

# **2022 Update: County of Santa Cruz Stream Crossing Inventory and Fish Passage Evaluation**

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## **Summary**

This report provides an update to the County's Fish Passage Program and identifies new priority projects. This report builds on the 2004 Santa Cruz County Stream Crossing Inventory and Fish Passage Evaluation (Ross Taylor and Associates) and a 2015 update report. This report identifies 13 High Priority projects that include 2 locations damaged in the 2017 storms, 6 locations in 3 watersheds (Liddell, Lompico and Casserly) and 5 locations for adaptive management of completed projects.

Two moderate priority culverts that were in poor condition failed during the 2017 storms and are currently in progress for full replacement. Completing these two projects - Molino Creek at Swanton Road and West Branch Soquel Creek at Redwood Lodge Road - is a high priority to benefit fish passage and stream wood movement.

The two culverts on West Liddell Creek at Bonny Doon Road (PM 0.69 and PM 1.01) have been moved back to the High Priority list for full replacement to benefit fish passage, wildlife corridors and to maintain an important emergency access route. Well designed, full culvert replacement of these two crossings would benefit passage for steelhead, red-legged frog and western pond turtle. Improved passage could potentially also benefit coho salmon, which were found in the East Branch of Liddell Creek by the City of Santa Cruz, although West Branch Liddell does not have the same habitat quality as the East Branch. In addition, these culverts are in very poor condition and their replacement would also benefit public safety since Bonny Doon Road is an alternative emergency route for the San Lorenzo Valley when access is lost due to landslides or other storm related issues.

Two culverts on Casserly Creek - at Mount Madonna and Gaffey Road - are new high priority locations. The Pajaro Valley Water Management Agency and partners are making a significant investment to improve steelhead migration through College Lake which makes passage on Casserly Creek a high priority. In addition, several years of juvenile steelhead sampling immediately downstream of Casserly Creek at Mount Madonna Road support the assumption that passage conditions are very poor at the culvert. Casserly Creek at Gaffey Road was not included in the original 2004 report but is located about 600' upstream of Casserly Creek at Mount Madonna Road. Since both culverts are in extremely poor condition, full replacements are the best approach.

Passage at several completed projects could be improved by implementing adaptive management projects. Corralitos Creek at Eureka Canyon Road PM 2.95, and several

Green Valley Creek sites need adjustments or additional work to provide the best passage conditions.

### **Background**

In 2002, the County received a grant from the California Department of Fish and Wildlife Fisheries Restoration Grants Program to identify, assess and prioritize county culvert stream crossings for fish passage. The identification of fish bearing streams, habitat quality ratings and final priorities were completed in conjunction with local CDFW staff and fishery biologists. In 2004, Ross Taylor and Associates produced the final report: County of Santa Cruz Stream Crossing Inventory and Fish Passage Evaluation. The report identified 13 high priority sites, 13 moderate priority sites, 27 low priority sites and 12 low priority sites with a “green” passage rating. Fifteen sites were dropped from the final ranking since they were not within fish bearing reaches.

The County of Santa Cruz completed 14 fish passage projects between 2003 and 2014, including 11 projects at county culvert stream crossings. Of the 13 High Priority Sites identified in the 2004 Ross Taylor report, 7 projects have been completed. Of the 13 Moderate Priority sites, 3 projects were completed. Of the 27 low priority sites, passage at one site was completed when the culvert was repaired following storm damage. In addition to the culvert projects, the County of Santa Cruz completed an additional 3 fish passage projects: (1) at Carrol Avenue bridge on Lompico Creek, (2) a Caltrans culvert on Valencia Creek and (3) the removal of a sewer line across Aptos Creek at Spreckels Drive.

Most of these projects were completed through the Integrated Watershed Restoration Program (IWRP), coordinated by the Resource Conservation District of Santa Cruz County. Funding for these projects came from a mix of sources including IWRP (Prop 40, Prop 50, and Coastal Conservancy), California Department of Fish and Wildlife Fishery Restoration Grants Program, County of Santa Cruz Fish and Game Propagation Fund and FEMA. The County of Santa Cruz invested staff time and match contributions through the Public Works and Planning departments and Environmental Health Water Resources Division.

The 2015 Report identified 2 additional locations that were not included in the 2004 assessment. This report includes one additional location (Casserly Creek at Gaffey Road).

## **HIGH-PRIORITY PROJECTS IN PROGRESS – 2 SITES**

Crossings are listed generally from north to south.

**Molino Creek/Swanton Road (PM 0.71)** – This culvert failed in 2017 and is currently in design. Culvert provides access to approximately 2,700' of available habitat up to a historic earthen dam within the Cotoni-Coast Dairies National Monument, managed by Bureau of Land Management (BLM). BLM is considering removing or providing passage past the dam that would increase steelhead habitat area. Full replacement will also provide wildlife passage for red-legged frog and western pond turtle.

**West Branch Soquel Creek/Redwood Lodge Road (PM 1.88)** – This culvert failed in 2017. This crossing is located upstream of the anadromous reach and still provides passage for resident trout and the downstream passage of stream wood. Current design is to replace the crossing with an arch culvert. This project could benefit from coordination with the downstream property owner to allow wood passage through the reach and over Laurel Mill Dam.

## **HIGH-PRIORITY LOCATIONS – 5 SITES**

Crossings are listed generally from north to south.

**West Liddell Creek #1/Bonny Doon Road (PM 0.69)** – A full replacement would benefit passage for steelhead, possibly coho salmon, red-legged frog and western pond turtle. Culvert replacement would also benefit public safety since Bonny Doon Road is an important emergency access route from Bonny Doon and San Lorenzo Valley communities.

**West Liddell Creek #3/Boony Doon Road (PM 0.94)** - A full replacement would benefit passage for steelhead, possibly coho salmon, red-legged frog and western pond turtle. Steelhead, and coho salmon, continue to use East Liddell Creek. Culvert replacement would also benefit public safety since Bonny Doon Road is an important emergency access route from Bonny Doon and San Lorenzo Valley communities.

**Lompico Creek #3/Lompico Road (PM 1.82, listed as PM 2.00 in 2004 report)** – This crossing has been accepted into the State's bridge program and is due for a full replacement with a bridge. Among all the high priority sites, this crossing has the greatest amount of good habitat upstream.

**Cassery Creek #2/Mount Madonna Road (PM 1.00)** – Several years of juvenile steelhead sampling immediately downstream of this culvert indicates that this culvert is a significant barrier. The Pajaro Valley Water Management Agency is working to improve conditions in College Lake for steelhead and there would be significant support for this project. In addition, this culvert is in extremely poor condition and should be replaced.

**Cassery Creek #3/Gaffey Road** – This culvert was not included in the original 2004 report. This crossing should be replaced in conjunction with the Cassery Creek at Mount Madonna Road culvert since this culvert is only about 600' upstream and is also in poor

condition. Culvert replacement would provide much improved fish passage to about 2,000' of habitat, but a more detailed habitat assessment would be helpful.

### **HIGH-PRIORITY FOR ADAPTIVE MANAGEMENT – 6 SITES**

Crossings are listed generally in order of priority.

**Lompico Creek #2/Lompico Road (PM 0.50)** – existing retrofit of sacrete weirs could be improved by modifying the weir closest to the culvert outlet.

**Corralitos Creek/Eureka Canyon Road (PM 2.95)** – This 2008 retrofit project has been performing well, but a large boulder is blocking optimal fish passage just downstream of the project. Removing this single boulder would improve steelhead passage.

**Shingle Mill Gulch #2/Eureka Canyon Road (PM 5.24)** – In 2010, a new concrete box culvert, that included crossing re-alignment, was constructed at this location. Left bank slope instability at culvert inlet should be addressed.

**Valencia Creek #1/Soquel Drive (PM 6.20)** – 2007 Retrofit project included a new fish ladder, baffles and low flow channel installed within culvert. Erosion at the rail line has made it very difficult to maintain this ladder; a project to repair the erosion and trail has been included in the Regional Conservation Investment Strategy (RCIS).

**Green Valley Creek #6/Green Valley Road (PM 0.69)** – The 2013 culvert replacement was completed but the substrate installed in the culvert flushed out during locally intense storms in 2016. Passage conditions are now poor at the culvert inlet.

**Arana Gulch #1/Capitola Road (PM 0.01 to Soquel Ave)** – During an emergency project, this culvert was lined and rock weirs were installed downstream for passage. Due to the urgent nature of this project, the sediment material was not sized or jetted into the rock weirs correctly and this site may need additional work to provide passage. As the first stream crossing on Arana Gulch, this site is important to monitor and fix. There is one additional culvert crossing within the tidally influenced area in the north Harbor.

## Photos of High Priority Locations



Left: West Liddell #1 at Bonny Doon Road 2002  
Right: West Liddell #1 at Bonny Doon Road 2005



Left: West Liddell #3 at Bonny Doon Road 2005  
Right: West Liddell #3 at Bonny Doon Road 2005

## Photos of High Priority Locations



Left: Casserly at Mount Madonna Road 2002  
Right: Casserly at Mount Madonna Road 2019



Left: Casserly at Gaffey Road 2004  
Right: Casserly at Gaffey Road, concrete weirs downstream 2004

## **MODERATE-PRIORITY LOCATIONS – 8 SITES**

Crossings are listed generally from north to south.

**Lompico Creek #1/Lompico Road (PM 0.40)** – provides passage for adults; existing retrofits could be improved for improved juvenile passage.

**Bean Creek #1/Mount Hermon Road (PM 1.80)** – meets criteria for adults, but not for juveniles. This crossing is downstream of a stream section that dries out frequently, so there is limited benefit to improve juvenile passage.

**Tie Gulch/Branciforte Drive (PM 0.38)** - habitat assessment is recommended.

**Granite Creek/Granite Road (PM 0.55)** – barrier downstream at private driveway; need additional information on passage and habitat quality upstream.

**Bates Creek/Main Street (PM 0.60)** – This site was evaluated by the Integrated Watershed Restoration Program (IWRP) which determined that full replacement to improve passage for juveniles and stream wood would be a poor investment due to the constricted channel downstream of road crossing. When replaced, this culvert should provide improved fish passage.

**Hester Creek/Soquel-San Jose Road (PM 5.30)** – The County completed a Design Option Study in 2008 for the Integrated Watershed Restoration Program (IWRP). The study showed that the cost of a retrofit or replacement project is not warranted based on habitat quality upstream. Full replacement would benefit large wood movement.

**Browns Creek #1/Browns Valley Road (PM 3.30)** – Retrofit project was ready to go to construction, but County was unable to obtain landowner access agreements (2008). Steelhead adults regularly observed upstream of this crossing. Replace with arch culvert or bridge when needed.

**Browns Creek #2/Browns Valley Road (PM 3.40)** – Retrofit project was ready to go to construction, but County was unable to obtain landowner access agreements (2008). Replace with arch culvert or bridge when needed.

## **LOW-PRIORITY LOCATIONS – 27 SITES**

Crossings are listed generally from north to south.

**Branciforte Creek #1/Branciforte Drive (PM 1.03)** – downstream weir is located on private property; not a County project. Project is in development through Integrated Watershed Restoration Program (IWRP).

**Shingle Mill Creek/Redwood Drive (PM at Oak Drive)** – dropped in ranking due to barrier upstream and poor habitat quality.

**Hare Creek/Hare Way (PM 0.20)** – low priority due to poor habitat quality upstream; culvert pipe replaced without passage improvements (2013).

**Unnamed tributary to Jamison Creek/Jamison Creek Road (PM 2.49)** – low priority due to poor habitat quality.

**Two Bar Creek #3/Two Bar Road (PM 2.70)** – although “RED” there is very limited habitat upstream.

**Logan Creek/Kings Creek Road (PM 2.65)** – arch culvert installed in 1999 was assessed as “RED” due to steep grade of channel. There is limited upstream habitat (<1000’).

**Love Creek #2/Love Creek Road (PM 0.90)** - meets most passage criteria for adults and juveniles.

**Love Creek #3/Love Creek Road (PM 1.30)** - meets most of passage criteria for adults and juveniles.

**Bean Creek #2/Bean Creek Road (PM 3.00)** – meets passage criteria for adults and 2+ juveniles; most for other juveniles.

**Lockhart Gulch/Lockhart Gulch Road (PM 0.60)** – provides adequate passage opportunities; however culvert is sized for only a two-year storm flow.

**Zayante Creek/Zayante Road (PM 2.12)** - this culvert crossing was not included in the 2004 report because it was considered to be upstream of the extent of anadromy. 2013 fieldwork documented that culvert is most likely upstream of extent of anadromy but definitely upstream extent of resident steelhead. Limited salmonid habitat upstream and currently functioning as a Pacific Giant Salamander nursery area.

**Redwood Creek #1/Glen Canyon Road (PM 1.02)** – low priority due to small stream size and habitat quality.

**Redwood Creek #2/Redwood Drive (PM 0.10)** - low priority due to small stream size and habitat quality.

**Redwood Creek #3/Redwood Drive (PM 0.20)** - low priority due to small stream size and habitat quality.

**Mountain View Creek #1/Vine Hill Road (PM 0.00)** – low priority due to poor habitat quality.

**Mountain View Creek #2/Mountain View Road (PM 0.76)** – low priority due to poor habitat quality.



### **LOW-PRIORITY LOCATIONS (continued)**

**Crystal Creek #3/Happy Valley Road (PM 0.18)** – low priority due to small stream size and limited reach of upstream habitat.

**Arana Gulch #1/Capitola Road (PM 0.01 to Soquel Ave)** – meets passage criteria for adults and 2+ juveniles. Arana Gulch watershed is currently considered low priority for fish restoration funding.

**Arana Gulch #4/Paul Sweet Road (PM 1.30)** – Arana Gulch watershed is currently considered low priority for fish restoration. There are other barriers upstream of this road crossing and limited poor quality habitat.

**Moore's Gulch/Soquel-San Jose Road (PM 3.10)** – Existing fish ladder at culvert appears to function well and provides access to Moore's Gulch. Currently, a natural logjam approximately 1,000 upstream of culvert is limiting steelhead access in Moore's Gulch, but stream supports resident steelhead. Site would be an expensive culvert replacement or bridge, but could benefit movement of stream wood into Soquel Creek.

**Laurel Creek #1/Morrell Road (PM 0.85)** – located upstream of two complete passage barriers.

**Laurel Creek #2/Soquel-San Jose Road (PM 11.00)** – located upstream of two complete passage barriers.

**Rider Creek/Rider Road (PM 0.29)** – Low priority due to poor habitat quality.

**Gamecock Canyon/Hazel Dell (PM 3.30)** – provides nearly 100% passage for adults and 2+ juveniles.

**Green Valley Creek #1/Casserly Road (PM 0.20)** - need to consider policy to preserve genetic integrity of native resident coastal rainbow trout located in upper reaches of Green Valley Creek before replacing this crossing.

**Green Valley Creek #2, #4/ (PM 4.03, 1.98)** – need to consider policy to preserve genetic integrity of native resident coastal rainbow trout located in upper reaches of Green Valley Creek before replacing this crossing.

**Green Valley Creek #3/Green Valley Road (PM 3.25)** – Due to poor condition, Public Works plans to replace this stream crossing within the next few years. The project will provide fish passage by removing all concrete structures from the stream channel.

**LOW-PRIORITY LOCATIONS: PASSAGE = GREEN – 12 SITES**

**Two Bar Creek #1/Two Bar Road (PM 0.63) – properly-sized ( >250-year discharge).**

**Love Creek #1/Love Creek Road (PM 0.40) – under-sized (<10-year discharge).**

**Mountain Charlie Gulch/East Zayante Road (PM 5.21) – under-sized ( $\approx$  10-year discharge).**

**Branciforte Creek #2/Branciforte Drive (PM 5.00) – adequately-sized ( $\approx$ 60-year discharge).**

**Crystal Creek #1/Branciforte Drive (PM 2.02) – extremely under-sized (< 5-year discharge).**

**Crystal Creek #2/Happy Valley Road (PM 0.09) – under-sized ( $\approx$ 5-year discharge).**

**Clear Creek/Clear Creek Road (PM 0.05) – under-sized ( $\approx$ 7-year discharge).**

**Blackburn Gulch/Vine Hill Road (PM 0.31) – properly-sized (>250-year discharge).**

**Arana Gulch #2/Soquel Avenue (PM 0.1 to Capitola Road) – under-sized ( $\approx$ 11-year discharge).**

**Arana Gulch #3/Brookwood Drive (PM 0.20) – extremely under-sized ( $\approx$ 3-year discharge).**

**Green Valley Creek #5/Green Valley Road (PM 0.89) – properly-sized ( $\approx$ 130-year discharge).**

**Casserly Creek #1/Casserly Road (PM 1.50) – under-sized ( $\approx$ 14-year discharge).**

**CULVERTS IN POOR CONDITION  
THAT MAY NEED TO BE REPLACED WITHIN 10-20 YEARS**

**West Liddell Creek #1/Bonny Doon Road (PM 0.69)**

**West Liddell Creek #3/Boony Doon Road (PM 0.94)**

**Lompico #1**

**Redwood Creek #3**

**Mountain View Creek #2**

**Casserly Creek #2, Mount Madonna Road PM 1.00**

## **COMPLETED PROJECTS – 11 SITES**

Crossings are listed generally from north to south.

2004 priority is noted with a brief description of the passage project and implementation date.

**Quesaria Creek/Swanton Road (PM 1.32)** – High Priority. Replaced with an arch culvert (2003).

**West Liddell Creek #2/Bonny Doon Road (PM 0.74)** – High Priority. Replaced with an arch culvert (2003).

**Gold Gulch/Brookside Way (PM = at Willow Way)** – High Priority. Replaced with an arch culvert (2008-09).

**Two Bar Creek #2/Two Bar Road (PM 0.86)** – Moderate Priority. Retrofit: culvert outlet improved and roughness elements added in culvert (2004).

**Valencia Creek #1/Soquel Drive (PM 6.20)** – High Priority. Retrofit: new fish ladder, baffles and low flow channel installed within culvert (2007).

**Valencia Creek #2/Valencia Road (PM 2.29)** – High Priority. Retrofit: downstream rock weirs and new baffles installed within the culvert (2006).

**Corralitos Creek/Eureka Canyon Road (PM 2.95)** – High Priority. Retrofit: downstream concrete weir and riffle ramp; new baffles installed within the culvert (2008)

**Shingle Mill Gulch #1/Eureka Canyon Road (PM 4.80)** – High Priority. Retrofit: culvert outlet modified and downstream rock weirs installed (2008; repaired 2011)

**Shingle Mill Gulch #2/Eureka Canyon Road (PM 5.24)** – Moderate Priority. Replaced with concrete box culvert and crossing re-aligned (2010).

**Green Valley Creek #6/Green Valley Road (PM 0.69)** – Moderate Priority. Replaced with new culvert (2013).

**Tanaka Creek (listed as unnamed tributary to Zayante Creek)/East Zayante Road (PM 6.22)** – Low Priority. Replaced with new culvert following storm damage (2014).

## Project Location Details from 2004 County of Santa Cruz Stream Crossing Inventory and Fish Passage Evaluation

Site ID #SC-006: West Liddell Creek #1/Bonny Doon Road, Liddell Creek, Coastal



**Site ID #SC-007: West Liddell Creek #2/Bonny Doon Road, Liddell Ck, Coastal Final Ranking: High-Priority**

**Location:** Road ID# 3202; County Map Sheet #5N. USGS Quad: Davenport. T11S, R3W. Lat/Long: 37° 00' 27.04" 122° 10' 28.22" Milepost = 0.71

**Culvert Type:** SSP, pipe-arch. **Corrugations:** None. **Dimensions:** ≈4' height x 6' width. **Length:** ≈ 45'

**Slope:** Not available **Modifications:** None. **Rustline Height:** N/A **Average Active Channel Width:** 8.9'

**Fill Estimate:** less than 250 cubic yards. **Overall Condition:** Extremely poor – invert rusted through. There was evidence of the culvert overtopping – with excess flow running down (and scouring) the road's inboard ditch.

**Sizing:** Appears extremely undersized; HW/D = 1 on a storm flow with less than a 10-year recurrence interval. Bonny Doon Road is probably overtopped on less than a 20-year storm flow.

**Barrier Status: GRAY:** although this culvert was not surveyed to evaluate passage, a visual inspection of the site estimated that the current pipe-arch probably allows for partial upstream passage of adult steelhead and to a lesser degree partial passage of 2+ juveniles. However, the severe blockage at West Liddell Creek #1 would prevent most steelhead from ever reaching this crossing.

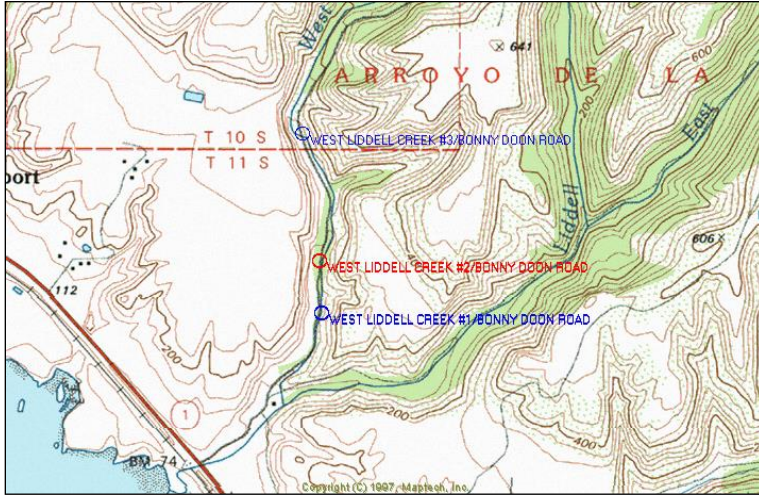
**Additional Crossings:** Downstream – (≈500') to Site ID#SC-006 and (≈3,500') to crossing under Highway 1 and the railroad tracks – crossing consists of an oval concrete culvert under the highway and a tunnel through bedrock under the railroad and the outlet is on Boony Doon beach. Upstream – (≈2,200') to Site ID#SC-008.

**Habitat: Quantity** = approximately 1.78 miles of potential fish-bearing habitat upstream of Site ID #SC-007.

**Quality** = Rated as "fair" for the ranking matrix, however no formal habitat typing or fisheries surveys have been conducted (Nelson/CDFG, Alley, pers. comm.). Crossing was visually examined in October of 2001 during the For-Sake-of-Salmon fish passage workshop. The habitat was described as "good" with a dense riparian canopy of conifer and hardwoods. There was continuous flow in the channel at time of survey and several juvenile salmonids less than 3" in length and between 3"-6" were observed both upstream and downstream of the crossing.

**Preferred Treatment:** Because the current culvert is undersized and in very poor condition, a full replacement with a properly sized open-bottom arch or a bridge is the best solution to restore unimpeded fish migration. The new crossing should also be better aligned with the upstream channel. County of Santa

Cruz should consider treating West Liddell Creek sites #1 and #2 concurrently to open up a significant reach of habitat.

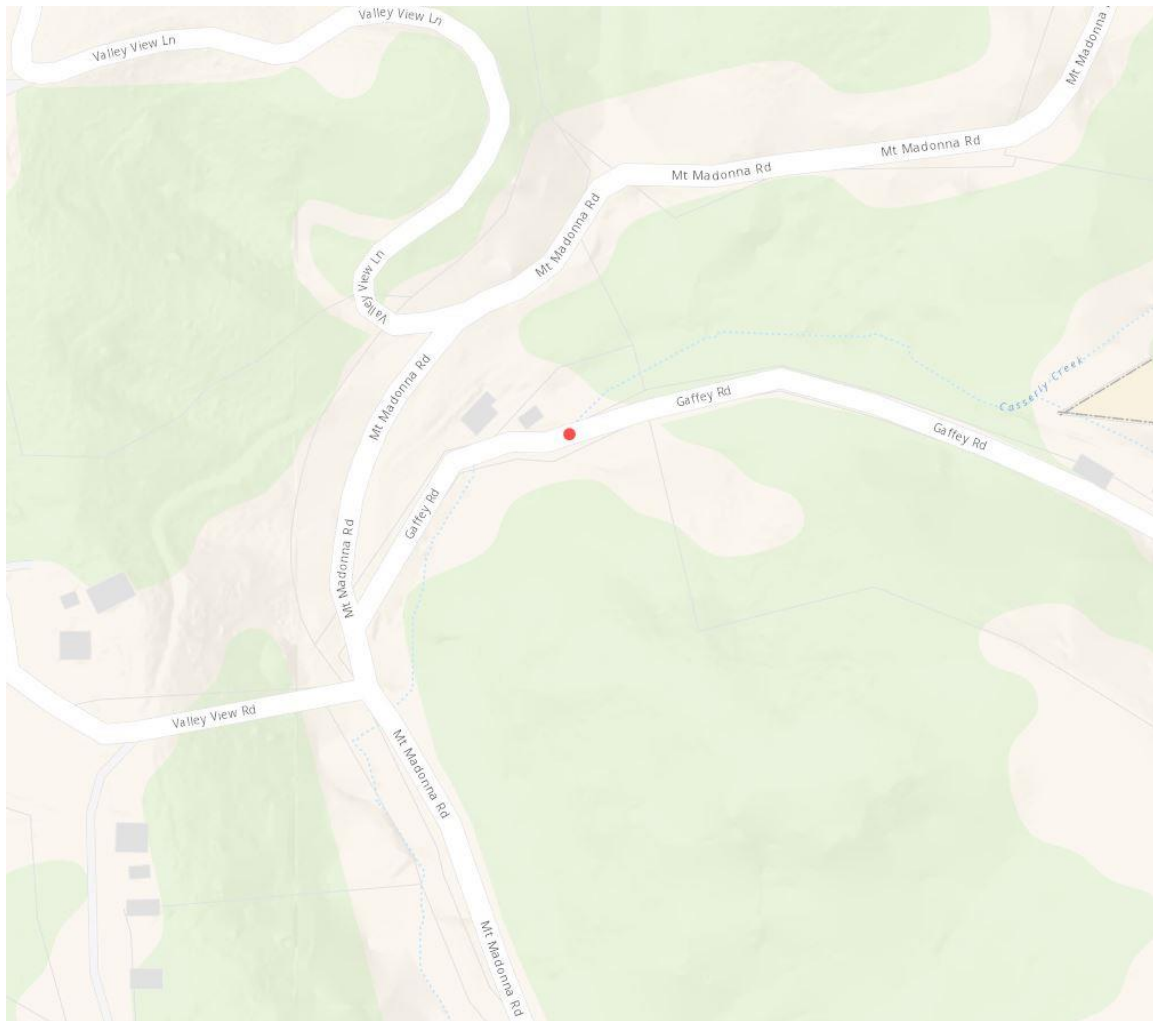


**Site ID #SC-083:** Casserly Creek #3/Gaffey Road; Pajaro River Watershed  
**Final Ranking: High Priority**

**Location:** Milepost = 0.18

**Culvert Type:** CMP **Dimensions:** diameters = 70”  
**Barrier Status:** UNKNOWN

This culvert crossing was not included in the 2004 report. Juvenile steelhead sampling confirm that the culvert at Mount Madonna Road is a significant barrier. This culvert should be replaced in conjunction with the Casserly Creek at Mount Madonna Road culvert, since this culvert is only about 600’ upstream. The County of Santa Cruz previously constructed a box to improve passage at this location.





Outlet: Casserly Creek at Gaffey Road PM 0.80;  
Inside culvert, showing poor condition.



## Locations added since 2004 Report

**Site ID #SC-081:** Zayante Creek #1/Upper East Zayante Road; San Lorenzo River  
**Final Ranking:** Low Priority

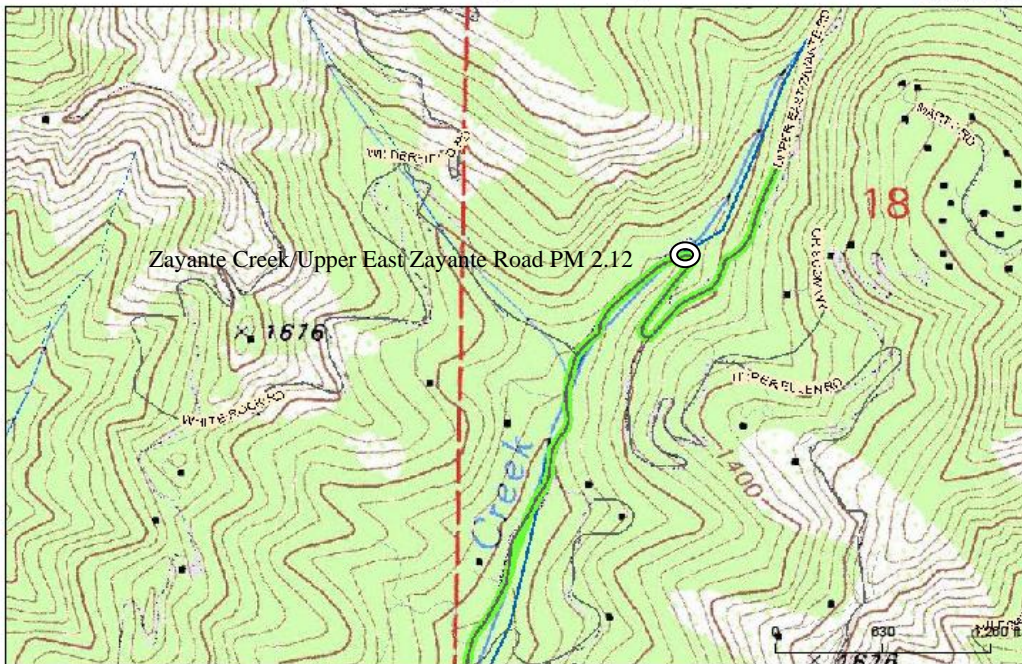
**Location:** Milepost = 2.12

**Culvert Type:** two circular, SSP **Dimensions:** diameters = 5.15' and 3.7'  
**Barrier Status:** RED based on height of jump into culvert (about 6 feet).

This culvert crossing was not included in the 2004 report because it was considered to be upstream of the extent of anadromy. Fieldwork from 2013 confirm that this culvert is upstream of several significant partial passage barriers and is most likely upstream of the extent of anadromy. However, *O. mykiss*, most likely resident steelhead, were found immediately downstream of this culvert indicating that the culvert could be considered the most upstream extent of anadromy on Zayante Creek. Upstream of the culvert, Zayante Creek has low flows and three additional passage barriers within 300'. The area upstream of the culvert is functioning as a Pacific Giant Salamander nursery area. USFWS supports maintaining this culvert barrier to protect this nursery area (J. Martin, personal communication).

Zayante Creek at Upper East Zayante Road

November 3, 2014





**Site ID #SC-081:** Zayante Creek #1/Upper East Zayante Road; San Lorenzo River



Left: Culvert Outlet; Right: Culvert Inlet

**Site ID #SC-082:** Green Valley Creek #7/Green Valley Road; Pajaro River

**Final Ranking:** Low Priority

**Location:** Milepost = 0.38

**Culvert Type:** Double wall plastic **Dimensions:** 9' diameter

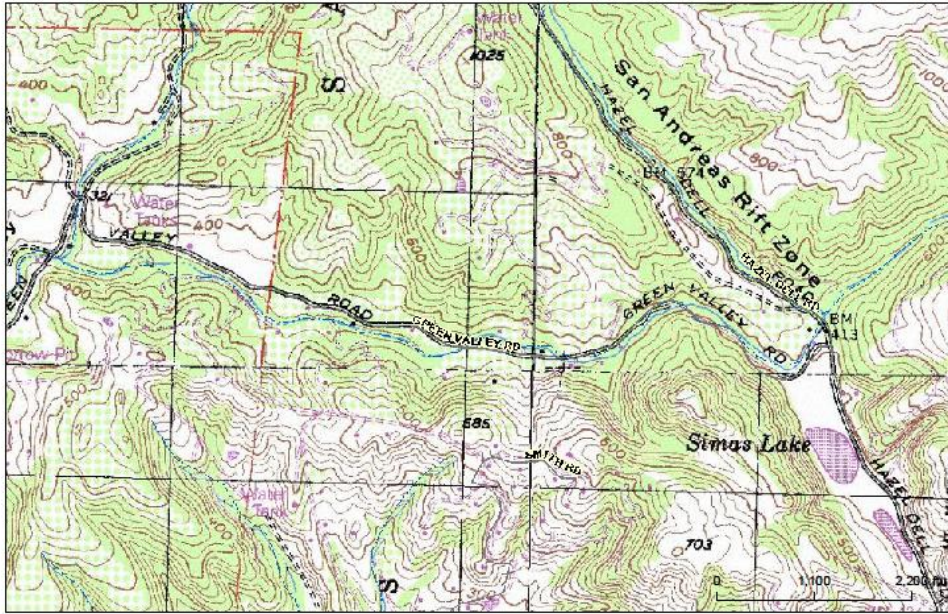
**Barrier Status:** **GRAY** natural stream substrate through culvert, low gradient culvert, but rip rap at culvert inlet creates 1' jump.

This culvert crossing was not included in the 2004 report because the previous culvert was storm damaged and there was no stream crossing during the 2002 fieldwork. In 2003, a new 9' culvert was installed. Natural substrate is found throughout the culvert. Rip rap at the inlet creates a 1' jump. On June 4, 2015, young-of-the-year *O. mykiss*, most likely resident steelhead, were observed upstream and downstream of the culvert. A larger resident fish was observed in a pool downstream of the culvert. A project to modify the rip rap could be implemented but should

consider upstream passage conditions in Green Valley Creek.

Green Valley PM 0.38

June 3, 2015



**Site ID #SC-082: Green Valley Creek #7/Green Valley Road; Pajaro River**



Culvert Outlet



Culvert Inlet