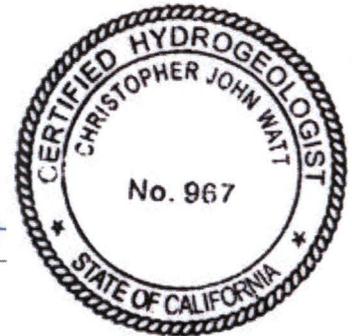


TECHNICAL MEMORANDUM

Request for Exception
North Coast Instream Flow Policy
Water Right Application JCR: A032898

Date: November 14, 2018
Project No.: 8970.00
Prepared For: Mr. David Coddling
Prepared By: Christopher J. Watt
CHG 967; Exp 03/31/20

Christopher Watt



Reviewed By: Christine S. Manhart, PG
Senior Geologist

Christine S. Manhart

Cc: California State Water Resources Control Board Division of Water Rights
California Department of Fish and Wildlife
Wagner and Bonsignore CCE

Attachments:	Appendix A:	Figure 1: Project Location Map
	Appendix B:	Applicant Letter
	Appendix C:	Area Capacity Calculations
	Appendix D:	2005 CDFG Stream Inventory
	Appendix E:	Correspondence with CALFire re: Fire Suppression
	Appendix F:	Estimate of Water Availability at POI #1

1.0 INTRODUCTION

The High Valley Ranch property, located in Mendocino County, east of the town of Hopland, California (Assessor's Parcel Number [APN] 050-380-020; see Appendix A, Figure 1: Project Location Map) and accessed via Adobe Creek Road, is developed with a reservoir located on a Class II stream that is subject to the jurisdiction of the State Water Resources Control Board (SWRCB). The property owner, Mr. David Coddling, voluntarily filed an application to appropriate water on January 10, 2018, in order to bring the reservoir into compliance with the SWRCB Division of Water Rights. Following subsequent consultation with the SWRCB,

Mr. Codding requested and LACO Associates (LACO) completed, a stream classification survey for the three tributary streams to the High Valley Ranch Reservoir. The survey was conducted on March 26, 2018, and a technical memorandum summarizing the survey results was submitted on April 13, 2018. The memorandum was submitted to the SWRCB as a supplement to Mr. Codding's water rights application. On October 17, 2018, the SWRCB submitted a letter to Mr. Codding (JCR: A032898, the SWRCB Letter) stating that Mr. Codding's water right application is deficient because the High Valley Ranch reservoir does not comply with the SWRCB criteria for on-stream diversions of Class II streams and will be rejected if a written request for an exception to the SWRCB Policy for Maintaining Instream Flows in Northern California Coastal Streams (the Policy) is not submitted. At the request of Mr. David Codding, LACO has prepared this technical memorandum to request an exception to the Policy. Should this exception request be denied, and the water right application rejected, Mr. Codding would be required to render the reservoir incapable of storing water. The impacts to both the immediate and downstream ecosystems and the public interest as a result of modifying the reservoir impoundment structure would be significant. This Technical Memorandum was prepared in accordance with the scope of services described in the Service Agreement Amendment No. 2 signed by Client and LACO on October 23, 2018.

2.0 PROJECT BACKGROUND

The High Valley Ranch reservoir was constructed by the previous property owner prior to 1959 (exact date of construction is unknown). The reservoir diversion infrastructure is currently 29 feet high and stores approximately 72.8 acre-feet of water. The reservoir infrastructure does not have a bypass structure in place and currently operates with a January 1 to December 31 diversion season, as described in the January 10 water rights application. Water accruing to the reservoir in excess of the 72.8-acre-foot capacity is discharged via the reservoir spillway to Jakes Creek. There is no consumptive use of the stored water, and the reservoir is used exclusively for aesthetic enjoyment, wildlife habitat, recreation, and fire protection. Enclosed as Appendix B is a letter from the applicant describing the primary uses of the reservoir and indicating his intent to not develop the property or establish a consumptive use of the stored water.

On May 24, 2018, representatives from the Department of Water Resources Division of Safety of Dams performed an inspection of the reservoir diversion structure and issued a July 6, 2018 letter indicating that the diversion structure is under State jurisdiction for dam safety and that the structure is currently in violation of the California Water Code. As we understand, in order to correct the violation, proposed as an alternative course of action in the July 6 letter, Mr. Codding intends to reduce the reservoir capacity from 72.8 acre-feet to 50 acre-feet (rendering it to less-than-jurisdictional size) by lowering the spillway invert elevation approximately 4 feet.

Because there is no consumptive use of the stored water, the clear majority of diverted water does not leave the watershed. The water stored in the reservoir either evaporates or infiltrates into the underlying fractured bedrock aquifer. As such, the total volume of water diverted annually is limited to the amount needed to replace water loss due to evaporation and seepage, rather than the total volume of the reservoir. On October 16, 2017, Adobe Associates Inc. observed approximately 1.6 feet of drawdown in the reservoir pool elevation. The measurement was collected prior to any rain events and represents the lowest pool elevation for the season. This data represents the theoretical minimum evaporation loss for the reservoir over the course of one season. Over the same period, publicly-available evaporation data from Warm Springs Dam in nearby Sonoma County and within the Russian River watershed recorded 3.68 feet of drawdown on Lake Sonoma. While Warm Springs Dam is located at a lower elevation and different geomorphic position than the High Valley Ranch reservoir, its rate of evaporation is likely slightly higher than the rate at High Valley Ranch.

Therefore, 3.68 feet represents a theoretical maximum drawdown value. Using this data and analyzing the High Valley Ranch reservoir at the proposed 50.0-acre-foot capacity condition (see Appendix C: Area Capacity Calculations) results in an annual estimated minimum evaporation drawdown of 7.55 acre-feet and an estimated maximum of 16.25 acre-feet. Due to the potential for subterranean inflows to the High Valley Ranch reservoir, the actual volume of water lost due to evaporation is between 7.55 acre-feet and 16.25 acre-feet.

3.0 POLICY PROVISIONS INVOLVED

The Policy provisions involved in this exception request are both the general principles as established in Section 2.1 of the Policy and the specific provisions from Section 2.4.2 of the Policy, both excerpted below. Please note that the October 17, 2018, SWRCB Letter erroneously references Policy Section 2.4.1, which establishes requirements for onstream dams on Class I streams. Section 2.4.2 of the Policy establishes requirements for onstream dams on Class II streams and is the applicable policy provision for the High Valley Ranch reservoir.

3.1 Policy Section 2.1

Protection of fishery resources is in the public interest. The primary objective of this policy is to ensure that the administration of water rights occurs in a manner that maintains instream flows needed for the protection of fishery resources. This policy establishes the following five principles that will be applied in the administration of water rights:

1. *Water diversions shall be seasonally limited to periods in which instream flows are naturally high to prevent adverse effects to fish and fish habitat;*

Water diversion is year-round; however, the discussion below supports our contention that the reservoir is not detrimental to fish and fish habitat downstream even with a continual diversion season. In addition, due to the lack of consumptive use of the diversion, the amount of water stored annually is limited to the volume required to replenish losses due to evaporation and seepage, rather than the total reservoir volume. This results in further limited impacts to fish and habitat downstream, as discussed in Section 5.0 of this memorandum.

2. *Water shall be diverted only when streamflows are higher than the minimum instream flows needed for fish spawning, rearing, and passage;*

There is little migration opportunity of fish from the Jakes Creek / Vasser Creek / Russian River watershed upstream to the reservoir due to the 16-foot tall rockfall located downstream of the reservoir outfall. Therefore, fish passage is not impacted by the diversion structure. Fish rearing and spawning downstream of the rockfall have been cataloged and the presence of the reservoir, at the current volume of 72.8 acre-feet, does not appear to be the limiting factor in the downstream fishery.

3. *The maximum rate at which water is diverted in a watershed shall not adversely affect the natural flow variability needed for maintaining adequate channel structure and habitat for fish;*

At its current holding capacity, a 2005 California Department of Fish and Game (CDFG) stream inventory (Appendix D) noted that flatwater habitat types comprised 34 percent of the total length of the survey. 40 percent is the threshold at which pool enhancement projects are recommended. A sediment yield inventory would help determine whether this lack of adequate flatwater habitat is a result of the reservoir or of other downstream factors as discussed below. However, the planned reduction in holding capacity to 50 acre-feet will increase downstream flow, primarily in the winter when flow conditions are higher. Increased flow may improve downstream scour that will enhance the habitat structures that aid in spawning and rearing of fry.

4. *The cumulative effects of water diversions on instream flows needed for the protection of fish and their habitat shall be considered and minimized; and*

There are no senior water diverters on Jakes Creek either upstream or downstream of the High Valley Ranch reservoir. Therefore, the cumulative impacts of water diversion on instream flows are limited to those that result from the High Valley Ranch reservoir diversion structure itself. As discussed in Section 5.0 of this memorandum, the total diversion volume of the reservoir following the proposed volume reduction is less than 5 percent of the cumulative flows of Jakes Creek, indicating little chance of significant cumulative impacts, per the 2002 Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversion in Mid-California Coastal Streams (the Guidelines). When considering that annual diversions are limited to enough volume to replenish losses through evaporation and subsurface seepage, the impact on cumulative flows is much smaller.

Detrimental issues noted in the stream inventory included sediment yield due to bank erosion, sheltering opportunities, canopy density, and bank vegetation. Of these issues, only sediment yield is likely to have a contribution from the upstream reservoir. Without an accurate inventory of upstream sediment sources, it is impossible to determine whether the reservoir is acting as a sediment source or sink. In addition to detrimental impacts, the stream survey noted that instream temperatures in September 2002 were within a range favorable to salmonids. This is notable because it indicates that summer water temperatures, at a time when flow is generally low, sustained no adverse cumulative effect of the water diversion.

5. *Construction or permitting of new onstream dams shall be restricted. When allowed, onstream dams shall be constructed and permitted in a manner that does not adversely affect fish and their habitat.*

As discussed above and throughout this memorandum, issuing a water right for the existing High Valley Ranch reservoir, at its proposed modified capacity, will not adversely affect fish and their habitat. The reservoir is of sufficient age that the surrounding and downstream ecosystems have reached an equilibrium and adapted to the flow modulations caused by the reservoir. The reservoir is located approximately 1.21 stream miles above the upper limits of anadromy on Jakes Creek and therefore does not impact fish passage. As there is no consumptive use of the diverted water, the amount of water diverted each season is limited to the volume necessary to "top off" the reservoir following losses from subsurface seepage and evaporation, resulting in a minimal impact to the downstream fishery and minimal total water diverted from the watershed.

3.2 Policy Section 2.4.1

With the exception below, the State Water Board will not approve a water right permit for an onstream dam on a Class II stream unless the following requirements are met:

- 1. The applicant provides documentation acceptable to the State Water Board that the onstream dam was built prior to July 19, 2006. This is the date the public notice of preparation of the policy was issued. After the adoption of this policy, water right applications for onstream dams built prior to July 19, 2006, within the affected policy area will no longer be accepted.*
- 2. A passive bypass system or automated computer-controlled bypass system is constructed that conforms to the requirements contained in Appendix E.*
- 3. Where needed, mitigation plans for non-native species eradication, gravel and wood augmentation, and/or riparian habitat replacement are developed and implemented. Guidance for developing mitigation plans is provided in Appendix D.*

Notwithstanding requirements number 1 and 2 above, the State Water Board may consider approving a water right permit for an onstream dam on a Class II stream if all of the following conditions are met:

- 1. The dam is located above an existing permitted or licensed reservoir that provides municipal water supply or is under the jurisdiction of the Federal Energy Regulatory Commission.*
- 2. The existing permitted or licensed reservoir was constructed prior to the adoption of this policy and does not have fish passage facilities, and CDFW has provided a written determination that it is not feasible to construct fish passage facilities.*
- 3. The applicant prepares and submits a biological assessment demonstrating that the dam will not adversely affect fish between it and the existing permitted or licensed reservoir.*
- 4. The applicant develops and implements mitigation plans for non-native species eradication, gravel and wood augmentation, and/or riparian habitat replacement, where needed. Guidance for developing mitigation plans is provided in Appendix D.*

As established by the Division of Water Rights based on information collected in a July 10, 2018, site visit, the Stream Classification Survey performed by LACO on March 26, 2018, and the technical memorandum summarizing the results of that survey prepared by LACO and dated April 13, 2018, the High Valley Ranch reservoir is located on a Class II stream. While this reservoir meets the first of three criteria presented in paragraph one of Policy Section 2.4.2, the reservoir does not yet contain a passive or automated computer-controlled bypass system and therefore does not comply with the second criteria in paragraph one. The reservoir is not located above an existing permitted or licensed reservoir that provides municipal water supply or is under the jurisdiction of the Federal Energy Regulatory Commission and therefore does not meet the full criteria established in paragraph two.

The criteria of Policy section 2.4.2 have not yet been met, however, the impacts of the reservoir are largely in line with the overall intent of the Policy. In addition, Applicant intends to work collaboratively with the SWRCB and CDFW to establish a diversion season, bypass structure and procedure, and potential late-fall release of water that is considerate of the needs of the downstream fishery and channel structure, which may include development of a formal water supply report and cumulative diversion analysis. Therefore, this technical memorandum provides justification for the issuance of a case-by-case exception to the Policy.

4.0 DESCRIPTION OF REASON FOR REQUEST AND EXPLANATION OF PUBLIC BENEFITS

This request for a case-by-case exception to the Policy is justified by (1) the age of the reservoir and its established historical impacts to local wildlife and hydrology, (2) the acute and long-term impacts of removal of the reservoir, and (3) the public benefits provided by the reservoir.

4.1 Age of Reservoir and Historical Impacts

The High Valley Ranch reservoir was developed prior to 1959 (exact date of development is unknown) by the previous property owner and is, at present, an established feature of the ecosystem of Jakes Creek. The reservoir has been in place for upwards of 60 years and, in that time, the hydrology and ecology in the vicinity have adapted to the presence of the reservoir to the point that removal of the structure would result in significant short- and long-term impacts to surrounding ecosystems. The reservoir appears to have been in place for a sufficient period of time that its presence could be considered the "new normal" state for Jakes Creek.

The reservoir, according to the 2005 CDFG stream inventory report does not impact the limits of anadromy or adversely impact fish passage. In the 2005 stream inventory, CDFG staff include a list of priority fishery enhancement opportunities, none of which include modification or removal of the High Valley Ranch reservoir. Further, the High Valley Ranch reservoir is not discussed in any depth in the inventory report, save for the watershed overview section, which indicates "a small reservoir catches runoff near the headwaters" with no further mention of the structure. Overall, the lack of substantial discussion in the stream inventory report seems to suggest the reservoir is not detrimental to fish populations.

The High Valley Ranch reservoir occurs above a natural fish barrier, a 16-foot rock fall located approximately 150 feet west of the impoundment structure, and so the impoundment does not block fish passage, as it is above the stopping point of the CDFG stream survey. In fact, during the stream inventory report, steelhead were found throughout the stream reach from 152 feet to 3,364 feet, and even as far as the 6,461-foot mark despite steepening grades beginning at stream reach 3,429 feet and continuing to stream reach 5,694 feet. The presence of steelhead above this steep portion of the channel may imply that the High Valley Ranch reservoir serves to moderate streamflow events to allow steelhead access through the steeper sections of the channel as well as allowing continuous dry season flow through infiltration into the fractured bedrock geology causing seepage from the reservoir to the downstream reach, in effect providing habitat support for summer-run steelhead.

4.2 Acute and Long-term Impacts of Reservoir Removal

4.2.1 Acute Impacts

Existing upstream sediment sources that are currently mitigated by the reservoir's settling capacity should be inventoried prior to finalizing a decision regarding its removal to determine the likely impact to downstream reaches of the watershed as well as calculating the predicted impact of activities ancillary to reservoir removal. The reservoir should be maintained if the impacts of its removal are detrimental to the downstream habitat.

The acute impacts of the removal of the High Valley Ranch reservoir would include significant ground disturbance near the reservoir impoundment structure from the use of large earth-moving equipment, such as bulldozers, large excavators, and compactors, required to conduct removal and restore stream channels. This work would naturally occur in the stream channels and riparian zones and would likely have significant effects on those ecosystems regardless of mitigation measures intended to limit impact on habitat. Similarly, mobilizing the necessary equipment to the project site would require access agreements from adjacent landowners in addition to construction of new access roads on neighboring parcels.

The construction of new roads would necessarily involve removal of existing trees and vegetation that would result in further environmental impacts within the watershed. Should the reservoir be removed, due to its age and the impact it currently has on both surface water and groundwater, the surrounding ecosystem, aquifer, and watershed would likely take several years to recover to pre-reservoir conditions, with little to no data available to establish baseline conditions prior to reservoir construction, making monitoring and mitigating environmental impacts of the project challenging.

While the applicant has indicated intention to reduce the reservoir storage capacity via a lowering of the spillway invert elevation, this work can be accomplished using portable equipment or a mini-excavator, with no heavy equipment required. The reservoir volume will be reduced using a siphon system to facilitate spillway work, with the siphoned water being routed downstream as quickly as possible, per recommendations from the SWRCB. As such, the impacts of work on the spillway will generate a significantly lower level of impact to the surrounding ecosystem when compared to the removal of the entire impoundment structure.

4.2.2 Long-term Impacts

Similarly, the impact of such a significant change in geomorphology and hydrology would have difficult-to-predict effects on bank erosion, sediment and gravel transport, deposition of large and small woody debris, water velocity and depth, pool variability, riffle frequency, and riparian habitat, among others. For example, the High Valley Ranch reservoir captures sediment from upstream sources and provides an opportunity for sediment to settle prior to water being discharged from the reservoir spillway. Removal of the reservoir would result in that sediment being mobilized downstream with unknown impacts on water quality and habitat.

The removal of the High Valley Ranch reservoir would also have impacts over the long-term on hydrology and groundwater recharge within the fractured bedrock aquifer underlying the area. Once springtime flows to the reservoir cease and the reservoir stops spilling, the stored water continues to discharge into the underlying fractured bedrock geology. This groundwater recharge results in an offset to local groundwater pumping and contributes to seepage into downstream reaches over the summer and fall.

4.3 Explanation of Public Benefits

4.3.1 Benefits to Fisheries

As established in Section 2.1 of the Policy, "protection of fishery resources is in the public interest." As discussed in Section 3.2 of this memorandum, the impacts of reservoir removal on downstream habitat could have notable impacts on fishery resources in Jakes Creek and subsequent water bodies. The High Valley Ranch reservoir moderates stream flows during high flow events, which may improve steelhead access to habitat in stream reaches otherwise too steep for passage, and seepage into/from underlying fractured bedrock contributes to improved water availability during the dry season, providing habitat that may not otherwise

exist for summer-run steelhead. The CDFG stream inventory report indicates "steelhead [trout] 0+, 1+, and 2+ were observed frequently throughout the creek from 152 feet to 3,364 feet" and that "Jakes Creek should be managed as an anadromous, natural production stream." As such, because the stream inventory report was completed many years after the reservoir was constructed, any proposed modifications on the scale of reservoir removal should consider the impacts to the fishery in the context of the existing conditions.

Northern California steelhead trout are considered a threatened species under the Endangered Species Act, and habitat degradation and loss are listed as threats to the population. Removal of the High Valley Ranch Reservoir could result in habitat degradation on Jakes Creek, which would impact the fishery and cause loss of important steelhead habitat. The sedimentation which could result from reservoir removal is of particular concern, as the CDFG stream inventory report indicates that "sediment sources in Jakes Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken."

In addition, the Russian River, which Jakes Creek ultimately flows into via Vasser and Coleman Creeks, is considered sediment impaired by the North Coast Regional Water Quality Control Board (NCRWQCB). While a sediment TMDL for the Russian River watershed has not yet been established, the NCRWQCB has established a goal of "comprehensively controlling excess sediment throughout the Russian River watershed." Removal of the High Valley Ranch Reservoir would likely impede efforts to achieve this goal by adding a potential sediment source to the watershed.

4.3.2 Fire Protection Benefits

The High Valley Ranch reservoir is in a remote, high fire hazard area with limited road access and few surface water bodies of sufficient size to provide fire protection, particularly water supply for use by fire suppression aircraft. In 2013, a small fire ignited to the north of the High Valley Ranch Reservoir near Adobe Creek Road and CALFire fire suppression aircraft were able to use the reservoir to "[decrease] the turnaround time for bucket drops and [enable] the helitack crew to work effectively and safely" (email correspondence from CALFire Battalion Chief Greg Bertelli, Appendix E). Mr. Bertelli also states that "the quick turnaround time helped to keep the fire in check and limit growth during the initial stages. This helped keep the fire to under 100 acres."

Within a 3-mile radius of the High Valley Ranch reservoir, analysis of satellite imagery via Google Earth indicates there are a total of two surface water bodies which may be of sufficient size to provide water to helitack teams, inclusive of the High Valley Ranch reservoir. In addition, the majority of the region is zoned by CALFire as high or very high fire hazard severity, which indicates the significant potential for a large-scale wildland fire event starting in the area. The July 2018 River Fire, which started approximately 12 miles north of the High Valley Ranch reservoir in an area of comparable vegetation type and density, burned over 48,000 acres and destroyed 146 residential structures, demonstrating the potential devastation a wildfire in this region can cause. The southernmost extent of the final River Fire perimeter was only 4 miles from the High Valley Ranch. While the area surrounding the High Valley Ranch reservoir is sparsely populated, in severe fire weather, a wildfire start in this area could threaten the communities of Kelseyville, Cloverdale, or Hopland. The significance of the High Valley Ranch reservoir in this context cannot be understated, as the most critical fire suppression activities occur shortly after the fire has started. The larger a wildfire becomes, the more challenging fire suppression becomes; the existence of a reservoir from which bucket drops can be staged in this region is critical for preventing starts from becoming large-scale fire events and protecting life and property in the future, demonstrating the clear public benefit of the reservoir with regards to fire protection for the surrounding area. The proposed reduction in reservoir volume will maintain these fire suppression benefits.

5.0 DOCUMENTATION OF REASONS EXCEPTION WILL NOT COMPROMISE MAINTENANCE OF INSTREAM FLOWS

5.1 Instream Flows at Point of Diversion #1

As discussed in water right application JCR: A032898 Attachment 2: Estimate of Water Availability to Accompany Water Right Application of David Coddling, prepared by Wagner and Bonsignore Consulting Civil Engineers, there are no senior water rights of record in the watershed above the High Valley Ranch reservoir, the outfall of which serves as Point of Diversion #1 (POD #1). Calculations demonstrate that in an average water year, approximately 1,288.3 acre-feet of water accrue at POD #1 while the current volume of the High Valley Ranch reservoir is 72.8 acre-feet. Further, the applicant has proposed to reduce this volume to 50 acre-feet through lowering the spillway invert elevation. The current reservoir volume of 72.8 acre-feet represents 5.7 percent of the total annual average water accrual at POD #1. The 2002 Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversion in Mid-California Coastal Streams (the Guidelines) indicate that "if the Cumulative Flow Impairment Index [CFII] is less than 5 percent, there is little chance of significant cumulative impacts due to the diversion and the project does not require additional studies to assess these impacts." As there are no other water rights on Jakes Creek the total annual average water accrual at POD #1, once the reservoir volume is reduced to 50 acre-feet, will represent 3.9 percent of the total annual average water accrual at POD #1, within the cumulative 5 percent limit set by the Guidelines.

5.2 Instream Flows at Point of Interest #1

Point of Interest #1 (POI #1) is located approximately 6,507 feet from the confluence of Jakes Creek and Vassar Creek, the location at which the CDFG stream inventory stopped due to steepening of the channel. This point is considered the upper limit of anadromy based on the available data. As with POD #1, there are no senior water rights in the watershed between the outlet of the High Valley Ranch reservoir and POI #1. As such, the total annual average water accrual calculation for this POI looks exclusively at the accrual at POI #1 to ascertain the potential level of flow impairment caused by the High Valley Ranch reservoir.

In an average water year, approximately 2,036.7 acre-feet of water accrue at POI #1 (see Appendix F). At its current volume, the High Valley Ranch reservoir represents approximately 3.6 percent of the mean seasonal runoff at POI #1. The proposed 50-acre-foot capacity of the High Valley Ranch reservoir represents 2.5 percent of this accrual, indicating that the cumulative diversion impacts at POI #1 are within the 5 percent cumulative diversion threshold as established in the Guidelines, both before and after the proposed reservoir volume modification. As such, the High Valley Ranch reservoir is unlikely to cause significant impacts on available water flow for the downstream fishery, as demonstrated by the healthy steelhead population observed during the 2005 CDFG Stream Inventory Report with the reservoir operating at the higher capacity.

5.3 Total Diversion Volume

As discussed previously, while the total volume of the reservoir, following spillway modification, will represent less than 5 percent of the total annual average water accrual at POD #1 and POI #1, because there is no consumptive use of the stored water each season, the actual amount of water stored annually is far less than the total reservoir volume. As there is no consumptive use for the diverted water each year, the only changes

in stored water result from evaporation and subsurface seepage to and from the underlying fractured rock aquifer during the diversion season. Therefore, the total volume to be replenished each season as discussed in Section 2.0 and Appendix C, is likely between 7.55 acre-feet and 16.25 acre-feet. The calculations in Sections 5.1 and 5.2 above are included to demonstrate that the entire reservoir volume represents an insignificant diversion from the watershed and its existence is within the intent of the Guidelines, but the actual volume of water diverted should be considered when evaluating the overall impacts and public benefits of the High Valley Ranch reservoir. After the reservoir capacity is modified to 50.0 acre-feet, the total amount of diverted water lost due to evaporation annually represents between 0.6 percent (7.55 acre-feet) and 1.3 percent (16.25 acre-feet) of the average annual water accrual at POD #1 and between 0.4 percent (7.55 acre-feet) and 0.8 percent (16.25 acre-feet) of the average annual water accrual at POI #1.

6.0 CONCLUSION

The High Valley Ranch reservoir has existed in its current form for upwards of 60 years and has become a significant resource to the Jakes Creek watershed. The reservoir provides public benefit via: (1) improvement of the downstream fishery via moderation of high flow events and provision of dry-season flows via seepage and, (2) provision of a significant fire protection resource, having been used within the last five years for fire suppression purposes by CAL Fire personnel. In addition to the clear public benefit provided by the reservoir, denial of this exception request and the associated water right application would require removing or otherwise rendering the diversion structure inoperable. Both the acute and long-term impacts of diversion structure removal would negatively impact fishery resources as well as groundwater resources. Because the reservoir does not impact downstream flows in a significant manner, it is within the intent of the Policy and the interests of the public to grant the exception to the Policy as presented in this memorandum.

7.0 REFERENCES

- California Department of Fish & Game and the National Marine Fisheries Service. "Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversions in Mid-California Streams" 2002.
- California Department of Fish and Game. Stream Inventory Report, Jakes Creek, 2005.
- Cardwell, G.T. (1965) Geology and Ground Water in Russian River Valley Areas and in Round, Laytonville and Little Lake Valleys, Sonoma and Mendocino Counties, California. USGS Water Supply Paper 1548.
- State Water Resources Control Board California Environment Protection Agency, Policy for Maintaining Instream Flows in Northern California Coastal Streams, February 4, 2014.

APPENDIX A

Figure 1

Project Location Map

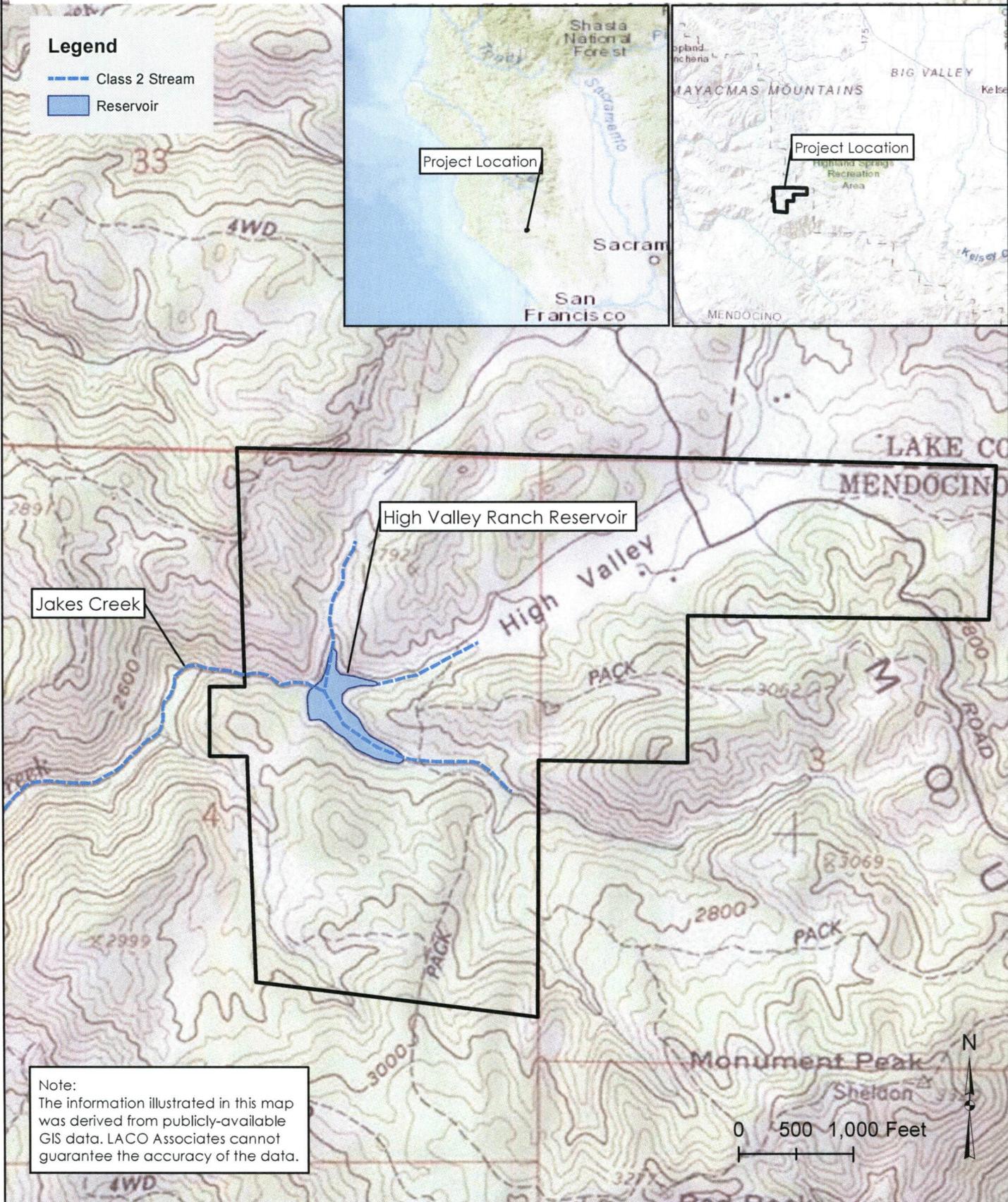
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PROJECT	High Valley Ranch Instream Flow Policy Exception	BY	VSD	FIGURE	1
CLIENT	High Valley Ranch	CHECK	CJW	JOB NO.	8970.00
LOCATION	12539 Adobe Creek Road	DATE	11/8/2018		
Location Map, Mendocino County, CA.					

REUSE OF DOCUMENTS: This document and the ideas and design incorporated herein, as an instrument of professional service, is the property of LACO Associates and shall not be reused in whole or part for any other project without LACO Associates' express written authorization.



APPENDIX B

Applicant Letter



G. DAVID CODDING

911 VILLAGE COURT • P.O. Box 9128
SANTA ROSA, CA 95405

November 7, 2018

Christopher J. Watt, CEG, CHG
LACO
3450 Regional Parkway, Suite B
Santa Rosa, CA 95403

Dear Chris:

Further to our conversation, as you know, I purchased my ranch over 13 years ago primarily for me and my family to enjoy the outdoors: the hiking trails, the wildlife, aquatic life and waterfowl that live at the ranch and surrounding vicinities.

My 26 year old daughter, Alexis, is obtaining her degree in Marine Biology then going onto obtaining her Masters in the same field. She has grown up with the ranch as a very integral part of her life – one in which she was able to get up close and learn about all sorts of indigenous species. She, as well as my wife, Melissa, and I go to the ranch for basically two reasons – to see the deer, turkeys, pigs and other wildlife and to go down to the reservoir so that we can go out on the lake to see what waterfowl and other aquatic life is inhabiting the area. In fact, at one time, I had a camera installed just to see what else roams around my ranch – the camera caught a very large black bear, a cougar and a bobcat!

Because I, my wife and daughter love the ranch wildlife, aquatic life and waterfowl it is not our intention to ever develop the ranch or to farm it as long as we own it. It truly is a peaceful, serene nature preserve, for a lack of a better description. We do not want to change that in any way – we want the “ranch” deer, turkeys, pigs, bears, bobcats, cougars, ducks and other waterfowl, otters, and fish to call Highland Valley Ranch and the surrounding area their home for generations to come!

Sincerely,

A handwritten signature in blue ink, appearing to read 'David Coddington', written over a large, stylized blue scribble.

DAVID CODDING
Owner, Highland Valley Ranch

DC/mdc

APPENDIX C

Area Capacity Calculations

Area Capacity Calculations

Client: **David Coddling**
 Project Name : **Pond**

Elevation	Drawdown	Area (ft-sq)	Area (ac)	Average Area (ac)	Height (ft.)	Volume (a.f.)	Sum. Volume (a.f.)
2505.52	22.62	0.00	0.00				0.00
2506	22.14	244.24	0.01	0.00	0.48	0.00	0.00
2508	20.14	9,463.06	0.22	0.11	2.00	0.22	0.22
2510	18.14	22,230.01	0.51	0.36	2.00	0.73	0.95
2512	16.14	52,184.85	1.20	0.85	2.00	1.71	2.66
2514	14.14	70,897.23	1.63	1.41	2.00	2.83	5.49
2516	12.14	88,342.09	2.03	1.83	2.00	3.66	9.14
2518	10.14	106,600.34	2.45	2.24	2.00	4.48	13.62
2520	8.14	123,331.21	2.83	2.64	2.00	5.28	18.90
2522	6.14	141,162.04	3.24	3.04	2.00	6.07	24.97
2524	4.14	163,186.58	3.75	3.49	2.00	6.99	31.95
2526	2.14	188,316.03	4.32	4.03	2.00	8.07	40.02
2528	0.14	214,483.11	4.92	4.62	2.00	9.25	49.27
2528.14 ⁽¹⁾	0	216,169.87	4.96	4.94	0.14	0.69	49.96 ⁽²⁾

Notes:

1. Area at contour 2528.14 is taken as user defined contour from surface built by Adobe Associates, Inc on January 3, 2018.
2. Spillway elevation to be lowered to 2528.14 to correspond to a 50 acre-foot capacity reservoir.

Calculations Showing Water Loss Due to Evaporation

Actual 2017 Drawdown measured at Pond by Adobe Associates, Inc.

Drawdown (ft)	Capacity (AF)	Water Loss (AF)
1.6	42.41	7.55

Annual Evaporation Loss computed per Average of Warm Springs Dam for 2017

Drawdown (ft)	Capacity (AF)	Water Loss (AF)
3.68	33.71	16.25

APPENDIX D

2005 CDFG Stream Inventory Report

**CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT**

Jakes Creek

Report Revised April 14, 2006

Report Completed 2005

Assessment Completed 2002

INTRODUCTION

A stream inventory was conducted during the summer of 2002 on Jakes Creek, a stream in the Russian River Basin. The inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the amount and condition of available habitat to fish, and other aquatic species with an emphasis on anadromous salmonids in Jakes Creek. The objective of the biological inventory was to document the salmonid and other aquatic species present and their distribution.

The objective of this report is to document the current habitat conditions and, after analyzing historical and recent data, recommend options for the potential enhancement of habitat for Chinook salmon, coho salmon and steelhead trout. Recommendations for habitat improvement activities are based upon target habitat values suitable for salmonids in California's north coast streams.

WATERSHED OVERVIEW

Jakes Creek is located in Mendocino County, California and is a tributary to Vasser Creek, a tributary of Coleman Creek, a tributary of Pieta Creek, which drains into the Russian River (see Jakes Creek map, APPENDIX A). The legal description at the confluence with Vasser Creek is T13N, R10W, S32. Its location is 38°55'48.53"N latitude and 123°00'15.54"W longitude. Vehicle access to the Jakes Creek reservoir exists from High Valley Ranch Road south off of Old Toll Road from Hwy 175, Hopland. Foot access to the mouth exists from Vasser Creek.

Jakes Creek and its tributaries drain a basin of approximately 1792.9 acres (2.8 square miles). Jakes Creek is a maximum second order stream and has approximately 19393.0 feet (3.67 miles) of blue line stream, according to the USGS "Hopland" 7.5 minute quadrangles. Elevations range from about 1155 feet at the mouth of the creek to 3291 feet in the headwaters. The vegetation is primarily shrub (48%) and hardwood (41%) with minor amounts of mixed hardwood/conifer (5%), conifer (3%), and herbaceous vegetation (2%). None of the watershed is agricultural or urban. A small reservoir catches runoff near the headwaters. The watershed is 78.1% privately owned and 21.9% federally owned which is managed by the BLM for Cow Mountain Recreation Area. Salmonid fish species historically present include steelhead trout. Endangered, threatened, or sensitive species present include Bell's sage sparrow (*Amphispiza belli belli*) (Nddb source).

METHODS

The habitat inventory conducted in Jakes Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi, et al., 1998). The California Department of Fish and Game (DFG) field crew that conducted the inventory was trained in standardized habitat inventory methods by DFG. This inventory was conducted by two person teams and was supervised by Derek

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and their lengths are measured. All pool units are measured for maximum depth, depth of pool tail crest (measured in the thalweg), dominant substrate composing the pool tail crest, and embeddedness. Habitat unit types encountered for the first time are measured for all the parameters and characteristics on the field form. Additionally, from the ten habitat units on each field form page, one is randomly selected for complete measurement.

HABITAT INVENTORY COMPONENTS

A standardized habitat inventory form has been developed for use in California stream surveys and can be found in the California Salmonid Stream Habitat Restoration Manual. This form was used in Jakes Creek to record measurements and observations. There are nine components to the inventory form: flow, channel type, air and water temperatures, habitat type, embeddedness, shelter rating, substrate composition, canopy, and bank composition.

1. Flow:

Flow is measured in cubic feet per second (cfs) at the bottom of the stream survey reach using standard flow measuring equipment, if available. In some cases flows are estimated. Flows were also measured or estimated at major tributary confluences.

2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (1985 rev. 1994). This methodology is described in the California Salmonid Stream Habitat Restoration Manual. Channel typing is conducted simultaneously with habitat typing and follows a standard form to record measurements and observations. There are five measured parameters used to determine channel type: 1) water slope gradient, 2) entrenchment, 3) width/depth ratio, 4) substrate composition, and 5) sinuosity. Channel characteristics are measured using a clinometer, hand level, hip chain, tape measure, and a stadia rod.

3. Temperatures:

Water and air temperatures, and time, are measured by crew members with hand held thermometers and recorded at each tenth unit typed. Temperatures are measured in Fahrenheit at the middle of the habitat unit and within one foot of the water surface.

4. Habitat Type:

Habitat typing uses the 24 habitat classification types defined by McCain and others (1988). Habitat units are numbered sequentially and assigned a type identification number selected from a

standard list of 24 habitat types. Dewatered units are labeled dry. Jakes Creek habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All measurements were in feet to the nearest tenth. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a hip chain and a stadia rod.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out reaches is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Jakes Creek, embeddedness was visually estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3), 76 - 100% (value 4). Additionally, a rating of "not suitable" (value 5) was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate particle size, having a bedrock tail-out, or other considerations.

6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide salmonids protection from predation, reduce water velocities so fish can rest and conserve energy, and allow separation of territorial units to reduce density related competition. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All shelter is then classified according to a list of nine shelter types. In Jakes Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the shelter. The shelter rating is calculated for each habitat unit by multiplying shelter value and percent covered. Thus, shelter ratings can range from 0-300, and are expressed as mean values by habitat types within a stream.

7. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. In all fully measured habitat units, dominant and sub-dominant substrate elements were visually estimated using a list of seven size classes which are defined in the California Salmonid Stream Habitat Restoration Manual.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densimeters as described in the California Salmonid Stream Habitat Restoration Manual. Canopy density relates to the amount of stream shaded from the sun. In Jakes Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the top of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated visually into percentages of evergreen or deciduous trees.

9. Bank Composition and Vegetation:

Bank composition elements range from bedrock to bare soil. However, the stream banks are usually covered with grass, brush, or trees. These factors influence the ability of stream banks to withstand

winter flows. In Jakes Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully measured unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation, including downed trees, logs and rootwads, was estimated and recorded.

BIOLOGICAL INVENTORY

Biological sampling during stream inventory is used to determine fish species and their distribution in the stream. Biological inventory is conducted using one or more of three basic methods: 1) stream bank observation, 2) underwater observation, 3) electro fishing. These sampling techniques are discussed in the California Salmonid Stream Habitat Restoration Manual.

IMPACT INVENTORY & ANALYSIS

Problems such as migration barriers, streambed erosion, poor water quality or temperatures are noted in the comments and landmarks section. In some cases measurements are taken, an analysis of what caused the problem is made and restoration potential and alternatives are recommended.

DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat for data storage and analysis. Habitat is a Visual Basic extension to Microsoft Access, developed by Zebulon Young, University of California, Berkeley. This program processes and summarizes the data, and produces the following tables and appendices:

- Summary of riffle, flatwater, and pool habitat types
- Summary of habitat types and measured parameters
- Summary of pool types
- Summary of maximum pool depths by pool habitat types
- Summary of shelter by habitat types
- Summary of dominant substrates by habitat types
- Summary of fish habitat elements by stream reach

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Jakes Creek include:

- Level II habitat types by % occurrence
- Level II habitat types by % total length
- Level IV habitat types by % occurrence
- Level I pool habitat types by % occurrence
- Maximum depth in pools
- Percent embeddedness estimated in pool tail-outs
- Mean percent cover types in pools
- Substrate composition in pool tail-outs
- Mean percent canopy
- Dominant bank composition in survey reach

- Dominant bank vegetation in survey reach

HISTORICAL STREAM SURVEYS:

The Department of Fish and Game has not conducted previous surveys of Jakes Creek.

HABITAT INVENTORY RESULTS FOR JAKES CREEK

* ALL TABLES AND GRAPHS ARE LOCATED AT THE END OF THE REPORT *

The habitat inventory of Jakes Creek, 9/7/2002, was conducted by Amy Livingston (Americorps) and Douglas Mitchel (DFG) with supervision and analysis by California Department of Fish and Game (DFG). The survey began at the confluence with Vasser Creek and extended up Jakes Creek to a very steep portion of channel. The total length of stream surveyed was 6637 feet.

Flows were not measured on Jakes Creek.

Jakes Creek is a B3 channel type for 6637 feet of the stream surveyed.

B4 channels are moderately entrenched riffle dominated channels with infrequently spaced pools, very stable plan and profile, stable banks on moderate gradients with low width /depth ratios and gravel dominant substrates.

Water temperatures taken during the survey period ranged from 52 to 60 degrees Fahrenheit. Air temperatures ranged from 65 to 70 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 43% flatwater units, 16% pool units, 37% dry units, 4% riffle units, (Graph 1). Based on total **length** of Level II habitat types there were 34% flatwater units, 3% pool units, 62% dry units, 1% riffle units, (Graph 2).

Eight Level IV habitat types were identified (Table 2). The most frequent habitat types by percent **occurrence** were 33% Step Run units, 14% Mid-Channel Pool units, 37% Dry units, 3% Low Gradient Riffle units, 9% Glide units, 1% Run units, 1% High Gradient Riffle units, 1% Lateral Scour Pool - Root Wad Enhanced units, (Graph 3). Based on percent total **length**, 32% Step Run units, 3% Mid-Channel Pool units, 62% Dry units, 1% Low Gradient Riffle units, 1% Glide units, 1% Run units.

A total of 11 pools were identified (Table 3). Main Channel pools were the most frequently encountered, at 91%, and comprised 89% of the total length of all pools (Graph 4).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. One of the 11 pools (9%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the eleven pool tail-outs

measured, one had a value of 1 (9.1%); six had a value of 2 (54.5%); four had a value of 3 (36.4%); (Graph 6). On this scale, a value of 1 indicates the best spawning conditions and a value of 4 the worst. Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate like bedrock, log sills, boulders.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Flatwater habitat types had a mean shelter rating of 13, and pool habitats had a mean shelter rating of 13 (Table 1). Of the pool types, the Main Channel pools had a mean shelter rating of 14, Scour pools had a mean shelter rating of 5, (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover types in Jakes Creek. Graph 7 describes the pool cover in Jakes Creek. Boulders is the dominant pool cover type followed by undercut banks.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was observed in 27% of pool tail-outs and boulders observed in 36% of pool tail-outs.

The mean percent canopy density for the surveyed length of Jakes Creek was 83%. The mean percentages of hardwood and coniferous trees were 48% and 52%, respectively. Seventeen percent of the canopy was open. Graph 9 describes the mean percent canopy in Jakes Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 12%. The mean percent left bank vegetated was 12%. The dominant elements composing the structure of the stream banks consisted of 8% bedrock, 52% boulder, 29% cobble/gravel, 10% sand/silt/clay, (Graph 10). Grass was the dominant vegetation type observed in 12% of the units surveyed. Additionally, 33% of the units surveyed had hardwood trees as the dominant vegetation type, and 27% had coniferous trees as the dominant vegetation (Graph 11).

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

Department of Fish and Game has not conducted previous biological inventories of Jakes Creek nor are there any records of hatchery releases or fish rescues in the Jakes Creek watershed. A biological inventory was not conducted in 2002. However, during the habitat inventory survey, the field crew observed steelhead 0+, 1+, and 2+, newts, frogs, salamanders, and snakes.

DISCUSSION FOR JAKES CREEK

Jakes Creek has one channel type: 6637 feet a B3. Many site specific projects can be designed within this channel type, especially to increase pool frequency, volume and shelter.

According to the DFG Salmonid Stream Habitat Restoration Manual, B3 channel types are excellent for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing

wing-deflectors and log cover. They are also good for medium-stage plunge weirs. These channel types have suitable gradients and the stable stream banks that are necessary for the installation of instream structures designed to increase pool habitat, trap spawning gravels, and provide protective shelter for fish.

The water temperatures recorded on the survey day 9/7/2002 ranged from 52°F to 60°F. Air temperatures ranged from 65°F to 70°F. This temperature regime is favorable to salmonids. Water temperatures above 65°F, if sustained, are above the threshold stress level for salmonids.

Flatwater habitat types comprised 34% of the total length of this survey, riffles 1%, and pools 3%. The pools are shallow, with only one of the eleven (9%) pools having a maximum residual depth greater than 2 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined to have a maximum residual depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy, or where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream.

Seven of the 11 pool tail-outs measured had embeddedness ratings of 1 or 2. Four of the pool tail-outs had embeddedness ratings of 3 or 4. None of the pool tail-outs had a rating of 5, which is considered unsuitable for spawning. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead. Sediment sources in Jakes Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Seven of the eleven pool tail-outs had silt, sand, large cobble, boulders or bedrock as the dominant substrate. This is generally considered unsuitable for spawning salmonids.

The mean shelter rating for pools was 13. The shelter rating in the flatwater habitats was 13. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by Boulders in Jakes Creek. Boulders are the dominant cover type in pools followed by undercut banks. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

The mean percent canopy density for the stream was 83%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was low at 12% and 12%, respectively. In areas of stream bank erosion or where bank vegetation is sparse, planting endemic species of coniferous and hardwood trees, in conjunction with bank stabilization, is recommended.

GENERAL MANAGEMENT RECOMMENDATIONS

Jakes Creek should be managed as an anadromous, natural production stream.

Winter storms often bring down large trees and other woody debris into the stream, which increases the number and quality of pools. This woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. Landowners should be sensitive about the natural and positive role woody debris plays in the system, and encouraged not to remove woody debris from the stream, except under extreme buildup and only under guidance by a fishery professional.

PRIORITY FISHERY ENHANCEMENT OPPORTUNITIES

1. Map sources of upslope and in-channel erosion, and prioritize them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream. Near-stream riparian planting along any portion of the stream should be encouraged to provide bank stability and a buffering against agricultural, grazing and urban runoff.
2. Jakes Creek would benefit from the utilization of bio-technical vegetative techniques to re-establish floodplain benches and a defined low flow channel. This would discourage lateral migration of the base flow channel and decrease bank erosion.
3. Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.
4. Where feasible, increase woody cover in the pool and flatwater habitat units along the entire stream. Most of the existing shelter is from vegetation and undercut banks. Adding high quality complexity with larger woody cover is desirable. Combination cover/scour structures constructed with boulders and woody debris would be effective in many flatwater and pool locations in the upper reaches. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion. In some areas the material is at hand.
5. Where feasible, design and engineer pool enhancement structures to increase the number of pools in the upper reaches. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.

COMMENTS AND LANDMARKS

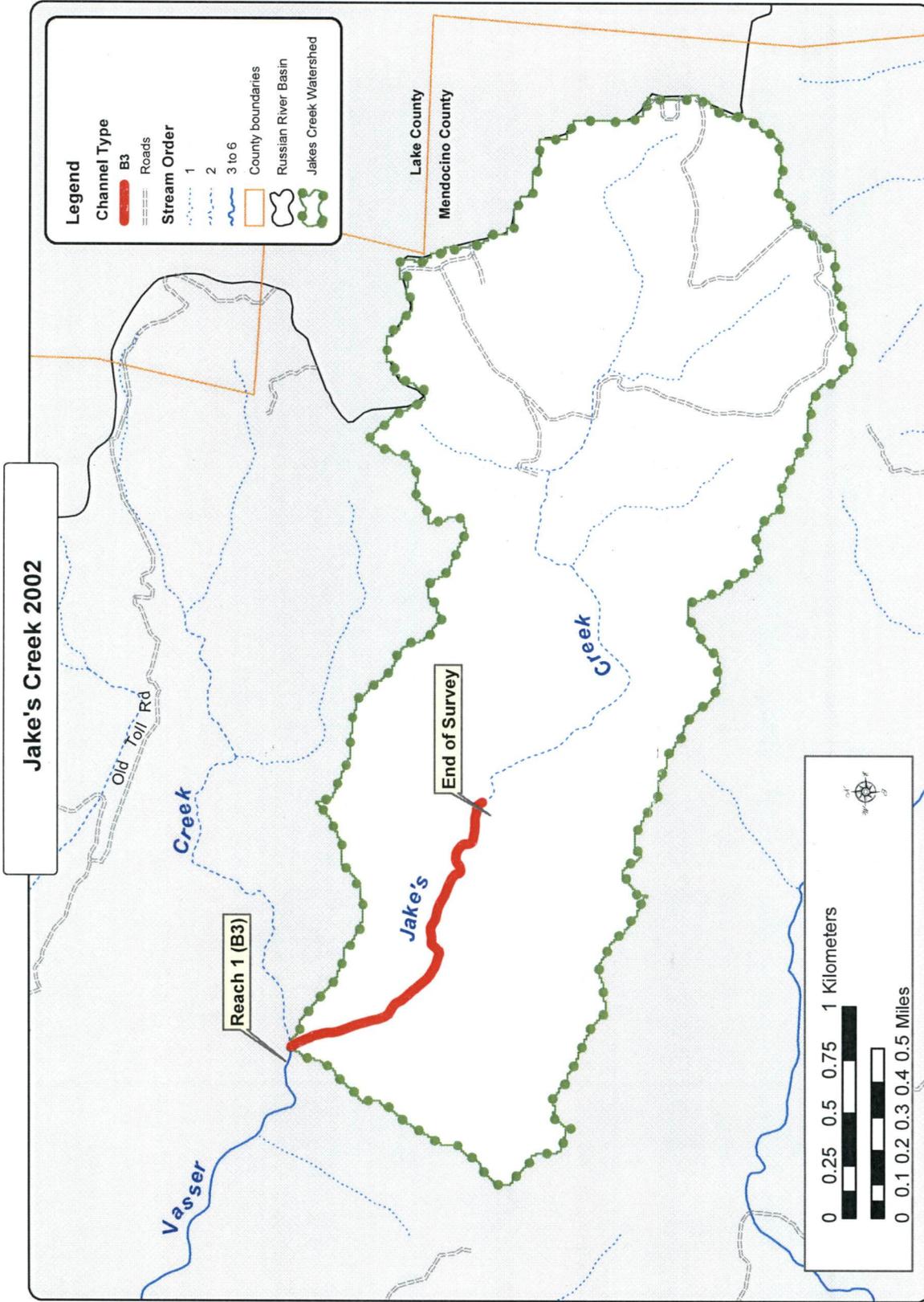
The following landmarks and possible problem sites were noted. All distances are approximate and taken from the beginning of the survey.

- 152' Steelhead 0+, 1+, 2+ were observed frequently throughout the creek from 152' to 3364'.
- 345' Scattered small pockets of water in unit - some large and small debris in unit
- 787' Log at the top of the unit retaining 2' of gravel/cobble.

- 1192' Boulder in creek (photo# 22)
- 1621' Lots of SWD and LWD throughout unit. At 35 ft, LWD with gravel build up 2 ft. Left bank (LB) EROSION, dimensions: 50'L x 30'H x 10'D, dumping fines, exposed roots, 75 ft – 125 ft into unit. LB tributary/gully at 200ft, dry and steep. Channel has A3 characteristics for a short distance.
- 1921' At 15ft into unit, LB tributary/gully, steep and dry.
- 2238' Right bank (RB) EROSION not serious but dumping fines into creek.
- 2569' RB EROSION not serious but dumping fines into creek.
- 2605' RB gully at bottom of unit. LB EROSION
- 3429' Channel gradient steepens. Abundant SWD and LWD. EROSION of RB with serious gully. Wood debris accumulation at 375 ft, 400 ft, and 450ft, photos 23-25. At 1200 ft into unit RB EROSION/gully.
- 5222' LB EROSION /gully; huge boulders entering system.
- 5400' RB EROSION at 100' into unit, dimensions: 100'H x 6'L x 10'D, dumping fines into creek.
- 5694' Trickle of water at parts, but grade is steep and water is minor. Channel gradient lessens.
- 6144' HU 056: RB spring wetting RB at 52' into unit
- 6368' LB EROSION in HU 065 and 066, dimensions: 75'L x 35'H x 20'D, dumping fines through boulders and lots of shale cobbles and gravel. Exposed roots and three trees have already fallen into the creek.
- 6461' LB minor EROSION dumping fines through cobbles into pool. There were no fish on 09/07/2002 when this survey was completed, however, one week before that, eight, 2+ fish were observed in the pool.
- 6507' END OF SURVEY. Channel steep

REFERENCES

- Flosi, G., Downie, S., Hopelain, J., Bird, M., Coey, R., and Collins, B. 1998. California Salmonid Stream Habitat Restoration Manual, 3rd edition. California Department of Fish and Game, Sacramento, California.



Prepared by: Jacob Newell and Ann Marie Osterback, May 6, 2003

APPENDIX B: TABLES

Table 1 - Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name: Jakes Creek

LLID:

1230043389301

Drainage:

Russian River - Upper

Survey Dates: 9/7/2002 to 9/7/2002

Confluence Location: Quad: HOPLAND

Legal Description: T13NR10WS32

Latitude: 38:55:48.0N

Longitude: 123:00:15.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
26	0	DRY	37.1	157	4093	61.7									
30	11	FLATWATER	42.9	75	2239	33.7	4.5	0.4	0.9	164	4926	63	1890		13
11	11	POOL	15.7	21	232	3.5	8.9	1.2	1.8	180	1983	259	2854	209	13
3	3	RIFFLE	4.3	24	73	1.1	2.6	0.1	0.2	13	38	1	4		

Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
70	6637	6947	4748

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Jakes Creek
 LLID: 1230043389301
 Drainage: Russian River - Upper
 Survey Dates: 9/7/2002 to 9/7/2002
 Confluence Location: Quad: HOPLAND
 Legal Description: T13NR10WS32
 Latitude: 38:55:48.0N
 Longitude: 123:00:15.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating	Mean Canopy (%)
2	2	LGR	2.9	28	55	0.8	2	0.1	0.2	16	31	2	3			74
1	1	HGR	1.4	18	18	0.3	4	0.1	0.2	7	7	1	1			89
6	4	GLD	8.6	16	95	1.4	5	0.5	1.4	92	554	53	320		19	79
1	1	RUN	1.4	52	52	0.8	6	1.0	1.8	187	187	187	187		5	77
23	6	SRN	32.9	91	2092	31.5	4	0.3	1.2	208	4790	49	1122		5	84
10	10	MCP	14.3	21	206	3.1	9	1.3	3.5	180	1801	269	2690	217	14	83
1	1	LSR	1.4	26	26	0.4	7	0.7	1.8	182	182	164	164	127	5	97
26	0	DRY	37.1	157	4093	61.7										86

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
70	25	6637	7553	4487

Table 3 - Summary of Pool Types

Stream Name: Jakes Creek

LLID: 1230043389301 Drainage: Russian River - Upper

Survey Dates: 9/7/2002 to 9/7/2002

Confluence Location: Quad: HOPLAND Legal Description: T13NR10WS32 Latitude: 38:55:48.0N Longitude: 123:00:15.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Residual Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Residual Pool Vol (cu.ft.)	Estimated Total Resid.Vol. (cu.ft.)	Mean Shelter Rating
10	10	MAIN	91	21	206	89	9.1	1.3	180	1801	217	2171	14
1	1	SCOUR	9	26	26	11	7.0	0.7	182	182	127	127	5
Total Units Fully Measured	11				232					1983		2298	

Table 4 - Summary of Maximum Residual Pool Depths By Pool Habitat Types

Stream Name: Jakes Creek		LLID: 1230043389301		Drainage: Russian River - Upper							
Survey Dates: 9/7/2002 to 9/7/2002		Latitude: 38:55:48.0N		Longitude: 123:00:15.0W							
Confluence Location: HOPLAND		Legal Description: T13NR10WS32									
Habitat Type	Habitat Occurrence (%)	< 1 Foot Maximum Residual Depth	< 1 Foot Percent Occurrence	1 < 2 Feet Maximum Residual Depth	1 < 2 Feet Percent Occurrence	2 < 3 Feet Maximum Residual Depth	2 < 3 Feet Percent Occurrence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
10 MCP	91	1	10	8	80	0	0	1	10	0	0
1 LSR	9	0	0	1	100	0	0	0	0	0	0
Total Units											
		Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1 < 2 Feet Max Resid. Depth	Total 1 < 2 Feet % Occurrence	Total 2 < 3 Feet Max Resid. Depth	Total 2 < 3 Feet % Occurrence	Total 3 < 4 Feet Max Resid. Depth	Total 3 < 4 Feet % Occurrence	Total >= 4 Feet Max Resid. Depth	Total >= 4 Feet % Occurrence
11		1	9	9	82	0	0	1	9	0	0
Mean Maximum Residual Pool Depth (ft.):											1.8

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Jakes Creek		LLID: 1230043389301		Drainage: Russian River - Upper						
Survey Dates: 9/7/2002 to 9/7/2002		Dry Units: 26		Longitude: 123:00:15.0W						
Confluence Location: Quad: HOPLAND		Legal Description: T13NR10WS32		Latitude: 38:55:48.0N						
Habitat Units Measured	Habitat Type	Mean % Undercut Banks	Mean % SWD	Mean % LWD	Mean % Root Mass	Mean % Terr. Vegetation	Mean % Aquatic Vegetation	Mean % White Water	Mean % Boulders	Mean % Bedrock Ledges
2	0 LGR									
1	0 HGR									
3	0 TOTAL RIFFLE									
6	4 GLD	8	0	4	0	5	0	0	84	0
1	1 RUN	0	0	0	0	0	0	0	100	0
23	2 SRN	0	0	0	0	0	0	0	100	0
30	7 TOTAL FLAT	4	0	2	0	3	0	0	91	0
10	9 MCP	17	0	0	0	0	0	0	83	0
1	1 LSR	45	0	0	45	0	0	0	10	0
11	10 TOTAL POOL	20	0	0	5	0	0	0	76	0
70	17 TOTAL	13	0	1	3	1	0	0	82	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Jakes Creek
 Survey Dates: 9/7/2002 to 9/7/2002
 Confluence Location: Quad: HOPLAND
 LLID: 1230043389301
 Dry Units: 26
 Legal Description: T13NR10WS32
 Drainage: Russian River - Upper
 Latitude: 38:55:48.0N
 Longitude: 123:00:15.0W

Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
2	2	LGR	0	0	0	50	0	50	0
1	1	HGR	0	0	0	0	100	0	0
6	4	GLD	0	0	50	0	0	50	0
1	1	RUN	0	0	100	0	0	0	0
23	6	SRN	0	0	0	17	0	83	0
10	4	MCP	25	25	0	0	0	50	0
1	1	LSR	100	0	0	0	0	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Jakes Creek
 Survey Dates: 9/7/2002 to 9/7/2002
 Confluence Location: Quad: HOPLAND
 LLID: 1230043389301
 Drainage: Russian River - Upper
 Legal Description: T13NR10WS32
 Latitude: 38:55:48.0N
 Longitude: 123:00:15.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
83	52	48	0	12	12

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Jakes Creek

LLID:

1230043389301 Drainage: Russian River - Upper

Survey Dates: 9/7/2002 to 9/7/2002

Confluence Location: Quad: HOPLAND

Legal Description: T13NR10WS32 Latitude: 38:55:48.0N Longitude: 123:00:15.0W

Mean Percentage of Dominant Stream Bank Substrate

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Bedrock	3	1	8.3
Boulder	9	16	52.1
Cobble / Gravel	8	6	29.2
Sand / Silt / Clay	4	1	10.4

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	2	4	12.5
Brush	1	3	8.3
Hardwood Trees	8	8	33.3
Coniferous Trees	7	6	27.1
No Vegetation	6	3	18.8

Total Stream Cobble Embeddedness Values: 2

Table 10 - Mean Percent of Shelter Cover Types For Entire Stream

StreamName: Jakes Creek

LLID:

1230043389301 Drainage: Russian River - Upper

Survey Dates: 9/7/2002 to 9/7/2002

Confluence Location: Quad: HOPLAND

Legal Description: T13NR10WS32 Latitude: 38:55:48.0N Longitude: 123:00:15.0W

	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)		4	20
SMALL WOODY DEBRIS (%)		0	0
LARGE WOODY DEBRIS (%)		2	0
ROOT MASS (%)		0	5
TERRESTRIAL VEGETATION (%)		3	0
AQUATIC VEGETATION (%)		0	0
WHITEWATER (%)		0	0
BOULDERS (%)		91	76
BEDROCK LEDGES (%)		0	0

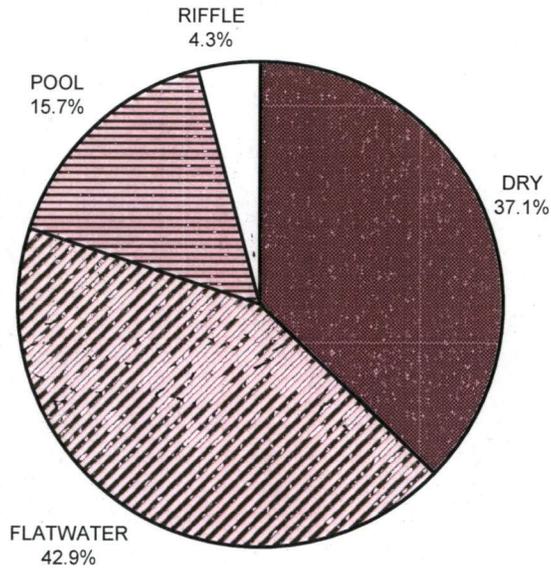
Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 3

Channel Type: B3	Canopy Density (%): 90.5	Pools by Stream Length (%): 0.0
Reach Length (ft.): 450	Coniferous Component (%): 25.0	Pool Frequency (%): 0.0
Riffle/Flatwater Mean Width (ft.): 3.0	Hardwood Component (%): 75.0	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep:
Range (ft.): to	Vegetative Cover (%): 20.0	2 to 2.9 Feet Deep:
Mean (ft.):	Dominant Shelter:	3 to 3.9 Feet Deep:
Std. Dev.:	Dominant Bank Substrate Type: Boulder	>= 4 Feet Deep:
Base Flow (cfs): 0	Occurrence of LWD (%): 0.0	Mean Max Residual Pool Depth (ft.):
Water (F): 56 - 56 Air (F): 68 - 68	LWD per 100 ft.:	Mean Pool Shelter Rating:
Dry Channel (ft.): 249	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: Sand: Gravel: Sm Cobble: Lg Cobble: Boulder: Bedrock:		
Embeddedness Values (%): 1. 2. 3. 4. 5. 0.0		

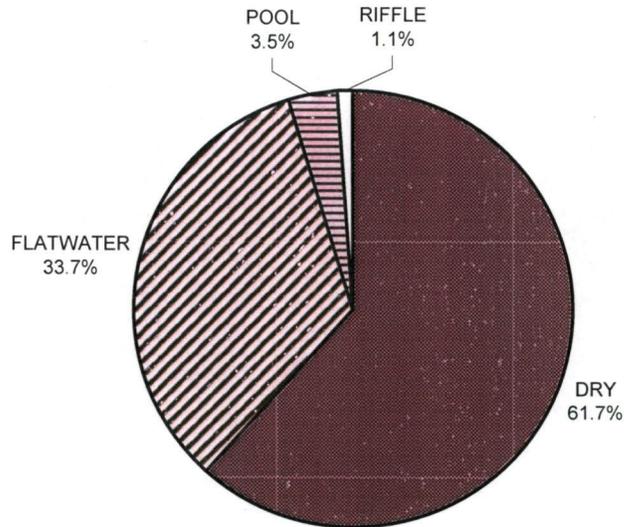
APPENDIX D: GRAPHS

**JAKES CREEK 2002
HABITAT TYPES BY PERCENT OCCURRENCE**



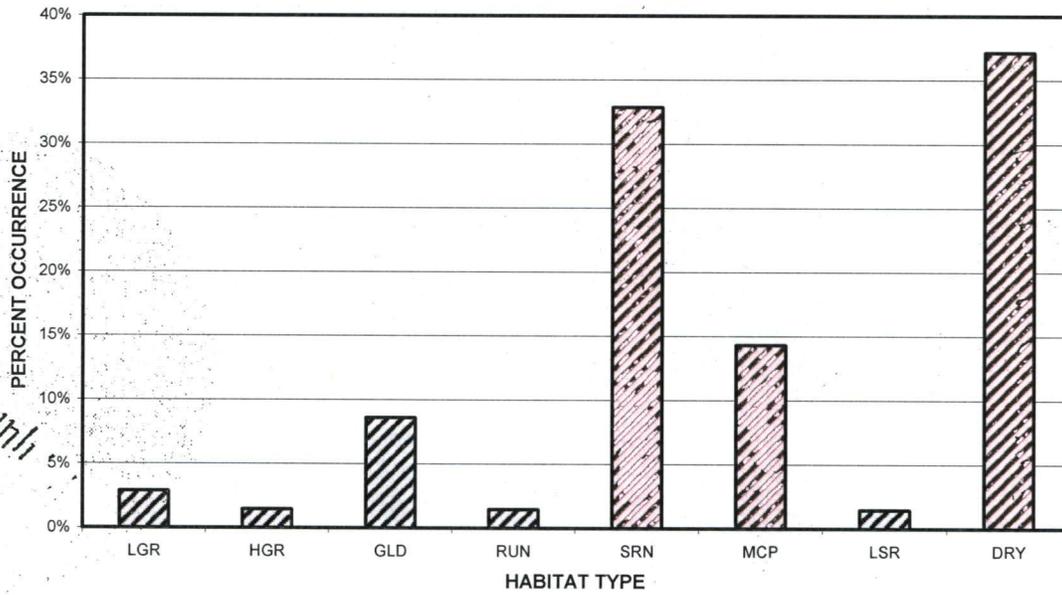
GRAPH 1: Level II habitat types by percent occurrence

**JAKES CREEK 2002
HABITAT TYPES BY PERCENT TOTAL LENGTH**



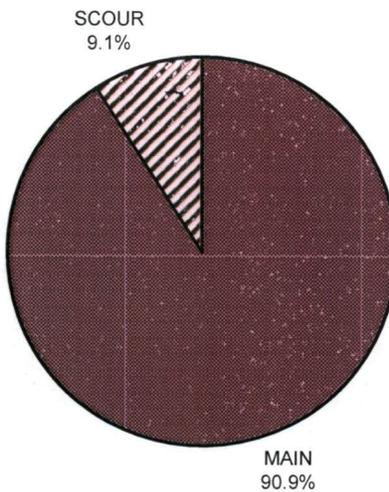
GRAPH 2: Level II habitat types by percent total length

**JAKES CREEK 2002
HABITAT TYPES BY PERCENT OCCURRENCE**



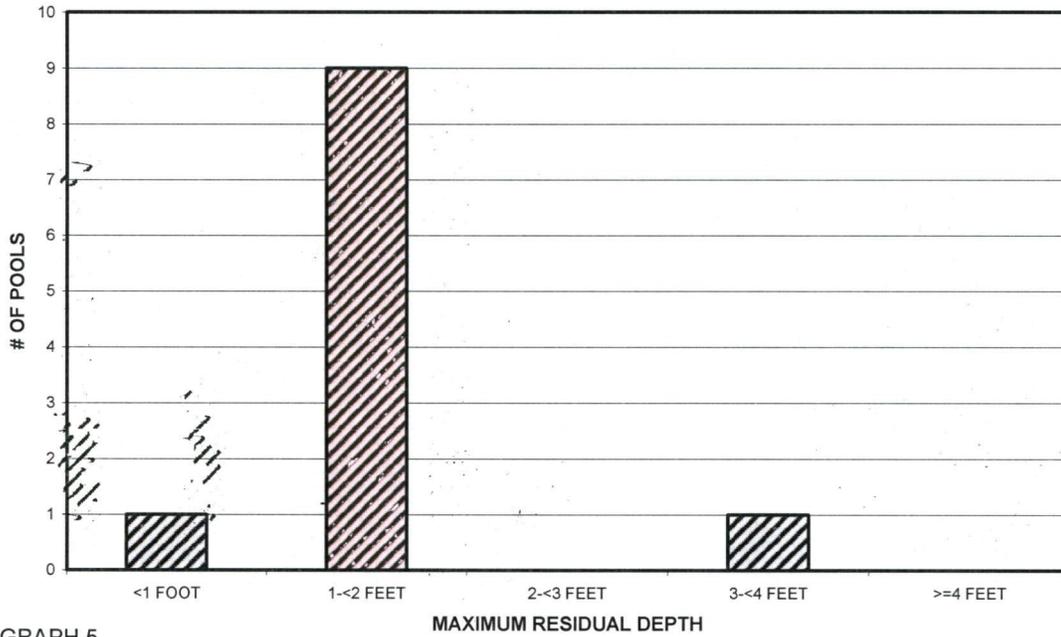
GRAPH 3: Level IV habitat types by percent occurrence

**JAKES CREEK 2002
POOL TYPES BY PERCENT OCCURRENCE**



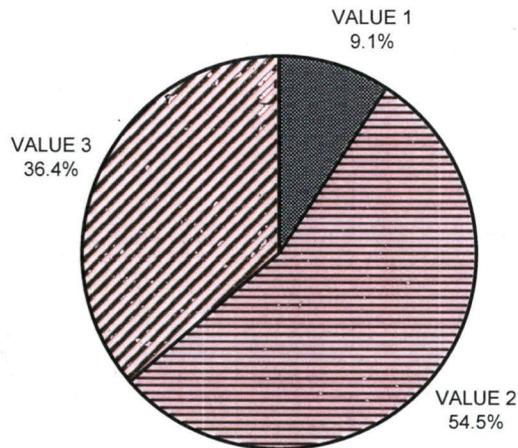
GRAPH 4: Level I pool types by percent occurrence.

**JAKES CREEK 2002
MAXIMUM DEPTH IN POOLS**



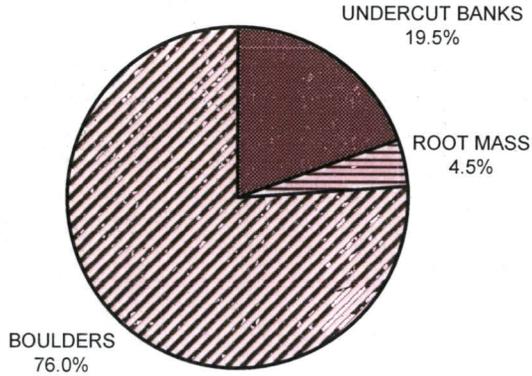
GRAPH 5

**JAKES CREEK 2002
PERCENT EMBEDDEDNESS**



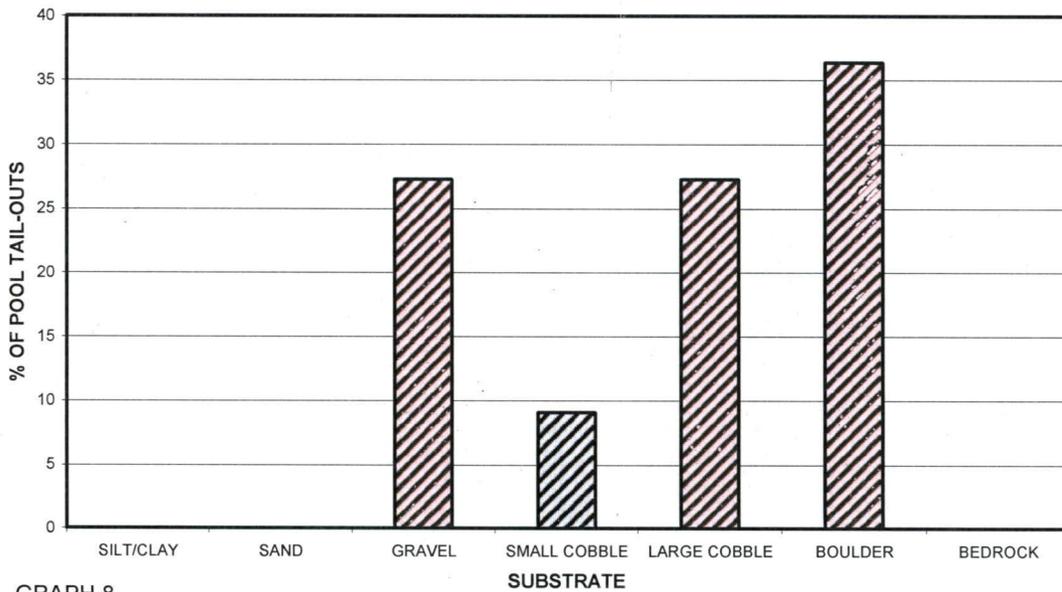
GRAPH 6

**JAKES CREEK 2002
MEAN PERCENT COVER TYPES IN POOLS**



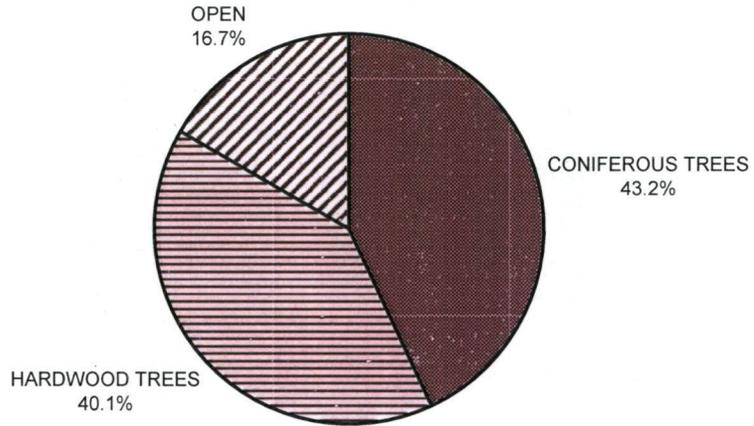
GRAPH 7

**JAKES CREEK 2002
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS**



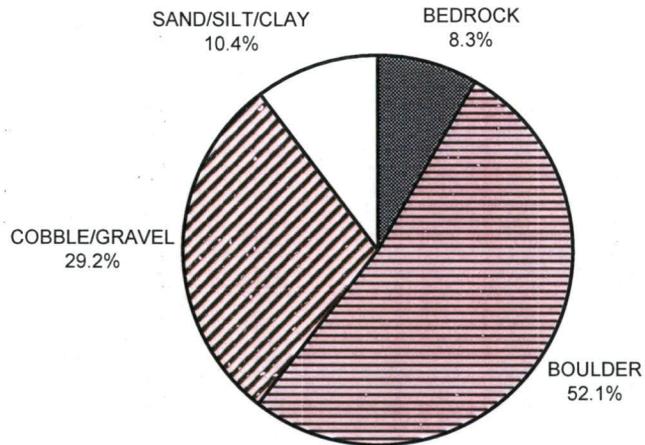
GRAPH 8

**JAKES CREEK 2002
MEAN PERCENT CANOPY**



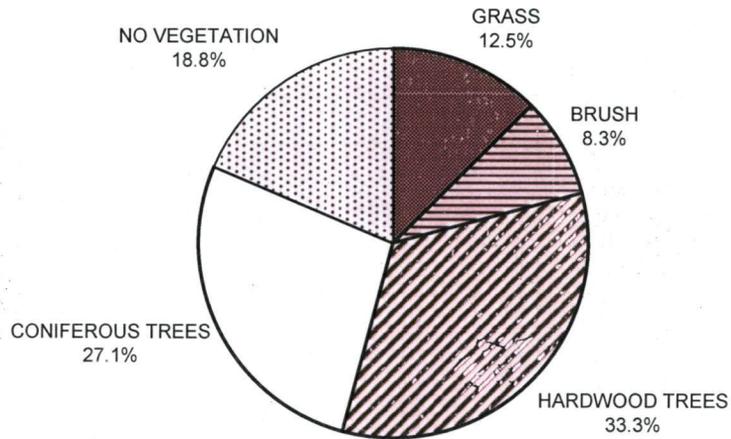
GRAPH 9

**JAKES CREEK 2002
DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10

**JAKES CREEK 2002
DOMINANT BANK VEGETATION IN SURVEY REACH**



GRAPH 11

APPENDIX E

Correspondence with CALFire re: Fire Suppression

From: "Bertelli, Greg@CALFIRE" <Greg.Bertelli@fire.ca.gov>
Date: October 10, 2013, 11:29:27 AM PDT
To: "David Coddling" <dc@MVShops.com>
Subject: RE: Cal Fire at Ranch

Mr. Coddling,

Thank you for the kind words and recognition of the hard work done by the fire personnel during last week's fire on Adobe Creek road. As you know this is a remote area. In remote areas such as this it is critical to have a good working relationship with the landowners. This helps us become familiar with the area prior to having future fires and meet the needs of those involved.

Access and water sources are critical in these remote areas. In remote areas such as this aircraft will often get to the fire before ground resources do. It was a benefit having your lake close by. This decreased the turn around time for bucket drops and enabled the helitack crew to work effectively and safely. I feel that the quick turnaround time helped to keep the fire in check and limit growth during the initial stages. This helped keep the fire to under 100 acres. Thank you for letting us use your lake.

I am also grateful that we now have the combinations to the gates along the ridge. I hope to drive that ridge with you and Mr. Nielsen. This will be a huge benefit to know exactly what to expect when we get a fire in this area again.

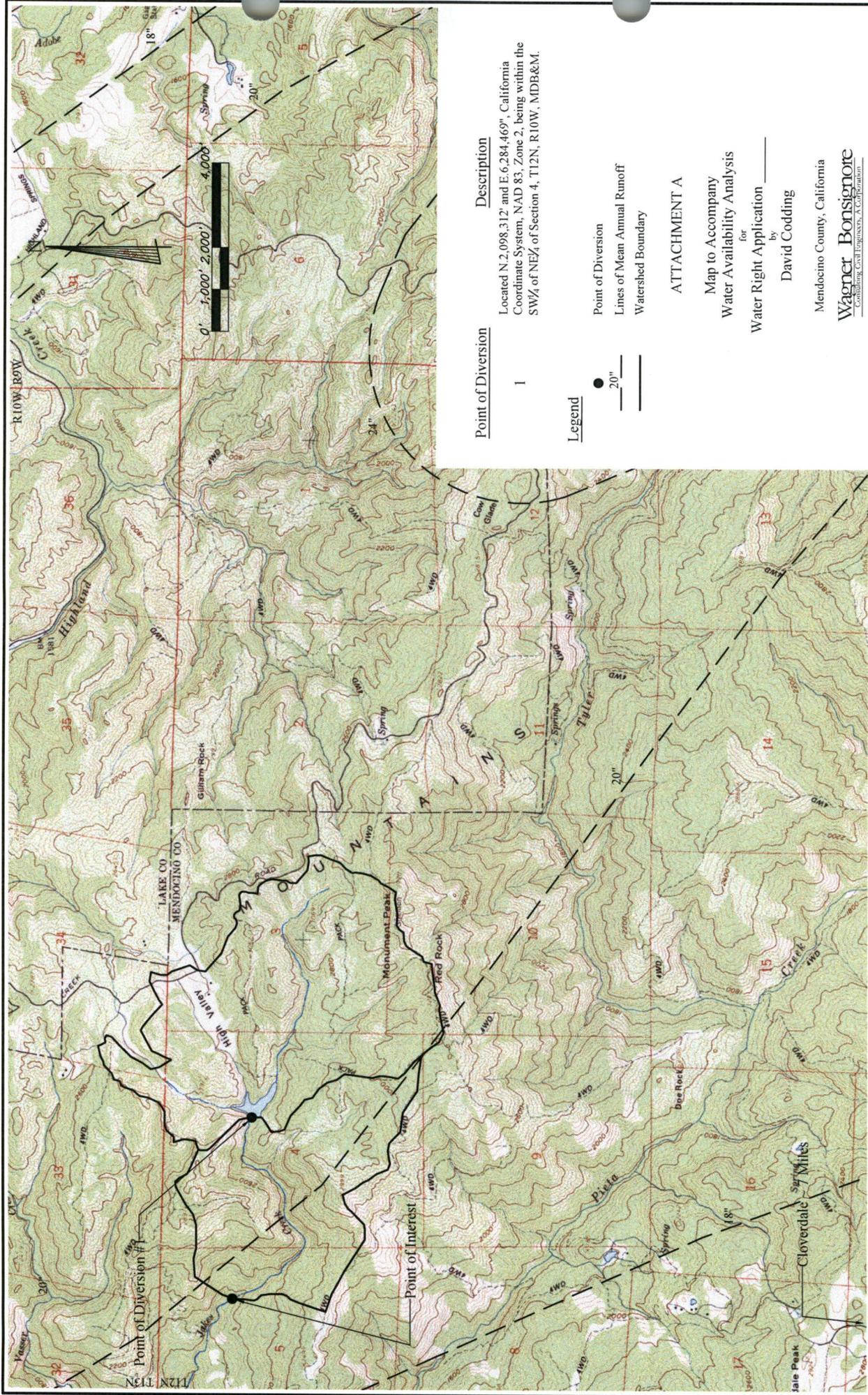
As stated earlier I hope to meet with you soon to become better acquainted with the Adobe Creek Ridge. If there is anything I can be of assistance please do not hesitate to ask.

Respectfully,

Greg Bertelli
CAL FIRE
Battalion Chief
Sonoma-Lake-Napa Unit
Battalion 18
(707)481-2362 Cell
greg.bertelli@fire.ca.gov

APPENDIX F

Estimate of Water Availability at POI #1



Point of Diversion

1

Description

Located N 2,098.312' and E 6,284.469', California Coordinate System, NAD 83, Zone 2, being within the SW¼ of NE¼ of Section 4, T12N, R10W, MDB&M.

Legend

● Point of Diversion

— Lines of Mean Annual Runoff

--- Watershed Boundary

ATTACHMENT A

Map to Accompany
Water Availability Analysis

for

Water Right Application _____
by
David Coddling

Mendocino County, California

Wagner Bonsignore
Consulting Civil Engineers, A Corporation

**Water Right Application
by David Coddling
Estimate of Water Availability**

Point of Diversion #1	
Mean Annual Runoff: ⁽¹⁾	21.2 in
Watershed Area for POD #1:	727.9 ac
Point of Interest (ULA)	
Mean Annual Runoff: ⁽¹⁾	20.8 in
Watershed Area for POD #1:	1,176.0 ac
Total Estimated Mean Seasonal Runoff at POD #1:	1,287.9 ac-ft
Senior Diverters of Record within POD #1 watershed (face value):	0.0 ac-ft
Total water available at POD #1:	1,287.9 ac-ft
Requested diversion amount:	72.8 ac-ft
Total Seasonal Amount Remaining in Stream After Diversion:	1215.1 ac-ft
Total Estimated Mean Seasonal Runoff at POI (ULA):	2,036.7 ac-ft
Senior Diverters of Record within POI (ULA) watershed (face value):	72.8 ac-ft
Total water available at POI (ULA):	1,963.9 ac-ft
Total Seasonal Amount Remaining in Stream After Diversion:	1,963.9 ac-ft

Notes:

⁽¹⁾ Mean Annual Runoff in the San Francisco Bay Region, California, 1931-70 (Miscellaneous Field Studies Map MF-613) , by