment and Wetland Delineation Reports (Salix Consulting 2012a, 2012b, 2012c, 2013a, 2013b, 2013c, 2014a, 2014b, 2014 c, 2014d, and 2014e). In these reports, potential jurisdictional wetland features and associated vegetation were mapped. In some cases, a vegetation community (alderleaf coffeeberry scrub) was not distinctly separated in the report text from the wetland/jurisdictional habitat (seep) it was closely associated with. To ensure that all habitat occurrences were disclosed, the alderleaf coffeeberry shrub associated with the East Parcel seep is identified in Table 6-1 and on page 6-12 of the DEIR, rather than ignoring the alderleaf coffeeberry shrub associated with the seep and only identifying this location as seep habitat. Although this information could have been presented differently, all habitat occurrences are disclosed in the DEIR.

08b-5 Willow vegetation was delineated in Salix Consulting's Biological Assessment Reports (Salix Consulting 2012a, 2012b, 2012c, 2013a, 2013b, 2013c, 2014a, 2014b, 2014 c, 2014d, and 2014e) and intermittent streams were described as containing some riparian/sensitive habitat vegetation as discussed previously in response to comment 08b-3. See response to comment 08b-3 with respect to whether impacts to willow riparian scrub in intermittent streams were appropriately quantified and analyzed.

08b-6 See response to comment 08b-4 with respect to the identification of occurrences of seep and alderleaf coffeeberry scrub.

08b-7 See response to comment 08b-3 regarding perennial stream and riparian habitat categories. In addition, the discussion of perennial stream habitat on page 6-12 of the DEIR identifies that the only activity in the perennial stream habitat in the Truckee River consists of replacement of an existing sewer siphon under the river, would be undertaken by SVPSD, and has independent utility from the VSVSP because it would move forward with or without the project (the sewer siphon replacement is discussed further in Chapter 13, "Hydrology and Water Quality,"of the DEIR).This SVPSD activity is not part of the proposed project, and, therefore, the proposed project would not result in impacts to habitat in this location. See also the Master Response regrading water supply for a discussion of project impacts on the Truckee River.

08b-8 See response to comment 08b-3 with respect to the identification of riparian vegetation, calculations of riparian impacts, and adequacy of mitigation. Regarding identification of riparian woodland versus riparian scrub to ensure proper mitigation, Mitigation Measure 6-1a has a requirement that wetland replacement be conducted on a "no net loss" basis, including acreage and function. Mitigation Measure 6-1b requires creating or restoring "in-kind habitat." Once specific areas of impact are identified, the type and extent of affected wetlands and riparian habitat will be determined, and any compensatory habitat restoration, creation, or enhancement will be determined based on coordination with the permitting agency, as well as the County, using the no net loss and in-kind habitat criteria.

08b-9 See responses to comments 08b-3 and 08b-4 regarding the identification of various vegetation communities within wetland categories. For the reasons described in these responses, the occurrence of and impacts to willow scrub on the project site are adequately disclosed in the DEIR and mitigation measures are appropriate for addressing potential impacts.

08b-10 The commenter states that no wetland delineation has been conducted for the wet meadow habitat along the sewer line corridor and therefore impacts may be understated. As noted in the DEIR, a Biological Resources and Wetlands Constraints Analysis was prepared for the 2.2-mile Squaw Valley Sewer Line Study Corridor (Salix Consulting 2014e). (See DEIR, pp. 6-1, 6-3, 6-14.) A formal wetland delineation was not prepared for the sewer line because the areas where the sewer line would require upgrades were not known at the time that the survey was conducted. Instead, habitats along the entire sewer line were identified, including potential wetland habitat (see Exhibits 6-1 and 6-2 and page 6-25 of the DEIR).

08b-11 See responses to comments 08b-3 and 08b-4 regarding the identification of various vegetation communities within wetland categories. For the reasons described in these responses, the occurrence of and impacts to willow alder scrub on the project site are adequately disclosed in the DEIR and mitigation measures are appropriate for addressing potential impacts.

08b-12 See responses to comments 08b-3, 08b-4, and 08b-9.

08b-13 See responses to comments 08b-10 and 09-59 with respect to the assessment of impacts to wetlands and waters of the U.S and the programmatic nature of the EIR document and analysis, respectively. The comment fails to identify the following parenthetical statement on page 6-25 of DEIR that follows after the text identified in the comment:

> (The unsurveyed areas are limited to certain off-site utility corridors and potential trails; reconnaissance-level surveys have been performed, but further site-specific surveys will be necessary in order to comply with Corps requirements.)

Therefore, the only project components where delineations have not been conducted are trail improvement area and portions of utility corridors, and these areas have had reconnaissance-level surveys. The potential for effects to wetlands from these activities are addressed both in the requirement for verification of wetland delineations in Mitigation Measure 6-1a, and in the disclosure of potential effects from trails provided in Impact 6-10.

Because no wetland delineation has been approved by USACE for any part of the DEIR project area at the time of the writing of the DEIR, jurisdictional resources have the potential to be slightly underestimated or overestimated depending on the outcome of the USACE delineation verification process. The acreages noted in the DEIR's analysis are the best available information. A completed or verified wetland delineation is not necessary to adequately disclose or assess impacts to wetlands and waters of the U.S. in the context of an EIR when adequate surveys and habitat mapping have been conducted as here. In addition, Mitigation Measure 6-1a requires final verification of delineations, identification of site specific effects, and provides minimum performance standards for compensatory mitigation. It is common, and beneficial, for EIRs to provide a certain level of flexibility in assessing wetland impacts to support the ultimate balancing between wetland avoidance and compensation that occurs through the project design, construction, and permitting processes.

08b-14 Wet meadow is addressed separately in Table 6-4; however, this is not clear because due to a typographical error, the heading text for wet meadow near the bottom of page 6-25 was not put in bold text and was indented incorrectly. In response to this comment, the text formatting for the wet meadow heading in Table 6-4 on page 6-25 of the DEIR is corrected to appear as follows:

Table 6-4 Acres of Potential Wetlands and Other Waters of the United States within the Project Site

Wetlands and Other Waters of the U.S.[1]	Main Village	East Parcel	Utilities and Other Facilities	Total Acres on Project Site
Seasonal Wetland/Willow Scrub				
SW/WS-1		0.158	0.035	0.193
SW/WS-2		0.097		0.097
Wet Meadow				*1.081*
WM-1	0.231			0.231
WM-2	0.053			0.053
WM-3	0.067	-	-	0.115
WM-4	0.047	-	-	0.047
WM-5	-	-	0.018	0.018
WM-6	-	-	0.0002	0.0002
WM-7	-	-	0.003	0.003
WM-8	-	-	0.0002	0.0002
WM-9	-	-	0.314	0.314
WM-10	-	-	0.275	0.275

With respect to acreage discrepancies between Tables 6-1 and 6-4 in the DEIR, the Sensitive Habitats category in Table 6-1 includes jurisdictional and non-jurisdictional sensitive habitats in the sensitive habitat subheader because non-jurisdictional wetlands are considered sensitive by the County per the General Plan. Table 6-4 only includes those habitats that could be potentially jurisdictional. Therefore, the "Total Potential Jurisdictional Features" provided at the end of Table 6-4 (8.233 acres) is lower than the total if one were to add the acres of sensitive habitats identified in Table 6-1 (12.54 acres).

The 0.091 acre difference between the 5.32 acres of intermittent stream identified in Table 6-1 and the 5.229 acres identified in Table 6-4 is due to rounding.

08b-15 The Impact 6-1 summary statement on page 6-40 of the DEIR identifies that the impact acreage due to groundwater reduction is uncertain because of lack of available information.

Although the data analysis indicates that perennial riparian and annual meadow vegetation will not be permanently lost the lack of specific information on bank and habitat elevation (as well as restoration impacts) prevents certainty in this conclusion; thus there is potential for some loss of these sensitive habitats.

The DEIR analysis on groundwater/vegetation impacts was informed by the best available data, which included the Todd Groundwater Study (2014) and the location of vegetation types in the project area from Biological Assessments and Wetland Delineation Reports and various reconnaissance surveys. However, even with this information, an accurate assessment as requested by the commenter, combining information on occurrences of habitat types at different elevations along the streambed and attributing specific groundwater elevation changes to these locations cannot be provided with a reasonable level of effort. The area of interest also includes portions of Squaw Creek outside the control of the project applicant. While a detailed analysis cannot be conducted, the paragraph that begins on page 6-43 and ends on page 6-44 of the DEIR is revised as follows, and a new table is added:

These data show that based on these perennial vegetation requirement thresholds, groundwater withdrawals to support the Specific Plan and other development, if managed as currently modelled, ~~are unlikely to~~ has some potential to result in some mortality and degradation to selected areas of established perennial riparian vegetation within portions of the western channel ~~or upper meadow reach~~ of Squaw Creek- the areas most affected by groundwater withdrawal. The reduction of potential germination levels through groundwater decline could impact seedling recruitment in certain areas and reduce the health of the riparian community along the streambank where seedlings of cottonwoods succeed. Sapling establishment/survival could be reduced to the point of not allowing for suitable riparian replacement or age structure around West Cells F and G. ~~However~~ The data used in this analysis does not take into account riparian vegetation that may be several feet above the creek bed. The stream channel for Squaw Creek is several feet below the surrounding ground surface in many areas, and some riparian vegetation is located along the higher elevation edges of the incised channel. The data available only shows groundwater levels compared to creek bed levels, not bank levels that may be several feet higher than the creek. While direct observations (Ascent Environmental 2013) of the creek show that most perennial riparian vegetation is at or just slightly above creek level in the areas mentioned above, this is not the case in all areas of the creek or ~~even~~ within the meadow complex itself. Therefore, it is possible that some riparian vegetation ~~within~~ along the creek in the west channel and upper east channel may die due to a drop in ground water below these thresholds, or significant degradation of seedling/sapling establishment and survival conditions could occur. Within the plan area, riparian or wetland vegetation associated with the hydrology of West Cells D through J could be affected by lowering groundwater levels, if such vegetation loses access to groundwater that is currently available to the plants during the dry months. Table 6-5 provides the acreages of sensitive habitat within the plan area that, depending on distance to groundwater levels under current and future conditions, could be affected by drops in groundwater levels; also see Exhibit MM 6-1c. The mapped vegetation that could be negatively impacted within these affected areas would include an estimated 12.87 acres of sensitive habitats. Of this acreage, 7.66 acres would be directly affected by construction activities (e.g., grading), so up to an additional 5.21 acres could be affected solely by lowering groundwater levels. The actual acreage that could be affected would vary from year to year depending on rainfall, drought, fluctuations in groundwater, creek restoration design and other conditions, and the location of this vegetation relative to existing and future groundwater levels.

Additionally, some indirect effects such as crown dieback, reduced growth rates, or reduced foliage density may occur throughout the west channel in the Village area (West Cells E through I) and at the top of the east channel surrounding East Cells A and B. Groundwater level reduction that could result in loss or degradation of riparian habitat, a sensitive natural community specifically identified in the significance criteria listed above, and protected under Placer County policies and under the jurisdiction of the CWA, would be a potentially **significant** impact.

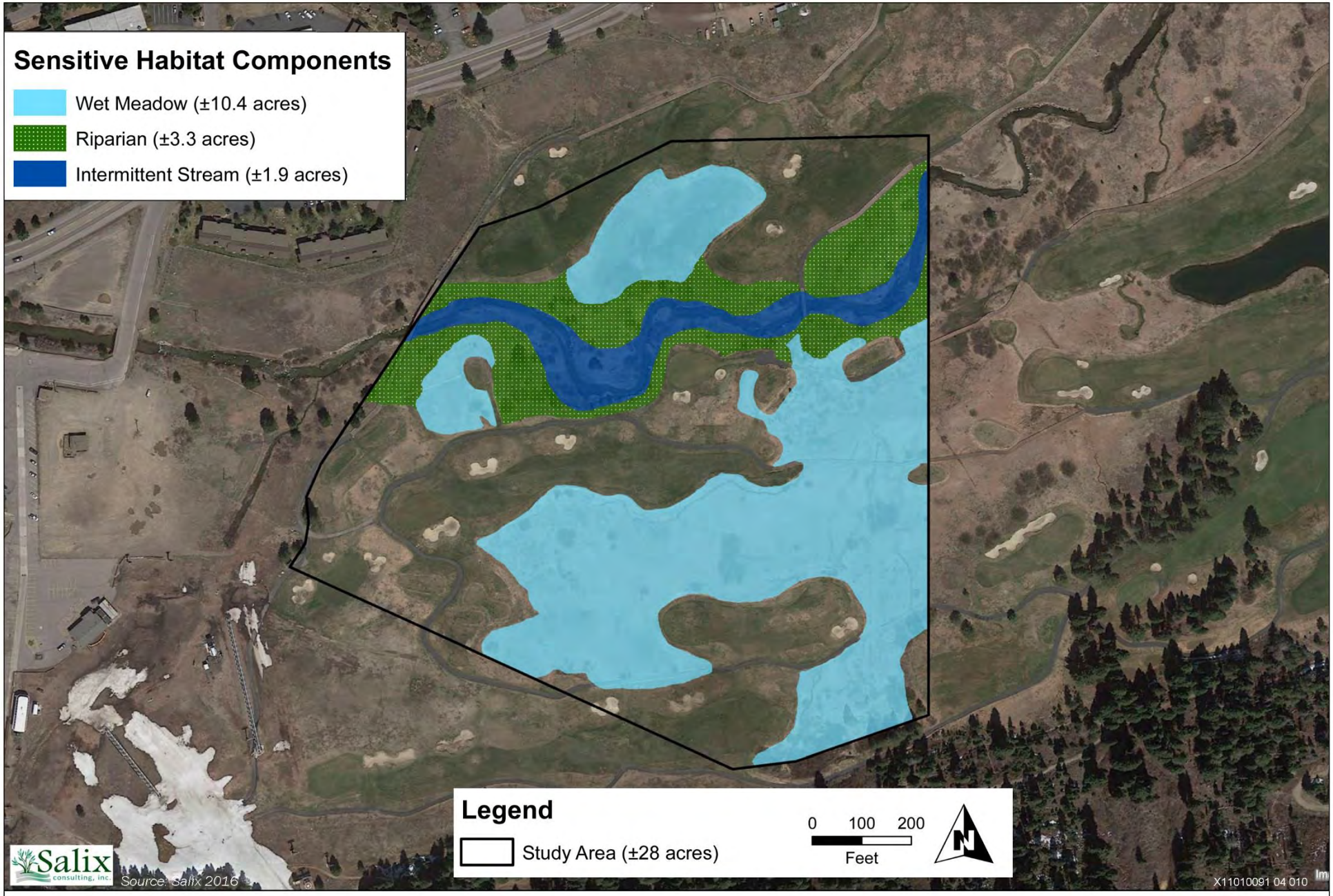

Exhibit MM 6-1c

Area Potentially Impacted by Groundwater Pumping

ASCENT ENVIRONMENTAL

Table 6-5 Estimate of Potentially Affected Sensitive Habitats from Operational Groundwater Impacts within the Mapped Project Area*

Sensitive Habitat Land Cover	Total Acres Potentially Impacted by Operational Groundwater Drawdown	Acres Impacted by Construction in the Area Potentially Impacted by Operational Groundwater Drawdown	Acres Impacted by Operational Groundwater Drawdown Only (Minus Construction Acres)
Intermittent Stream	4.14	1.69	2.45
Meadow	4.09	3.42	0.67
Riparian	3.73	1.74	1.99
Seasonal Wetland	0.07	0.05	0.02
Wet Meadow	0.4	0.33	0.07
Wetland Swale	0.43	0.41	0.02
Wetland Swale/Willow Alder Scrub	0.00	0.00	0.00
Willow Alder Scrub	0.01	0.01	0.00
Total	**12.87**	**7.66**	**5.21**

* Sensitive habitat vegetation surrounding Todd Groundwater (2015) modeled groundwater cells considered potentially affected by groundwater reduction: areas associated with West Cells E through J. This area includes meadow habitat north and south of Squaw Creek in the Plan Area.

Source: data provided by Ascent Environmental 2015

This information added to the discussion in Impact 6-1 does not change the conclusion in the EIR. There is still a conclusion of a significant impact because of loss of natural communities important to the

Mitigation Measure 6-1c addresses the uncertainty regarding specific impact locations and intensity by ensuring that the project applicant would record baseline locations of riparian and meadow vegetation along the upper eastern channel of Squaw Creek. As written in the DEIR, this Mitigation Measure did not capture mitigation to impacts that could occur in the portions of the western channel of Squaw Creek that were most affected by groundwater drawdown; it only captured those that were most affected along the upper eastern channel. To clarify this, Mitigation Measure 6-1c is revised as follows to capture this potential loss in the western channel, if it occurs outside of the location estimated in in the DEIR analysis. Additional revisions have been made to Mitigation Measure 6-1c, and are reflected below, to address issues raised in other comments in this letter (08b-7, 08b-16, 08b-17, 08b-28, 08b-35, 08b-36, and 08b-38) as well as comments in other letters (09-61, 09-110, PH-47, etc.). Revisions also reflect clarifications and additional information that became available since publication of the DEIR.

Mitigation Measure 6-1c: Implement Mitigation Measure 13-4 and monitor and respond to groundwater effects.

The project applicant shall implement Mitigation Measure 13-4, provided in Chapter 13, "Hydrology and Water Quality." Mitigation Measure 13-4 reduces the uncertainty associated with management of well system design and operation by ensuring the adoption of performance standards, thresholds, and recommendations from the WSA for well system operation, and requiring consistency with applicable groundwater plans. By confirming that groundwater management is implemented in a manner that is consistent with the operational parameters described in the WSA, Mitigation Measure 13-4 would also result in confirmation that groundwater pumping ~~does not result in losses of riparian vegetation in the west channel or upper east channel of Squaw Creek~~ and any future groundwater/vegetation impact modeling is consistent.

In addition, the project applicant shall record baseline locations and composition of species of riparian and meadow vegetation ~~along the~~ in the surrounding meadow that is hydrologically connected to the upper eastern channel of Squaw Creek (in relation to East Cells A, ~~B, C, D and E~~ through D) and along the western channel (in relation to West Cells E through J) before initiation of construction of the VSVSP. If sensitive plant species are found in these areas, the project proponent will follow mitigation measures outline in Mitigation Measure 6-8 to consult with CDFW and USFWS, as appropriate depending on species status, to determine the appropriate mitigation measures for the indirect impacts that could occur as a result of project operational groundwater drawdown. ~~Where these locations are on lands not controlled by the applicant, the applicant shall seek access from the landowner to conduct monitoring. If access cannot be obtained, monitoring will be conducted via photo-points or other means from the property line or other nearby publicly accessible location.~~ The extent and composition of vegetation in the western channel and associated riparian and wet meadow areas shall be monitored annually until at least 5 years ~~after final project build out~~ after the last project element is occupied, to ensure accurate recordation of responses to groundwater level declines and any beneficial effects resulting from creek restoration. Any riparian or meadow habitat lost or degraded within these areas that is determined to be a ~~as~~ result of project-related groundwater level declines shall be compensated for on or off-site (within the Olympic Valley preferred) at a minimum 1:1 ratio within the Sierra Nevada bioregion and the Tahoe-Truckee region, or conditions otherwise corrected, such as through irrigation of riparian ~~vegetation~~ and/or wet meadow vegetation to maintain composition and functionality of existing habitat. If monitoring shows that riparian vegetation along the streambank is not supported, other native vegetation will be planted and managed to stabilize the creek bank as per Mitigation Measure 6-1b. ~~Alternatively, groundwater modeling can be conducted that predicts conditions for riparian vegetation and meadows at a higher elevation than the Squaw Creek low flow channel (current groundwater analysis only supports an evaluation of conditions at the elevation of the low flow channel). If this modelling indicates that changes in groundwater conditions under the proposed groundwater management regime would not result in a significant adverse effect to riparian and meadow habitat, ongoing monitoring would not be needed.~~

To address the potential effects of groundwater pumping outside of the VSVSP area, the following steps shall be taken:

(a) Prior to recordation of the first Small Lot Tentative Map, conduct soil borings throughout the wet meadow east of the project boundary (see Exhibit MM 6-1c) to determine whether groundwater is available to wet meadow vegetation (i.e., there are no barriers to between groundwater and plant roots and/or moisture levels in the soil column indicate that groundwater is available to plant roots). Soil borings may be taken in multiple months and in successive seasons as needed to determine if a connection to groundwater is present. If groundwater is not available to the plants during the July-October period, then no further steps are necessary with respect to those areas. In these conditions, it is assumed that vegetation is receiving water from sources other than groundwater, such as golf course irrigation overspray.

(b) If soil borings indicate that groundwater is available to these plants in some or all portions of the study area east of the project boundary during July through October, then it is assumed that drops in groundwater levels could affect the viability of the plants and a monitoring plan shall be implemented, and shall include the following steps.

- Determine the minimum depth to groundwater needed during the critical period for existing habitat to maintain baseline conditions.

- Install groundwater monitoring wells in the riparian and wet meadow portions of the study area east of the project boundary where a potential connection to groundwater has been established. The location of the wells shall be based on the extent of the area that could be affected, based in part on the data collected by soil borings conducted as part of Item (a), and for which access is available. For example, if the entire wet meadow in the study area east of the project boundary is included, it is anticipated that 8 to 12 wells will need to be installed, including at least one well east of the study area. Existing and planned monitoring wells may be used, if appropriate, and permission is provided by the well operator/owner. Well locations shall be coordinated with plant survey transects.

- Collect data from the monitoring wells each year from July through October, at a minimum.

- Establish transects on a north-south heading every 50 meters or less.

- Determine the species that are located on each transect at one-meter intervals.

- Surveys shall be conducted at least once annually to determine whether the vegetation profile is changing along the transect and/or there is increased plant mortality.

Initial monitoring [as outlined in (b)] to establish baseline conditions of wet meadow vegetation and groundwater levels east of the VSVSP area shall be conducted annually for 5 years. The onset of monitoring may be coordinated with creek restoration efforts, but shall begin prior to or concurrent with recordation of the first Small Lot Tentative Map or within 2 years of project approval, whichever occurs first. After the initial 5 years, monitoring shall be conducted every 5 years, at a minimum, until 30 percent of VSVSP development has been completed. Upon occupancy of 30 percent of the VSVSP development, monitoring shall be conducted on an annual basis until 5 years after buildout of the project.

If access cannot be gained to survey the riparian habitat and/or wet meadow and/or to install monitoring wells east of the VSVSP area, then an assessment shall be made via photo-points or other means from the property line or other nearby publicly accessible location and/or surveys of a control site with similar characteristics that is located on property that can be accessed. In order to determine whether observed changes are due to groundwater pumping, modeling methods may be used. If adverse effects are observed and can be attributed to groundwater pumping, then mitigation would be required as described below.

If monitoring and surveys indicate that riparian and/or wet meadow vegetation is being lost and/or degraded at levels that could impair the viability and value of the wet meadow and/or riparian habitat, and that change is correlated with lowered groundwater levels as indicated by monitoring wells and pumping data, one or more of the following steps shall be undertaken to ensure that there is no net loss of acreage and/or value of wet meadow habitat:

- Work with the SVPSD to adjust the pumping regime in a manner that minimizes draw down in the portion of the overall study area that is being affected;

- Irrigate the affected area during the critical period using water from a source other than the aquifer, such as fractured wells used for snowmaking at Squaw Valley;

- Provide improvements to the water system in Squaw Valley (e.g., replacement of old, leaking pipelines, replacement of high-water use fixtures) to reduce demand from other sources by an amount commensurate with the amount of irrigation water required for riparian and/or meadow vegetation. In this case, water from the aquifer could be used for irrigation of sensitive habitats; and/or

- Provide compensation for the affected area by restoring a commensurate area of wet meadow and/or riparian habitat. Preference shall be given to areas within the Squaw Valley meadow and/or in the vicinity of Squaw Creek. Contribution to the restoration efforts for Squaw Creek east of the VSVSP would be one method of compensation, because the creek restoration would improve the function of the creek, and thereby improve habitat conditions along the creek and within the meadow. If suitable land is unavailable within the Squaw Valley meadow and/or in the vicinity of Squaw Creek, then restoration activities may occur outside of Squaw Valley but within the Tahoe-Truckee area. VSVSP would be responsible for restoring that portion which is attributable to its share of increased groundwater pumping. Such compensation shall ensure that there is no net loss in the quantity or function of such habitat.

The selection of the remediation measures shall be based in part on whether the effects on riparian and/or meadow vegetation are occurring only during certain years (e.g., particularly dry years) and the period of time that remediation would be needed to ensure vegetation viability. If irrigation is used, it shall be demonstrated that the amount of water used would be within the water demand evaluated in the 2015 Water Supply Assessment or that another source of water, such as snow making wells or reducing other demand, as discussed above, could be used. As discussed previously, water could be supplied from snow-making wells located within fractured bedrock (i.e. not drawing water from the Olympic Valley aquifer) to provide irrigation for landscaping, the creek restoration area, and riparian vegetation along East Cells A through C.

This information added to Mitigation Measure 6-1c does not change the conclusion of significance after mitigation in the EIR. There is still a conclusion of a less-than-significant impact because of loss and degradation of natural communities important to the ecosystem were avoided, minimized, or mitigated.

08b-16 The comment references the Myers comment letter (letter 08a in this FEIR). Please see responses to letter 08-a. Also see Section 2.2, “Updated Water Supply Assessment and Groundwater Data,” of this FEIR regarding further refinements to the WSA and groundwater modelling conducted since publication of the DEIR. Also see the Master Response regarding water supply, which addresses various issues related to the adequacy of the WSA and groundwater modelling as well as the potential effects of climate change on groundwater in the Olympic Valley.

08b-17 In response to this comment, the following paragraph has been added to page 6-43 of the DEIR immediately following the first full paragraph on that page to clarify potential indirect and sublethal effects to riparian and sensitive habitats. Additional revisions have been made as a result of other comments in this letter, and are included here for clarity (i.e., 08b-18, 08b-19, 08b-20, 08b-21, and 08b-22).

Studies have also documented sublethal indirect effects on black cottonwood and other riparian tree species such as reduced tree growth, crown dieback, and lower canopy foliage density (Stromberg and Patten 1990, 1992, and 1996, Rood and Mahoney 1990, Scott et al 1999, Lite and Stromberg 2005) from reduced groundwater or changes to flow regime. These effects could occur in areas where the threshold for tree mortality described above is not reached, but reductions in available groundwater are still sufficient to cause measurable stress to existing trees. The groundwater levels at which these sublethal impacts may occur for the species present along Squaw Creek are not described in sufficient manner to determine areas of impact based on the literature surveyed for this project. Those areas that are impacted by significant reductions in groundwater level described below would be susceptible to these indirect effects.

Exhibits 13-23 through 13-27 in Chapter 13 show simulated groundwater elevations under the baseline and project scenarios (including the cumulative 2040 scenario evaluated in the Water Supply Assessment [WSA] prepared for the project) and comparison to surface elevation in the same model cells (Todd Groundwater 2015). Exhibit 13-22 also shows the location of the "West Cells, A through J" identified in the study (Village reach, western channel) and East Cells, A through N (meadow reach) at which data was taken and simulated. Based on observations from this data (Todd Groundwater 2015), the bullet items below reflect whether the areas where perennial riparian vegetation requirements described above would not be met:

- West Cells ~~B, D, E, G and H~~ E, F, G, H and I show more years with maximum groundwater depths >10 feet below the surface during the growing season when compared with baseline and non-project (i.e., future Olympic Valley development condition without the proposed project) conditions. ~~However, b~~Baseline groundwater conditions for West Cells A, B, and D are generally greater than 10 feet below the surface in most years. So it can be expected that this is a circumstance where existing perennial riparian vegetation likely has root systems that extend farther than 10 feet below the ground surface. ~~Thus there will likely be no substantial increase in probability of mortality to established vegetation in these areas based on the groundwater depths > 10 feet criteria.~~ Only the East Cells and West Cells C and J will be less than 10 feet below the creek bed during summer months for all years after plan implementation and have a higher likelihood to maintaining perennial riparian vegetation. Thus, there will be no impacts from the project to established riparian vegetation in the East Cells or West Cells A, B, C, D, and J. West Cells E, F, G, H, and I may experience some mortality to the riparian vegetation located at the bottom of the channel due to the increase in depths and duration. Additionally, these cells may experience indirect effects such as branch die-back or reduced growth, especially during stressful low water years.

- Relative to seedling/sapling establishment and survival and providing water tables within 3.3 feet of the ground surface, specific to this parameter, all West Cells except Cells F, G, and J would experience similar conditions to the baseline and Non-Project conditions with groundwater withdrawals for the new development. West Cell F, G, and J would see unsuitable establishment/survival conditions increase from 60-68 percent of years under Non-Project conditions to all or almost all years under 2040 WSA conditions; removing any possibility of good germination years. ~~These~~ All other West Cell areas already experience groundwater levels greater than 3.3 feet below the ground surface for either all modelled years, or ~~almost all~~ most modelled years (greater than 75 percent of years), with an expected commensurate reduced potential for seedling/sapling establishment and survival. Further reductions in groundwater levels associated

with implementation of the VSVSP and other development would only move groundwater levels further below the 3.3 foot threshold, which would not result in a greater reduction in the potential for seedling/sapling ~~establishment and~~ survival. Whether groundwater levels are 4 feet below the ground surface or 14 feet below the ground surface, conditions are highly unfavorable for seedling/sapling establishment and survival. Seedlings/sapling survival and establishment potential in East Cells A, ~~and~~ B, and C would be reduced compared to baseline and Non-Project conditions because the number of years where groundwater is below the 3.3 foot threshold would increase by approximately 10-20 percent. However, WSA 2040 conditions show 37 percent (East Cell A), ~~to~~ 53 percent (East Cell B), and 68 percent (East Cell C) of the years continuing to provide groundwater elevations suitable for supporting seedling/sapling establishment and survival (i.e., groundwater less than 3.3 feet below the ground surface). Conditions suitable for seedlings/sapling survival and establishment is already intermittent in these areas. While the number of years with suitable conditions would be reduced slightly with future groundwater withdrawals, conditions are likely to remain adequate to support a multi-aged riparian system since many perennial riparian species reproduce through clones, suckers, or intermittent periods of seedling establishment every 5-10 years (Steinberg 2001). If seedling establishment occurs every 5-10 years in a ten year period, then the number of years seedling establishment would occur would be 20 percent of all years (two years in ten). The amount of years seedling/sapling survival is available under WSA conditions for East Cells A, B, and C are greater than this 20 percent. Changes to East Cells A, ~~and~~ B, and C groundwater levels should therefore continue to allow for enough years of potential establishment and seedling/sapling survival and long-term maintenance of riparian vegetation within the upper meadow reach without restoration.

- Germination is not expected to occur in locations that do not have groundwater depths of 1.9 feet from the surface during at least two consecutive months between July and October. Based on this threshold, conditions for germination are not adequate under baseline or Non-Project conditions in West Cells A through E. Because the years of germination potential are only a few in West Cells H through J (11-18 percent) under Non-Project conditions, these areas are likely inadequate to support a black cottonwood healthy community through germination. Therefore, reduced groundwater from project and 2040 WSA conditions would not impact germination of black cottonwoods in these areas.

- West Cells F and G and all East Cells have adequate germination threshold levels in greater than 20 percent of years under Project and Non-Project conditions to support a healthy community (as noted above). The Project and 2040 WSA conditions would reduce the years of germination in West Cells F and G and East Cells A through C. 2040 WSA levels would drop West Cells F and G below the necessary 20 percent of years to support a healthy community. East Cells A through C would see a reduction in years of germination potential under Project and WSA conditions, but the number of years for adequate germination would remain suitable to support a healthy community (>20 percent of years). The reduction in East Cells C is minor and would likely not impact regeneration of cottonwoods by continuing to allow for germination in 91 percent of all years.

- As a result of these impacts, germination in areas connected hydrologically with West Cells F and G would be negatively impacted by the project and 2040 WSA conditions by increasing the number of years with unsuitable germination conditions far below baseline or Non-Project levels. Since these areas are located

in the proposed restoration area, this impact may be mitigated somewhat through restoration of the channel and its increased water holding capacity.

These data show that based on these perennial vegetation requirement thresholds, groundwater withdrawals to support the Specific Plan and other development, if managed as currently modelled, ~~are unlikely to~~ has some potential to result in some mortality and degradation to selected areas of established perennial riparian vegetation within portions of the western channel ~~or upper meadow reach~~ of Squaw Creek- the areas most affected by groundwater withdrawal. The reduction of potential germination levels through groundwater decline could impact seedling recruitment in certain areas and reduce the health of the riparian community along the streambank where seedlings of cottonwoods succeed. Sapling establishment/survival could be reduced to the point of not allowing for suitable riparian replacement or age structure around West Cells F and G. ~~However~~ The data used in this analysis does not take into account riparian vegetation that may be several feet above the creek bed. The stream channel for Squaw Creek is several feet below the surrounding ground surface in many areas, and some riparian vegetation is located along the higher elevation edges of the incised channel. The data available only shows groundwater levels compared to creek bed levels, not bank levels that may be several feet higher than the creek. While direct observations (Ascent Environmental 2013) of the creek show that most perennial riparian vegetation is at or just slightly above creek level in the areas mentioned above, this is not the case in all areas of the creek or ~~even~~ within the meadow complex itself. Therefore, it is possible that some riparian vegetation ~~within~~ along the creek in the west channel and upper east channel may die due to a drop in ground water below these thresholds, or significant degradation of seedling/sapling establishment and survival conditions could occur. Within the plan area, riparian or wetland vegetation associated with the hydrology of West Cells D through J could be affected by lowering groundwater levels, if such vegetation loses access to groundwater that is currently available to the plants during the dry months. Table 6-5 provides the acreages of sensitive habitat within the plan area that, depending on distance to groundwater levels under current and future conditions, could be affected by drops in groundwater levels. The mapped vegetation that could be negatively impacted within these affected areas would include an estimated 12.87 acres of sensitive habitats. Of this acreage, 7.66 acres would be directly affected by construction activities (e.g., grading), so up to an additional 5.21 acres could be affected solely by lowering groundwater levels. The actual acreage that could be affected would vary from year to year depending on rainfall, drought, fluctuations in groundwater, creek restoration design and other conditions, and the location of this vegetation relative to existing and future groundwater levels.

Additionally, some indirect effects such as crown dieback, reduced growth rates, or reduced foliage density may occur throughout the west channel in the Village area (West Cells E through I) and at the top of the east channel surrounding East Cells A and B. Groundwater level reduction that could result in loss or degradation of riparian habitat, a sensitive natural community specifically identified in the significance criteria listed above, and protected under Placer County policies and under the jurisdiction of the CWA, would be a potentially **significant** impact.

This information added to the discussion in Impact 6-1 does not change the conclusion in the EIR. There is still a conclusion of a significant impact because of loss of natural communities important to the ecosystem from direct and indirect effects of the Specific Plan.

For additions to mitigation measures, see response to comment 08b-15 with regard to expanded monitoring areas to ensure long term mitigation for riparian and meadows impacts as a result of groundwater drawdown.

Additionally, see response to comment 08b-38 about long-term monitoring and Mitigation Measure 6-1c for the most affected meadow and riparian habitats (West Cells E through J and East Cells A through D) and required associated avoidance and mitigation measures for any observed impacts (see response to comment 08b-15). This long-term monitoring would help avoid unmitigated mortality resulting from water stress.

08b-18 The comment states that the DEIR analysis did not use the correct thresholds for riparian vegetation mortality, and cites Scott et al 1999, Lite and Stromberg 2005, Safroth et al. 2000, Rood and Mahoney 1990, and Condra 1994 in support of this assertion. These studies were reviewed and are discussed here with respect to their use in assessing threshold depth to the riparian species at the project site.

None of the referenced studies discuss thresholds for riparian species located in the project area (e.g., black cottonwood, Pacific willow, shining willow, Lemmon's willow) as the comment appears to suggest. Therefore, no thresholds depths can be concluded from these studies that would be specific to any species in the project area to be used in the DEIR analysis.

The studies referenced by the commenter (Scott et al 1999, Shafroth et al 2000) concluded that cottonwood mortality (species studied: *Populus deltoides* subsp*. monilifera*; *Populus fremontii* and *Salix gooddingii,* respectfully) would occur at depths of 3 to 8 feet from *rapid* groundwater declines (*emphasis* added). However, the DEIR identifies that groundwater declines associated with project implementation and cumulative development in Olympic Valley would be *gradual* as development creating increased water demand is implemented over a period of 25+ years (emphasis added). This issue about rapid versus gradual water table decline is addressed in the DEIR on page 6-42, which states,

> Although rapid declines in groundwater levels greater than 3.3 feet from lowest annual baseline can also have an adverse effect on survival of riparian trees, any declines in groundwater depth resulting from water use for the proposed project and other development in Olympic Valley would be gradual, occurring slowly over many years as new development is constructed and water extraction is increased to support this development. Because any development generated reductions in groundwater levels would not be rapid, this criteria for assessing potential effects on riparian vegetation is not utilized as an important threshold in the analysis below.

These threshold levels are therefore not indicative of the gradual drawdown of water that would occur onsite, and, therefore, only absolute maximum depth was analyzed.

Lite and Stromberg 2005 only reported factors from a regression model comparing riparian communities that were dominated by an invasive tree species to those not dominated by the invasive species. The groundwater annual fluctuation and absolute groundwater thresholds they provide, which are lower than those stated in the DEIR, were based on the combined effects of multiple factors (e.g., groundwater, presence of invasive species, surface water flows) rather than independent influences of single factors. Given the multiple variables considered concurrently significantly reduce the potential for applying the results of this study to the VSVSP EIR analysis.

Rood and Mahoney 1990 reviewed literature to address the responses of poplar dominated riparian communities downstream of dam. While it discussed other studies' findings of forest declines from altered flow regimes and some life history characteristics of healthy poplar

communities, no thresholds for mortality or indirect impacts from water table declines were concluded within the paper.

The DEIR preparers were not able the obtain a full reproduction of the suggested Condra 1944 study, but do not feel that this study would be applicable to the analysis of effects in Olympic Valley because of its age; the fact that the study was about "Drought, its effects and measures of control in Nebraska" providing both a geographic distinction as well as a different groundwater impact mechanism (drought versus a gradual reduction in groundwater levels over time); and because citations found in the reviewed references also did not appear applicable to the conditions of interest in Olympic Valley. For example, the Condra 1944 study is referenced in Scott et al. 1999 to conclude that trees that have shallow groundwater sites have shallow, lateral root zones "trees growing on shallow groundwater sites exhibit shallow, laterally spreading root structures in close association with the tension saturated zone" to show that trees adapted to water tables near the ground surface may be susceptible to mortality from groundwater depth changes. However, groundwater near the ground surface is not the issue of concern related to mortality of established riparian trees in Olympic Valley. The Condra 1944 study is also referenced in Shafroth et al. 2000, "Condra (1944) reported mortality of shallow-rooted *Populus*, *Fraxinus*, and *Acer negundo* trees along the Platte River following water table declines of 0.61–0.91 m in coarse soils." Again, this relates to established shallow rooted trees, which is not the issue of concern in the DEIR. None of the papers cited in comment 08b-18 cite the Condra 1944 study relative to effects on black cottonwood, which suggests that it is not an important paper for black cottonwood life history or groundwater impacts. In addition, the paper seems to address shallow rooted trees, whereas the black cottonwood can be deep rooted. As stated on page 6-42 of the DEIR,

> This is why cottonwoods can sometimes be found where water table depth can seasonally reach as low as 23-29 feet below the ground surface and why cottonwood and willows may be located in areas in the western channel of Squaw Creek where groundwater elevations can reach 15-17 feet below the ground surface.

Therefore, we believe that no new information can be gleaned from Condra 1944 that is not already included in the DEIR analysis for the other papers cited by the commenter.

See response to comment 08b-17 in terms of incorporating indirect impacts to riparian species into the DEIR analysis. See the portion of the water supply Master Response regarding potential effects of climate change on groundwater in the Olympic Valley. The conclusion, supported by substantial evidence, is that the WSA and groundwater modelling appropriately reflect potential effects of climate change. Therefore, impact analyses based on the WSA and groundwater modelling (e.g., groundwater effects on riparian vegetation) appropriately reflect potential climate change effects.

08b-19 With respect to the groundwater modeling and data, see response to comment 08b-16. Regarding climate change and groundwater conditions, see the portion of the water supply Master Response addressing this topic. With respect to considering long-term, sub-lethal stress to riparian vegetation from lowered groundwater depths, see response to comment 08b-17.

08b-20 While seedling establishment and survival were considered with the 3.3-foot threshold (see response to comment 08b-17), further research into the subject shows that another threshold may be necessary to consider impacts to germination potential for cottonwoods from project-related groundwater impacts. To incorporate this information into the analysis, the first full paragraph on page 6-43 of the DEIR is revised as follows:

> Establishment of seedlings and saplings is important to maintaining a healthy riparian community as well as successful riparian habitat restoration. While some riparian tree species like black cottonwood can regenerate ~~primarily~~ through

suckering from adult trees (sprouting from shallow roots or the tree base) in drier areas away from the streambank, riparian tree seedlings from species such as cottonwood and willow require water tables within 3.3 feet of the ground surface (Mahoney and Rood 1998, Shafroth et al. 2000, Scott et al. 1999, USDA 2004). Therefore, having a groundwater depth from surface <3.3 feet for ~~establishment~~ survival of seedlings/saplings is taken into account when considering whether any groundwater reduction from proposed new wells and increased pumping would negatively impact perennial riparian vegetation.

Cottonwood seed germination requires moist seeds beds at the soil surface for up to a month after seed deposition for germination and seedling survival, prior to deep root growth (Steinberg 2001, DeBell 1990). Reduced groundwater levels could impact riparian seedling germination and initial survival where summer months have reduced soil moisture in areas currently adequate. Rood and Mahoney 1998 report that studies show that cottonwood species seeds generally have adequate moisture 60 centimeters (1.9 feet) to 150 centimeters (4.9 feet) above the base flow of the stream during summer months. This level of groundwater depth can be used to address adequacy of germination potential sites. Sites would have to have groundwater levels less than 1.9 feet from the surface for more than two consecutive months during the summer from July to October when seed falls, since exposed germination rates are highest when moist conditions persist for a month after seed deposition (Steinberg 2001), would likely be disseminated around mid-July, and seeds are usually only viable in natural conditions for 2 weeks to a month (DeBell 1990).

This information added to the discussion in Impact 6-1 does not change the conclusion in the EIR. There is still a conclusion of a significant impact because of the potential loss of natural communities important to the ecosystem from direct and indirect effects of the Specific Plan.

Also, see response to comment 08b-17 for additional changes to the second bullet at the bottom of page 6-43 of the DEIR dealing with the new germination threshold in the analysis.

08b-21 With respect to cottonwood species primary mode of reproduction, additional research has shown that intermittent seedlings establishment is the primary mode of reproduction closest to streambeds. See response to comment 08b-20 for text revisions.

Also, see response to comment 08b-17 for additional changes to the DEIR dealing with a new germination threshold in the analysis.

08b-22 See DEIR revisions in response to comment 08b-17 that clarify the conclusion in Impact 6-1 that the 10-20 percent increase in years with unsuitable conditions for seedlings/saplings would not impact riparian health and persistence in the upper eastern channel of Squaw Creek. Evidence that supports the fact that seedling establishment is intermittent is located within the text as Steiner 2001. Furthermore, comment 08b-23 states, “Seedling establishment is episodic…” and uses Steiner 2001 as one of the references for this statement. While clarifications to the text have been made, the comment does not provide any evidence that does not support the conclusion in the DEIR that the number of years with suitable conditions for seedling/sapling survival is adequate to support a healthy riparian system.

Additionally, Mitigation Measure 6-1c provides a response to any uncertainty of the hydrologic modeling by monitoring and mitigating for degradation to riparian or sensitive habitats from project-related groundwater drawdown for 5 years after the last project element is occupied in the areas mentioned in comment 08b-22.

See response to comment 08b-16 and the water supply Master Response with respect to including climate change impacts into the hydrology analysis. See response to comment 08b-

46 with added text to the cumulative effects section regarding climate change impacts and its contribution to project impacts.

08b-23 See Section 2.2, "Updated Water Supply Assessment and Groundwater Data," of this FEIR regarding further refinements to the WSA and groundwater modeling conducted since publication of the DEIR. Also see the Master Response regarding water supply, which addresses various issues related to the adequacy of the WSA and groundwater modeling as well as the potential effects of climate change on groundwater in the Olympic Valley. See responses to comments 08b-21 and 08b-22 regarding the assessment of seedling establishment, and response to comment 08b-46 with added text to the cumulative effects section regarding climate change impacts and its contribution to project impacts.

08b-24 See Section 2.2, "Updated Water Supply Assessment and Groundwater Data," of this FEIR regarding further refinements to the WSA and groundwater modeling conducted since publication of the DEIR. Also see the Master Response regarding water supply, which further addresses the refinements to the WSA and groundwater modeling as well as various issues related to the adequacy of the WSA and groundwater modeling and the potential effects of climate change on groundwater in the Olympic Valley.

08b-25 See response to comment 08b-15 for DEIR revisions that clarify potential impacts to areas not modeled. See the portion of the water supply Master Response addressing climate change effects on the groundwater analysis.

08b-26 The DEIR analysis considers the potential for indirect impacts to riparian habitat due to potential streambank instability caused by potential loss of riparian habitat from groundwater reduction. Page 6-46 of the DEIR states,

> The potential loss of some riparian or meadow habitat along the higher elevation edges of the Squaw Creek channel or within the Squaw Creek meadows through lowered groundwater described above could result in streambank instability depending on the amount and location.....Increased instability could result in increased erosion and sedimentation...

This issue is also addressed in the last paragraph of the discussion of Impact 13-4 on page 13-73 of the DEIR.

08b-27 Mitigation Measure Impact 6-1b requires compliance with a streambed alteration agreement with California Department of Fish and Wildlife. As part of this compliance, a Compensatory Stream and Riparian Mitigation Monitoring Plan (CSRMMP) will be created. The CSRMMP is required by the measure to have "in kind reference habitats for comparison with compensatory riparian habitats (using performance and success criteria) to document success." Reference habitats for onsite restoration will be selected during the preparation of the CSRMMP. Additionally, Mitigation Measure 6-1c requires that the project applicant record baseline locations of riparian and wetlands species along the areas of western and upper eastern channel of Squaw Creek most impacted by groundwater withdrawal (see response to comment 08b-15). These data can be used to determine suitable conditions and targets for restoration.

Regarding the potential for climate change to affect groundwater conditions, see the portion of the water supply Master Response addressing this topic.

08b-28 See the water supply Master Response regarding the assessment of effects of climate change on groundwater conditions, the adequacy of the WSA and groundwater modeling, as well as additional modeling scenarios incorporated into the WSA and groundwater modeling.

08b-29 To clarify the impacts that may occur to annual or perennial species in the meadow complex, the second full paragraph on page 6-44 is revised as follows. Additional revisions have been made as a result of other comments in this letter (08b-30, 08b-31, and 08b-32), and are included here for clarity.

Meadow Vegetation

The creek bed groundwater depth estimates show that annual vegetation, such as meadow vegetation, could also be affected during low water years by groundwater reduction near the upper meadow reaches of Squaw Creek nearest to the anticipated new wells. According to Stillwater Science's 2012 *A Guide for Restoring Functionality to Mountain Meadows of the Sierra Nevada - Technical Memorandum*, a functional meadow with the Sierra Nevada "supports plants that use surface water and/or shallow groundwater (generally at depths of less than one meter [3.3 feet]) at some point during the growing season." This statement includes annual and perennial plants. Meadow habitat occurs only within the northeastern portion of the plan area, with small areas of wet meadow located in proximity to West Cells I and J. Changes in groundwater elevations in this area would typically range from 0 to 3 feet during the critical period, although in some instances the changes would be more than 4 feet.

Baseline and non-project groundwater depths in the upper meadow reaches of the Squaw Creek (East Cells A-C) is generally 0-3 feet below surface during the growing season and only drops below 3.3 feet during the driest months of some years (East Cells A, B and C). With VSVSP operations associated groundwater reduction (including 2040 WSA conditions), these cell areas would continue to have groundwater within 3.3 feet of the surface during the majority of growing season months (Todd Groundwater 2014) during most years, although the number of years that the threshold would be exceeded would increase. In the WSA 2040 conditions, the driest years (10-20 percent of years) would have seasons where groundwater levels drop below the threshold of meadow functionality for the majority of the growing season near Squaw Creek. These changes could affect timing and amount of annual seed set, mortality of individuals, and cause a shift in compositions from wet meadow vegetation to dry meadow vegetation. Additionally, they could lead to conditions in which invasive annual plants brought in by visitors become established in the meadow.

The relationship of groundwater levels to meadow vegetation, particularly the wet meadow east of the plan area, has not been established. There could be other sources of water for some or all of the wet meadow, such as the surrounding golf course. If groundwater is the primary source of water during the growing season, then a lowering of groundwater could affect the viability of meadow vegetation.

In order to address the potential extent of groundwater impacts east of the plan area, Salix Consulting, Inc. prepared a habitat map for a study area that encompasses those the portions of the meadow in proximity to East Cells A, B and C (in order to be conservative, the study area extends past East Cell D).[1] The mapping was based on aerial photograph analysis, surveys prepared in the study area vicinity and the biologist's working knowledge of the Squaw Valley meadow. The habitats within the study area are quantified in Table 6-6. Sensitive habitats in this study area are estimated to include 10.4 acres of wet meadow, 3.3 acres of riparian and 1.9 acres of intermittent stream. The developed areas and ruderal areas are disturbed and would not be affected by groundwater levels. The golf course is irrigated. The sagebrush scrub and dry meadow habitats are composed of upland species that are better-adapted to groundwater fluctuations than wetland species are, because the upland species are

[1] Salix Consulting, Inc., *Potential Squaw Valley Village Groundwater Effects on Wetland Vegetation*, Feburary 18, 2016.

not as dependent on year-round water.[2] For these reasons, the analysis focused on the wetland habitats. The study area and sensitive habitats area shown in Exhibit MM 6-1c. As discussed above, if vegetation in the sensitive habitat areas is dependent on groundwater during the growing season under existing conditions, and groundwater pumping caused those levels to decline farther than 3.3 feet from the ground surface, the functionality of the wet meadow could be adversely affected.

Table 6-6 Habitat Components East of the VSVSP Potentially Affected by Groundwater Drawdown

Components	Approximate Acreage
Golf Course	12
Dry Meadow	0.4
Riparian	3.3
Wet Meadow	10.4
Intermittent Stream	1.9
Total	**28**

Source: Salix Consulting, Inc., 2016

~~Since meadows are composed of annual plants that have adapted to variable water conditions, reduced vegetation productivity or earlier die off of annual vegetation due to lower water levels or dry years is a regular part of ecosystem function. Meadow vegetation will return during wetter years, which are the majority of years in the upper meadow reach of Squaw Creek near East Cells A and B (based on implementation of groundwater management as assumed in the modelling). Thus, impacts to meadow vegetation in the upper reaches of Squaw Creek meadows would not be substantial since any reduction in meadow vegetation or vegetation productivity during dry years would be minimal and temporary.~~

~~However, stated above with perennial riparian vegetation, the data used in this analysis does not take into account the meadow vegetation that may be several feet above the creek bed or how the groundwater levels for meadow vegetation away from Squaw Creek might be affected. While personal observations (Ascent Environmental 2013) of the creek show that most meadow vegetation is at or just slightly above creek level in the areas mentioned above, this is not the case in all areas of the creek or even within the meadow complex itself. Therefore, it is possible that some meadow vegetation along the Squaw cCreek in the upper east channel or the south of the upper east channel (West Cells may not be able to be sustained due to a drop in ground water below these thresholds.~~ As a result of the impacts described above, Plan Operations induced groundwater reduction (nearest the wells) ~~that~~ could result in loss or degradation of wet meadow habitat protected under Placer County policies and under the jurisdiction of the CWA would be a **potentially significant** impact.

This information added to the discussion in Impact 6-1 does not change the conclusion in the EIR. There is still a conclusion of a significant impact because of loss of natural communities important to the ecosystem from direct and indirect effects of the Specific Plan. Additionally, Mitigation Measure 6-1c requires long-term monitoring of the most affected meadow and

[2] Salix Consulting, Inc., *Potential Squaw Valley Village Groundwater Effects on Wetland Vegetation*, Feburary 18, 2016, page 2.

riparian habitats (West Cells D-J and East Cells A-D) with associated avoidance and mitigation measures (see response to comment 08b-35).

08b-30 See response to comment 08b-29.

08b-31 See responses to comments 08b-29 and 09-70. See the portion of the water supply Master Response addressing climate change.

08b-32 See response to comment 08b-29. Also, the protection of existing habitats through Mitigation Measures 6-1a through 6-1c would retain the current resistance of native habitats to invasive species.

08b-33 The DEIR analysis states what was reported in the Balance Hydrology Report (2014) concerning an increase in wetted area and wetlands within the restoration boundary. The report's restoration modeling did not incorporate plant species distribution, composition and survival in its estimate of wetted habitat acres increase. This lack of information is stated in the DEIR analysis on page 6-45. However, the level of detail provided with the restoration plan is consistent with what is often included in a DEIR. Final restoration designs will need to address multiple topics that are not "ripe" for consideration at the EIR phase, such as the specific requirements of the regulatory agencies, detailed soils analysis to be conducted by a landscape architect or restoration ecologist, and development of engineering drawings and construction specifications. It would not be appropriate to expect a project applicant to undertake the costly process of fully developing a restoration plan, when, for example, the CEQA process that could influence project design and alternative selection, is not yet complete. The information provided in the DEIR and available in the project record is sufficient to have a reasonable expectation of restoration success, especially given that wetland and riparian restoration is a frequently implemented and fairly standard mitigation activity. Note that further information on anticipated wetted area and other aspects of the planned restoration are now available in a 2015 report from Balance Hydrologics titled *Anticipated changes to Surface and Groundwater Hydrology Associated with the Squaw Creek Restoration Project, part of the VSVSP, Placer County, CA*. This report is provided in Appendix B of this FEIR.

In addition, the project applicant is required under Mitigation Measure 6-1a to replace all wetlands (jurisdictional and non-jurisdictional) by acreage and function that would be lost, removed, or degraded by the project in accordance with the County, USACE, and Lahontan Water RWQCB. If wetlands are not increased in this area, mitigation for replacement will still occur onsite and/or elsewhere in Olympic Valley as stated in Mitigation Measures 6-1a, 6-1b, and 6-1c.

With respect to using new groundwater modeling that incorporates climate change impacts, see the Master Response regarding water supply.

08b-34 See response to comment 08b-10 regarding the timing of verification of wetland delineations relative to the timing of CEA review. Also see response to comment 09-59 for a discussion of the CEQA requirements for a programmatic document such as the VSVSP EIR.

Impacts to sensitive natural communities and additional waters of the US are quantified in the DEIR (e.g., see Tables 6-1 and 6-4). Based on this data, the impacts are considered significant in the impact analysis for the VSVSP. Further minor acreage refinements that may occur through verification of the wetland delineation or further agency coordination would not alter the DEIR impact conclusions or alter the effectiveness of mitigation measures provided to address the impacts.

In those areas where surveys were not conducted at a level required to procure permits, the analysis was based on reconnaissance–level surveys, review of aerial photography and, in the case of potential trails, inferences of the types of sensitive resources that may be affected based on habitat type, reports of sensitive species sightings, and other data. The DEIR also included performance standards as part of the mitigation requirements to demonstrably reduce potential impacts to sensitive habitats, if impacts were to occur. Thus, the DEIR did not defer analysis of impacts or mitigation measures; instead, it conducted various surveys and employed other tools to identify potential resources, determine if they may be affected, and developed mitigation as needed for those areas of know impacts. This is a programmatic EIR that addressed impacts specifically in known areas and more broadly in unknown areas (such as the future unknown trails and utilities). The DEIR examined the type and extent of impact that could occur throughout the project area, included appurtenant facilities such as trails and utility installation, and provided mitigation that is specific in some areas and programmatic in other areas. In those instances, where it is programmatic, mitigation took the form of performance standards that can be applied for impacts to unknown sites. The mitigation for wetlands and waters of the U.S. and other sensitive habitats (Mitigation Measures 6-1a, 6-1b, and 6-1c) required avoidance measures, planning measures, and specific minimum compensation levels (i.e. no net loss) and showed that this type of compensation would mitigate for the significant impact. The details of these mitigation measures for sensitive habitats are discussed below.

The DEIR Mitigation Measures 6-1a and 6-1b on pages 6-46 through 6-49 require that a wetland delineation be prepared through a formal Section 404 wetlands delineation process for all potential wetlands and waters of the U.S. that are determined to be present within 50 feet of any groundbreaking activity within the plan area, and specific performance standards are provided to compensate for any wetlands that would be filled by the project if they cannot be avoided. Other resources are similarly addressed. The measure includes requirements pertaining to evidence of permits associated with Improvement Plans, compliance with permit requirements from USACE, USFWS, and CDFW; monitoring requirements; and other provisions necessary to assure that adequate compensation is provided or that significant biological resources would be avoided.

Conditions included in Mitigation Measure 6-1b require that “the project applicant shall notify CDFW before commencing any activity within the bed, bank, or riparian corridor of any waterway…the proponent shall obtain an (Streambed Alteration) Agreement.” The construction activities that might damage or degrade habitat will be conducted in accordance with this agreement that will include implementing reasonable measures to protect fish and wildlife resources (including streambank habitat). Temporary construction impacts should be minimized as a result. This measure requires compensation for permanent loss at an approved CDFW wetland mitigation bank or through the development and implementation of a CSRMMP and a County-approved MMIP aimed at creating and restoring in-kind habitat within the plan area or in the surrounding area.

Additionally, impacts from potential trail system improvements that did have defined locations were discussed in Impact 6-10 in the DEIR. Mitigation Measure 6-10 requires surveys of these areas and the application of DEIR mitigation measures for the appropriate biological resource.

08b-35 See response to comment 08b-33 regarding the level of detail provided in the restoration planning documents and the level of confidence in the success of restoration activities.

The project applicant is required under Mitigation Measure 6-1a to replace all wetlands by acreage and function that would be lost, removed or degraded by the project in accordance with USACE and Lahontan Water RWQCB. If net wetlands functions and values are not fully mitigated in the proposed restoration area, the project proponent is required to mitigate for a

minimum 1:1 total replacement either onsite, elsewhere in Olympic Valley, or at an agency approved location in the Tahoe-Truckee area (see added text in response to comment 08b-36, below). See responses to comments 08b-38 and 08b-15 in regard to supporting wetland replacement on a long-term basis. See the portion of the water supply Master Response regarding anticipated irrigation demand and potential effects of irrigation on groundwater conditions. The conclusion in the Master Response is based on the assumptions used in that analysis, that vegetation within the VSVSP area and mitigation areas could be irrigated during dry periods without increasing demand on the Olympic Valley Groundwater Basin.

Supplemental Irrigation is identified in the DEIR as a tool that can be used to support restoration success or riparian/wetland habitat maintenance onsite if long-term impacts are observed. The use of "corrective measures" to ensure success of restoration within a 5-year monitoring period is discussed under the criteria for both the CSRMMP in Mitigation Measure 6-1b and the MMIP in Mitigation Measure 6-1a. Supplemental irrigation is a corrective measure and is discussed in Mitigation Measure 6-1b under "Compensatory Stream and Riparian Mitigation and Monitoring Plan":

- monitoring protocol, including schedule and annual report requirements (compensatory habitat shall be monitored for a minimum of 5 years from completion of mitigation or last human intervention [including recontouring and grading and irrigation], or until the success criteria identified in the approved mitigation plan have been met, whichever is longer);

This statement indicates the assumption that the CSRMMP would require "corrective measures" such as supplemental irrigation if success of restoration is hampered by low soil moisture levels. Therefore, areas that are being restored onsite and that require a CSRMMP or MMIP will use corrective measures such as irrigation to ensure success of restored vegetation.

Supplemental irrigation is also discussed in and required by Mitigation Measure 6-1c (page 6-49 of the DEIR) as potentially needed for riparian habitat where groundwater impacts may limit restoration activities or where operation impacts from groundwater drawdown are observed. See revisions to Mitigation Measure 6-1c in response to comment 08b-15.

Concerning the groundwater effects on sensitive habitats from irrigation demands for restoration, the vegetation monitoring included in Mitigation Measure 6-1c would ensure that any degradation or loss of sensitive habitats that occurs from groundwater drawdown, including irrigation, would be monitored and mitigated in the areas that have the greatest impact from groundwater drawdown (West Cells E through J and East Cells A through C). The following paragraph is added to page 6-45 of the DEIR under the subheader "Restoration Potential" to clarify potential impacts from restoration irrigation:

> **Restoration Potential**
> While restoration within Squaw Creek could increase riparian and meadow habitat, potential irrigation from restoration could impact groundwater levels and further impact vegetation outside the restoration area. Irrigation for restoration of sensitive habitats would likely be most required during the period following revegetation, until the new plants are established. Additionally, after vegetation has been established, some irrigation could be needed during the driest months and driest years within the upper eastern channel of Squaw Creek and most of the western channel as described above under "Riparian Vegetation." An analysis of irrigation needs, water demand, and groundwater modelling (provided in Appendices A and B in the FEIR) conclude that vegetation within the VSVSP area and mitigation areas could be irrigated during dry periods without increasing demand on the Olympic Valley Groundwater Basin. This analysis included the calculation of potential irrigation

demands for the proposed Squaw Creek restoration area and some areas of potential wetlands impacts along Squaw Creek, considering an area covering 16.1 acres. Snow-making wells located above the Olympic Valley aquifer are identified as potential source of irrigation water, if needed, to limit use of the basin aquifer. Since these wells are located in granitic fractures (spaces in the granitic rock) above, and isolated from, the modeled aquifer, additional impacts to sensitive habitats or species from use of these wells would not occur. Based on these data, the mitigation measure to irrigate 16.1 acres within parts of West cells B and D through East Cell C would not further affect groundwater or vegetation in this irrigation area.

This information added to the discussion in Impact 6-1 does not change the conclusion in the EIR. There is still a conclusion of a significant impact because of the potential loss of natural communities important to the ecosystem from direct and indirect effects of the Specific Plan.

08b-36 As identified in the discussion of Mitigation Measure 6-1a on page 6-47 of the DEIR, the use of credits from a mitigation bank is only one of several options identified to provide compensatory mitigation. Providing mitigation through the planned creek restoration project, or elsewhere on the project site, is the anticipated approach to achieving compensation/mitigation requirements. If compensatory mitigation is ultimately required outside the project site, then purchase of credits in mitigation banks and/or habitat restoration outside the project site are provided as additional options. The text on page 6-47 of the DEIR describes a County review and approval process for use of mitigation bank credits. Because several options are available to meet mitigation requirements, and purchase of mitigation bank credits is not the preferred option, cataloguing of available mitigation banks is not required to verify the feasibility of the mitigation measure. If there was a desire by the applicant to purchase mitigation bank credits, and none were available that met County qualifications, the applicant can take other actions to meet mitigation obligations.

While the preferred mitigation site is the proposed creek restoration, if offsite mitigation is ultimately needed, the requirement for agency approval would be expected to put the mitigation in the Sierra Nevada. However, to further clarify the mitigation to ensure that compensation will occur in the Sierra Nevada and to ensure that there is no net loss of wetlands in the Sierra Nevada ecosystem, the following bullet is added to Mitigation Measure 6-1a after the first bullet on page 6-48 of the DEIR:

- Any offsite wetlands mitigation will occur in the Sierra Nevada bioregion and within the Tahoe-Truckee area to ensure that there is a no net loss of wetland, riparian, or wet meadow habitat within the Sierra Nevada or Tahoe-Truckee regions.

This information added to Mitigation Measure 6-1a does not change the conclusion in the EIR. There is still a conclusion of less-than-significant impact following mitigation.

Mitigation Measure 6-1b requires that the project applicant use a CDFW approved wetland mitigation bank. This approval would ensure that the mitigation banks for riparian and streambank habitat comply with CDFW Banking Guidelines (2014). According to the Guidelines, mitigation and mitigation banks should comply with regulatory requirements, be based on the best available scientific information, be capable of being implemented successfully, have adequate funding to achieve mitigation measures, and be monitored for compliance and effectiveness. CDFW approved mitigation banks will ensure the success of all streamside riparian habitats that are mitigated offsite.

However, to ensure all sensitive riparian and wetland habitats (including non-jurisdictional wetland habitats) are mitigated within the region, the second bullet under Mitigation Measure 6-1b (page 6-48 of the DEIR) is revised as follows: