Marin County Department of Public Works West Marin Culvert Maintenance for 2011
White House Pool: Old Bear Valley and Silver Hills Creeks

Maintenance work by the DPW Roads crew involves sediment removal from roadside ditches, culverts and in streams in west Marin. Implementation of these projects improve water quality and salmonid habitat by minimizing sediment delivery to creeks and bays, removing barriers to fish passage, restoring channel function and drainage patterns and improving public safety on our roads prior to winter storms.

Our 2011 work at White House Pool is complete as of October 6, 2011.

Michael Fawcett was the lead biologist onsite to monitor for California red-legged frogs and to relocate steelhead trout prior to- and during construction. The site was dewatered prior to work and all sediment removal work was completed in one day. An additional biological monitor was onsite to watch for species and to verify that erosion control measures were in place. Biological monitors completed pre-construction surveys of the sites and staging areas for California red-legged frogs, western pond turtles, Point Reyes mountain beaver, badgers, and rails. None were noted. Monitors remained on-site during the entire construction period.

Of note this year were the 16 steelhead trout found in the work area during preconstruction surveys. A major sediment removal effort took place in 2010, opening up the culvert under Sir Francis Drake for fish passage. In 2010 only 1 steelhead was found in the same project area.

Michael's report is attached at the end of this summary as a separate report.

Mile Marker 25.00 Sir Francis Drake

The site was dewatered at Silver Hills Creek along Bear Valley Road upstream of the intersection with Sir Francis Drake Blvd.

Michael Fawcett moving fish ahead of dewatering (above)

Sandbagging to dewater the creek prior to sediment removal work (above)

Sediment removal occurred upstream and downstream of the box culvert at Sir Francis Drake Blvd. The sediment inside the culvert was not removed.

Upstream culvert at Sir Francis Drake Blvd. before (above) and after (below)

Downstream culvert at Sir Francis Drake Blvd before (above) and after (below)

Maintenance Clearing of Culverts and Drainages in Old Bear Valley and Silver Hills Creeks

Steelhead trout (above) and California giant salamander released after construction (below)

Maintenance Clearing of Culverts and Drainages in Old Bear Valley and Silver Hills Creeks

Maintenance Cleaning of 47 Culverts and Drainages in West Marin County
Mile Marker: 25.00 Sir Francis Drake Blvd
Project Plan

County of Marin
July 2008

FAWCETT ENVIRONMENTAL CONSULTING
P.O. BOX 385
BODEGA, CA 94922
TELEPHONE: 707/876-3450
FAX: 707/876-3451
mhfawcett@aol.com

Ms. Chris Choo
Marin County Department of Public Works
P.O. Box 4186
San Rafael, California 94913

26 December 2011

Subject: West County Culverts: Report on fish and frog protection during 2011 sediment removal

Dear Chris:

This letter provides the results of pre-construction surveys, construction monitoring, and salvage and relocation of native aquatic species conducted from 4-12 October 2011 at two of Marin DPW's sediment removal projects: White House Pool, Mile Marker 25.00 Sir Francis Drake Boulevard (double box culvert beneath Sir Francis Drake Boulevard and drainage ditches alongside Sir Francis Drake Boulevard and Bear Valley Road); and Lewis Gulch, Mile Marker 0.18 Olema-Bolinas Road (ditch along Bolinas Road, culvert under road, stream channel downstream from culvert).

Summary

Pre-construction surveys specifically targeting California red-legged frog, *Rana draytonii* (CRF), were conducted on the 4th and 5th of October at White House Pool prior to construction on the 6th. At Lewis Gulch, CRF surveys were conducted on the 8th and 9th of October, for construction which began on the 10th and was completed on the 12th. No CRF were found at either location during the pre-construction surveys, and none were found during construction monitoring and fish salvage and relocation. Sixteen juvenile Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) were captured and relocated during dewatering at White House Pool, and two steelhead were captured and relocated during dewatering at Lewis Gulch.

Methods

The CRF surveys were visual encounter surveys, conducted according to the methodology prescribed in the 2005 U.S. Fish and Wildlife Service (USFWS) *Revised Guidance on site assessments and field surveys for the California red-legged frog* (USFWS 2010). During the surveys I walked or waded slowly and quietly along the

stream channel, ditches, banks and adjacent riparian areas throughout the work area, searching for frogs. I looked under logs, pieces of bark or other debris, vines or branches hanging into the channel or ditches, and inside culverts, and used binoculars (Eagle Optics Ranger 8 x 42) to scan areas ahead of me, to aid in spotting frogs before they become alarmed and seek shelter. At night I used binoculars and a flashlight (Mag-Light, 4 D cells) to look into burrow entrances and inside culverts.

During dewatering and sediment removal, fish screens were installed at my direction upstream and downstream of the work areas, to prevent fish from entering. At White House Pool, the upstream screen was installed across Silver Hills Creek just above where the stream enters the ditch along the west side of Bear Valley Road; the downstream screen was placed just a few feet downstream of the double-box culvert crossing Sir Francis Drake Boulevard. At Lewis Gulch the upstream screen was installed across the stream channel/ditch alongside Olema Bolinas Road north of the intersection with the short bypass road to Shoreline Highway. The downstream screen was installed across the channel just upstream of where Lewis Gulch enters the dense saltmarsh vegetation of Bolinas Lagoon. Much of the vegetation overhanging and trailing into the ditches (Himalayan blackberry, *Rubus discolor*; California blackberry, *Rubus ursinus*, and other vines), and some of the emergent vegetation was removed by hand before or during dewatering, to facilitate seining to capture fish and other aquatic animals. All of the aquatic habitat in the work zones was seined and dip-netted before and during dewatering, and before any sediment removal began. I was assisted by DPW staff throughout the fish salvage and relocation, and construction monitoring.

A short (4-ft. long by 4-ft. deep, 3/16th-in. delta mesh) seine and long-handled dip nets were used to capture fish and other aquatic animals at both sites. Captured fish and salamander larvae were held temporarily in insulated, 3- gallon bait buckets with lids, holding clear stream water at ambient temperature, continuously aerated by portable aerators attached to the lids. Steelhead were held in separate containers from other species.

Results

California red-legged frog

The frog surveys were conducted in late afternoon/early evening and after dark over two calendar days preceding the anticipated construction date (Table 1). At the White House Pool site, the work zone consisted of the culvert beneath Sir Francis Drake Boulevard and the first 20 ft. or so of the channel downstream, plus the ditch alongside SFDB up to the culvert under Bear Valley Road, and the ditch along Bear Valley Road upstream to where Silver Hills Creek emerges from private property and drops into the ditch along Bear Valley Road (Figure 1). I surveyed the channels, banks, and nearby riparian areas

throughout the work zone, as well as the channel downstream from SFBD to the confluence with Lagunitas Creek. Although two CRF were captured and relocated from the work area during the maintenance work conducted in 2010, none were observed in 2011 during either the pre-construction surveys or the dewatering/ fish salvage/ sediment removal work in 2011.

At Lewis Gulch, pre-construction surveys were conducted throughout the work zone and adjacent areas, but no CRF were found during the pre-construction surveys or the construction period (Table 1, Figure 2).

Central California Coast steelhead and other aquatic species

At White House Pool the dewatering and sediment removal was completed in one day (Table 1). A total of 16 steelhead were captured by seine. All but one of the steelhead were presumed to be young-of-the-year (YOY), or age 0+, based on their size, estimated as approximately 75-105 mm. in length (fish were not measured); one was likely a yearling, or age 1+ (~125 mm.). Fifteen of the steelhead and the other native fish species (threespine stickleback, *Gasterosteus aculeatus*; and prickly sculpin, *Cottus asper*) were relocated to Bear Valley Creek just upstream from the Visitor Center, where there was good stream flow, instream shelter, and a full riparian canopy. The last steelhead captured was relocated to a plunge pool at the downstream end of the culvert beneath Bear Valley Road), as the pool had by then re-filled with clear stream water and the sediment removal work was finished. Additionally, 23 California giant salamander larvae (*Dicamptodon ensatus*), all of which were captured in the channel alongside Bear Valley Road, were released into the same reach from which they had been captured, after the bypass pump was shut off and the reach was re-hydrated (the only work that was done in that reach was to excavate the 3 sediment retention ponds which had been created in 2010; the remainder of the reach was undisturbed except for the temporary dewatering). Field notes are attached at the end of this report.

At Lewis Gulch the dewatering and sediment removal took 3 days to complete, because of rain-shortened work on the first day, and a shortage of suitable space for dumping wet mud on the second day. Most of the fish, including 2 steelhead yearlings, were captured on the first day (Table 1). The steelhead and most of the rest of the catch on the first day (threespine stickleback, prickly sculpin, giant salamander larvae) were relocated to Pine Gulch, near the town of Bolinas. The remainder of the native species were relocated either to a pool downstream from the work zone or to pools upstream from the work zone.

There were no steelhead injuries or mortalities observed, and no unanticipated effects of project construction. I am confident that I captured all of the steelhead in the work zones, and nearly all of the other fish large enough to be effectively handled and relocated.

Please give me a call if I can provide any additional information. It was a pleasure working with you.

Sincerely,

Michael H. Fawcett, Ph.D.

Attachments:
Tables and Figures
Field Notes

Tables and Figures

Table 1. Time Line of Activities

Site	Coordinates (UTM) NAD 27	Date	Activity	Time	Weather	Temperature (°C.) Wind (mph)	Results
White House Pool (SFDB culvert)	Zone 10 S 516229mE 4212496mN	10/4/2011	Pre-const. survey	1830-2020 hrs. (dark at1947)	Moon waxing gibbous, but sky overcast—steady rain	Air: 15.5-15.0 Water: 14.8 Wind: calm	1 juv. BF* (destroyed)
White House Pool		10/5/2011	Pre-const. survey	1645-2030 hrs.	Scattered clouds, clearing; rained ~ 2 in. day before	Air: 15.5-15.0 Water: 14.4 Wind: 2-5 SW	Observed several SH in ditch and pool below culvert
White House Pool		10/6/2011	Dewatering, fish salvage, monitoring	1015-1445	Overcast, partial clearing, cool	Not measured	15 SH 0+ 1 SH 1+ 5 PSC 4 TSS 23 CGS 2 MOS
Lewis Gulch (culvert)	Zone 10 S 526513mE 4198331N	10/8/2011	Pre-const. survey	1720-2020 (dark at 1939)	Overcast, fog	Air: 15.2-13.9 Water: 16.8 Wind: 0-5 SE	Heard PCF calling; observed TSS & PSC

Lewis gulch		10/9/2011	Pre-const. survey	1900-2015	Fog	Air: 15.2 Water: 14.7 Wind: 0-5 SW	Observed PSC and TSS; no frogs seen or heard
Lewis Gulch		10/10/2011	Dewatering, fish salvage, monitoring	0800-1430	Overcast, light rain (stopped work early)	Temp. and wind not measured	2 SH 1+ ~180 TSS ~ 125 PSC 1CGS
Lewis Gulch		10/11/2011	Dewatering, fish salvage, monitoring	0740-1450 (stopped work early—shortage of space for dumping mud)	Overcast, fog	Air: 17.0 Water: 14.6 Wind: calm	15 TSS 17 PSC
Lewis Gulch		10/12/2011	Dewatering, fish salvage, monitoring	0745-1145	Partial clearing	Not measured	1 TSS

*BF-bullfrog (*Lithobates catesbeianus*, non-native species; destroyed)
SH-steelhead (*Oncorhynchus mykiss*)—age 0+ (young-of-the-year) or 1+ (yearling)
TSS-threespine stickleback (*Gasterosteus aculeatus*)
MOS-western mosquitofish (*Gambusia affinis*, non-native species; destroyed)
PSC-prickly sculpin (*Cottus asper*)
CGS-California giant salamander (*Dicamptodon ensatus*, larvae)
PCF-Pacific chorus frog (*Pseudacris regilla*)

Figure 1. 2011 White House Pool work area

Figure 2. Lewis Gulch work area

4 Oct 11 White House Pool
48-hr pre-const. frog survey

Begin time 1830 Sunset 1850 hrs
Dark 1947 hrs
cloud cover
air Temp 17.2 @ 1830
Wind speed & direction calm at 1830
Moon phase half moon
Precipitation
Water Temperature
Visibility
humidity
Weather conditions
species observations
photos

Tide phase, Inverness:
high ~ 5:35 PM 5.2 feet
low 0115 hrs, -0.1 ft

Arr White House pool parking lot
1830 hrs.
- went along creek up to double culverts then along ditch & riparian up to where Silver Hills Creek comes off the Hill, then back. Then did whole thing again after dark, ~ 1915 - 2015 hrs in steady rain
2015 hrs stream temp 14.8
Air temp 15.5, raining
no wind.
- Saw 1 bullfrog juvenile (destroyed it)
- depart 2020

5 Oct 11 White House Pool
2nd CRF pre-constr.
survey -
Arrived 1645
sky partially clear, sun
out, but more rain coming
- rained >2" yesterday &
last night, but the Silver
Hills Cr. ditch looks
unchanged - flow ~ 0.5 cfs
water temp 14.4
Air temp 15.5
wind 2-5 mph SW
10 2 Steelhead in Pool
next to utility pole
in ditch
- no frogs seen, back to
car 1750 hrs
- sky clearing, Temperature dropping
a little - 15.0 @ 1800
light south breeze
Night survey 1930-2020 hrs
- Sunset ~ 1850 - totally
dark along creek by 1930
- No frogs seen - observed
~ 2 steelhead in ditch

in pool beside utility pole
along SFD, and 2-3 in
Pool below culvert outlet
at SFD/Hwy 1
- depart 2030 hrs

6 Oct 11, White House Pool dewatering - MK & CC

1015 - started catching fish from Pool near Utility Pole (4), then pool at outlet of culvert under Hwy 1

Steelhead YOY IIII IIII III
Steelhead 1+ I (16)
Dicamptodon Larvae 23,
Prickly Sculpin IIII
Stickleback IIII
Mosquitofish II
~~Dicamptodon (2)~~

1215 - crew moving to work on double box. Culvert - steelhead all taken (2 trips) to creek upstream from Bear Valley

Visitor center - cofferdam installed at base of Silver Hills creek then dug out some three sediment basins
Rescued 175 Dicamptodon larvae on uphill side of Hwy 1

1350 - nearly done with work at double box culvert
Total 23 Dicamptodon in bucket - should be able to release them in nearly the same area they came from - There is still flow in the ditch along SFD & it will be back up pretty quickly after they stop

6 Oct 11 (Cont) While Home pumping up at the coffer dam

- Finished with excavator @ 1400 then shut off pump & removed screen & cofferdam - 2 of 3 sediment basins were full within 20 minutes, so we sprinkled salamanders/newts back to the areas they came from (all were caught along Bear Valley Road)
- Of the 16 steelhead, 9 were caught in the plunge pool at the SFD/BVR intersection, 6 were caught in the 10 x 2' pool adjacent to the new utility pole, and one was rescued in shallow sandy channel downstream of double box culvert - (no other animals seen)

All the fish except the last one were taken up to BV creek above the visitor center.

The last one I released into the pool near the SFD/BVR intersection - it was still 16" deep, had cover, was relatively clear, & will be flowing again by nightfall

- Depart 1445

8 Oct 11 ~~Lewis Gulch~~
Lewis Gulch
arr. 1720 hrs walked down gulch to end of project
Air temp 15.2 wind 0-5 mph SW
water temp 16.8
flow ~ 0.3 cfs
Alder/willow riparian, understory Himalayan blackberry, Calif. blackbear wild cucumber, Equisedum
- deepest pool ~ 18', upstream side of bridge (box culvert)
no frogs seen or heard, except chorus frogs heard.
finish day survey 1750 hrs, go get dinner, come back at dark

Night survey 1940 - 2015
air temp 13.9, wind 2.0 SE

- no frogs seen or heard
visibility excellent, water clear
- saw stickleback & prickly sculpin
depart 2020

9 Oct 11 Lewis Gulch
- pre-construction frog survey #2
Arrive ~~0700~~ 1900 hrs, waited until fully dark

1930 hrs:
Air temp 15.2 SW
wind average 1.8, max 5.5
water temp 14.7 ↑
- saw ~12 sculpin (either Gasper or aleuticus or both) also TSS
- No frogs
- finished 2015, departed

10 Oct 11 Lewis Gulch
dewater MF & LIZL
0800 -
- light rain -
quickly dewatered & defished around culvert & downstream

2 SH H, 2+ ? (2)

Stickleback 25, 10, 10, 15, 10, 15, 10, 5, 10, 10, 5, 5, 3
Sculpin 8, 5, 10, 10, 5, 5, 10, 12, 5, 5, 10, 10, 5, 3, 4

release site
Pine Gulch
then worked on defishing ditch upstream of culvert

10 Oct 11 (cont)

Plan to clean ditch up to culv across from intersection — we cleared debris, seined and dip netted, but not much in the ditch: ~ 35 TSS
10 Pr. Sculp..

Lunch 11:45

12:15 - 2:30 worked on upstream ditch, but rain got worse, so they stopped at 2:30

additional 1 gl ant sal

10 TSS
8 Sculpin
depart 245

11 Oct 11 Lewis Gulch MF & CC
- finish dewater day
arrive 0740
air temp 17.0 water 14.6
no wind

- putting dock in coffer dam at upstream end, then pumping w/ 4" pump at culvert, 2" pump at upper end
overcast, fog

- pumping both sides of culvert & upstream at end of project

0930 - captured 1 Dicamptodon moved upstream
& 4 prickly sculpin
10 TSS (downstream of upper cofferdam

11 Oct 11

sculpin ||||/||| |||

TSS |||

1330 - now excavating only downstream of the Culvert - had to stop excavating the other side because they are running out of space to stockpile material

Departed 1450

12 Oct 11 Lewis Gulch. MF & Lewis

Arr 0745, nothing happening - looked for frogs & fish around culvert then up channel on north side of road - started out blasting mud out from under Bridge N 0815 | also resumed cleaning ditch upstream w/ small excavator

1130 - finished both jobs & rescued one TSS. nothing else sighted

Depart 1145

Marin County Department of Public Works West Marin Culvert Maintenance for 2011
Lewis Gulch

Maintenance work by the DPW Roads crew involves sediment removal from roadside ditches, culverts and in streams in west Marin. Implementation of these projects improve water quality and salmonid habitat by minimizing sediment delivery to creeks and bays, removing barriers to fish passage, restoring channel function and drainage patterns and improving public safety on our roads prior to winter storms.

Our 2011 work at Lewis Gulch work is complete as of October 11, 2011.

Michael Fawcett was the lead biologist onsite to monitor for California red-legged frogs and to relocate steelhead trout prior to- and during construction. The site was dewatered prior to work and work was completed in reaches to minimize impacts. An additional biological monitor was onsite to watch for species and to verify that erosion control measures were in place. Biological monitors completed pre-construction surveys of the sites and staging areas for California red-legged frogs, western pond turtles, Point Reyes mountain beaver, badgers, and rails. None were noted. Monitors remained on-site during the entire construction period.

Michael's report is attached at the end of this summary as a separate report.

Maintenance Clearing of Culverts and Drainages in Lewis Gulch

Lewis Gulch: Mile Marker 0.18 Olema-Bolinas Road

The site was dewatered at the upstream end of the project reach near Shoreline Highway and again at the culvert crossing at Olema-Bolinas Road. Work was completed in reaches first along the ditch, followed by the culvert, and then in the channel to minimize impacts during the work period.

Before and after of the ditch along Olema-Bolinas Road (looking east towards Shoreline Hwy)

Before and after of the channel looking upstream (above)

Dewatering at the upstream section prior to sediment removal along the roadside ditch (above)

Maintenance Clearing of Culverts and Drainages in Lewis Gulch

After photo of the channel (above) and of sculpin found in the reach during construction (below)

Maintenance Clearing of Culverts and Drainages in Lewis Gulch

Maintenance Cleaning of Sediment from 47 Culverts and Drainages in West Marin County
Mile Marker: 0.18 Olema - Bolinas Rd
Project Plan

County of Marin
July 2008

FAWCETT ENVIRONMENTAL CONSULTING
P.O. BOX 385
BODEGA, CA 94922
TELEPHONE: 707/876-3450
FAX: 707/876-3451
mhfawcett@aol.com

Ms. Chris Choo
Marin County Department of Public Works
P.O. Box 4186
San Rafael, California 94913

26 December 2011

Subject: West County Culverts: Report on fish and frog protection during 2011 sediment removal

Dear Chris:

This letter provides the results of pre-construction surveys, construction monitoring, and salvage and relocation of native aquatic species conducted from 4-12 October 2011 at two of Marin DPW's sediment removal projects: White House Pool, Mile Marker 25.00 Sir Francis Drake Boulevard (double box culvert beneath Sir Francis Drake Boulevard and drainage ditches alongside Sir Francis Drake Boulevard and Bear Valley Road); and Lewis Gulch, Mile Marker 0.18 Olema-Bolinas Road (ditch along Bolinas Road, culvert under road, stream channel downstream from culvert).

Summary

Pre-construction surveys specifically targeting California red-legged frog, *Rana draytonii* (CRF), were conducted on the 4th and 5th of October at White House Pool prior to construction on the 6th. At Lewis Gulch, CRF surveys were conducted on the 8th and 9th of October, for construction which began on the 10th and was completed on the 12th. No CRF were found at either location during the pre-construction surveys, and none were found during construction monitoring and fish salvage and relocation. Sixteen juvenile Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) were captured and relocated during dewatering at White House Pool, and two steelhead were captured and relocated during dewatering at Lewis Gulch.

Methods

The CRF surveys were visual encounter surveys, conducted according to the methodology prescribed in the 2005 U.S. Fish and Wildlife Service (USFWS) *Revised Guidance on site assessments and field surveys for the California red-legged frog* (USFWS 2010). During the surveys I walked or waded slowly and quietly along the

stream channel, ditches, banks and adjacent riparian areas throughout the work area, searching for frogs. I looked under logs, pieces of bark or other debris, vines or branches hanging into the channel or ditches, and inside culverts, and used binoculars (Eagle Optics Ranger 8 x 42) to scan areas ahead of me, to aid in spotting frogs before they become alarmed and seek shelter. At night I used binoculars and a flashlight (Mag-Light, 4 D cells) to look into burrow entrances and inside culverts.

During dewatering and sediment removal, fish screens were installed at my direction upstream and downstream of the work areas, to prevent fish from entering. At White House Pool, the upstream screen was installed across Silver Hills Creek just above where the stream enters the ditch along the west side of Bear Valley Road; the downstream screen was placed just a few feet downstream of the double-box culvert crossing Sir Francis Drake Boulevard. At Lewis Gulch the upstream screen was installed across the stream channel/ditch alongside Olema Bolinas Road north of the intersection with the short bypass road to Shoreline Highway. The downstream screen was installed across the channel just upstream of where Lewis Gulch enters the dense saltmarsh vegetation of Bolinas Lagoon. Much of the vegetation overhanging and trailing into the ditches (Himalayan blackberry, *Rubus discolor*; California blackberry, *Rubus ursinus*, and other vines), and some of the emergent vegetation was removed by hand before or during dewatering, to facilitate seining to capture fish and other aquatic animals. All of the aquatic habitat in the work zones was seined and dip-netted before and during dewatering, and before any sediment removal began. I was assisted by DPW staff throughout the fish salvage and relocation, and construction monitoring.

A short (4-ft. long by 4-ft. deep, 3/16th-in. delta mesh) seine and long-handled dip nets were used to capture fish and other aquatic animals at both sites. Captured fish and salamander larvae were held temporarily in insulated, 3- gallon bait buckets with lids, holding clear stream water at ambient temperature, continuously aerated by portable aerators attached to the lids. Steelhead were held in separate containers from other species.

Results

California red-legged frog

The frog surveys were conducted in late afternoon/early evening and after dark over two calendar days preceding the anticipated construction date (Table 1). At the White House Pool site, the work zone consisted of the culvert beneath Sir Francis Drake Boulevard and the first 20 ft. or so of the channel downstream, plus the ditch alongside SFDB up to the culvert under Bear Valley Road, and the ditch along Bear Valley Road upstream to where Silver Hills Creek emerges from private property and drops into the ditch along Bear Valley Road (Figure 1). I surveyed the channels, banks, and nearby riparian areas

throughout the work zone, as well as the channel downstream from SFBD to the confluence with Lagunitas Creek. Although two CRF were captured and relocated from the work area during the maintenance work conducted in 2010, none were observed in 2011 during either the pre-construction surveys or the dewatering/ fish salvage/ sediment removal work in 2011.

At Lewis Gulch, pre-construction surveys were conducted throughout the work zone and adjacent areas, but no CRF were found during the pre-construction surveys or the construction period (Table 1, Figure 2).

Central California Coast steelhead and other aquatic species

At White House Pool the dewatering and sediment removal was completed in one day (Table 1). A total of 16 steelhead were captured by seine. All but one of the steelhead were presumed to be young-of-the-year (YOY), or age 0+, based on their size, estimated as approximately 75-105 mm. in length (fish were not measured); one was likely a yearling, or age 1+ (~125 mm.). Fifteen of the steelhead and the other native fish species (threespine stickleback, *Gasterosteus aculeatus*; and prickly sculpin, *Cottus asper*) were relocated to Bear Valley Creek just upstream from the Visitor Center, where there was good stream flow, instream shelter, and a full riparian canopy. The last steelhead captured was relocated to a plunge pool at the downstream end of the culvert beneath Bear Valley Road), as the pool had by then re-filled with clear stream water and the sediment removal work was finished. Additionally, 23 California giant salamander larvae (*Dicamptodon ensatus*), all of which were captured in the channel alongside Bear Valley Road, were released into the same reach from which they had been captured, after the bypass pump was shut off and the reach was re-hydrated (the only work that was done in that reach was to excavate the 3 sediment retention ponds which had been created in 2010; the remainder of the reach was undisturbed except for the temporary dewatering). Field notes are attached at the end of this report.

At Lewis Gulch the dewatering and sediment removal took 3 days to complete, because of rain-shortened work on the first day, and a shortage of suitable space for dumping wet mud on the second day. Most of the fish, including 2 steelhead yearlings, were captured on the first day (Table 1). The steelhead and most of the rest of the catch on the first day (threespine stickleback, prickly sculpin, giant salamander larvae) were relocated to Pine Gulch, near the town of Bolinas. The remainder of the native species were relocated either to a pool downstream from the work zone or to pools upstream from the work zone.

There were no steelhead injuries or mortalities observed, and no unanticipated effects of project construction. I am confident that I captured all of the steelhead in the work zones, and nearly all of the other fish large enough to be effectively handled and relocated.

Please give me a call if I can provide any additional information. It was a pleasure working with you.

Sincerely,

Michael H. Fawcett, Ph.D.

Attachments:
Tables and Figures
Field Notes

Tables and Figures

Table 1. Time Line of Activities

Site	Coordinates (UTM) NAD 27	Date	Activity	Time	Weather	Temperature (°C.) Wind (mph)	Results
White House Pool (SFDB culvert)	Zone 10 S 516229mE 4212496mN	10/4/2011	Pre-const. survey	1830-2020 hrs. (dark at1947)	Moon waxing gibbous, but sky overcast—steady rain	Air: 15.5-15.0 Water: 14.8 Wind: calm	1 juv. BF* (destroyed)
White House Pool		10/5/2011	Pre-const. survey	1645-2030 hrs.	Scattered clouds, clearing; rained ~ 2 in. day before	Air: 15.5-15.0 Water: 14.4 Wind: 2-5 SW	Observed several SH in ditch and pool below culvert
White House Pool		10/6/2011	Dewatering, fish salvage, monitoring	1015-1445	Overcast, partial clearing, cool	Not measured	15 SH 0+ 1 SH 1+ 5 PSC 4 TSS 23 CGS 2 MOS
Lewis Gulch (culvert)	Zone 10 S 526513mE 4198331N	10/8/2011	Pre-const. survey	1720-2020 (dark at 1939)	Overcast, fog	Air: 15.2-13.9 Water: 16.8 Wind: 0-5 SE	Heard PCF calling; observed TSS & PSC

Lewis gulch		10/9/2011	Pre-const. survey	1900-2015	Fog	Air: 15.2 Water: 14.7 Wind: 0-5 SW	Observed PSC and TSS; no frogs seen or heard
Lewis Gulch		10/10/2011	Dewatering, fish salvage, monitoring	0800-1430	Overcast, light rain (stopped work early)	Temp. and wind not measured	2 SH 1+ ~180 TSS ~ 125 PSC 1CGS
Lewis Gulch		10/11/2011	Dewatering, fish salvage, monitoring	0740-1450 (stopped work early—shortage of space for dumping mud)	Overcast, fog	Air: 17.0 Water: 14.6 Wind: calm	15 TSS 17 PSC
Lewis Gulch		10/12/2011	Dewatering, fish salvage, monitoring	0745-1145	Partial clearing	Not measured	1 TSS

*BF-bullfrog (*Lithobates catesbeianus*, non-native species; destroyed)
SH-steelhead (*Oncorhynchus mykiss*)—age 0+ (young-of-the-year) or 1+ (yearling)
TSS-threespine stickleback (*Gasterosteus aculeatus*)
MOS-western mosquitofish (*Gambusia affinis*, non-native species; destroyed)
PSC-prickly sculpin (*Cottus asper*)
CGS-California giant salamander (*Dicamptodon ensatus*, larvae)
PCF-Pacific chorus frog (*Pseudacris regilla*)

Figure 1. 2011 White House Pool work area

Figure 2. Lewis Gulch work area

4 Oct. 11 White House Pool
48-hr pre-const. frog survey

Begin time 1830 Sunset 1850 hrs
Dark 1947 hrs
cloud cover
air Temp 17.2 @ 1830
Wind speed + direction calm at 1830
Moon phase half moon
Precipitation
Water Temperature
Visibility
humidity
Weather conditions
species observations
photos

Tide phase, Inverness:
high ~ 5:35 PM 5.2 feet
low 0115 hrs, -0.1 ft

arr White House pool parking lot
1830 hrs.
- went along creek up to double culverts then along ditch & riparian up to where Silver Hills Creek comes off the Hill, then back. Then did whole thing again after dark, ~ 1915 - 2015 hrs in steady rain
2015 hrs stream temp 14.8
Air temp 15.5, raining
no wind.
- Saw 1 bullfrog juvenile (destroyed it)
- depart 2020

5 Oct 11 White House Pool
2nd CRF pre-constr.
survey -
Arrived 1645
sky partially clear, sun
out, but more rain coming
- rained >2" yesterday &
last night, but the Silver
Hills Cr. ditch looks
unchanged - flow ~ 0.5 cfs
water temp 14.4
Air temp 15.5
wind 2-5 mph SW
10 of 2, Steelhead in Pool
next to utility pole
in ditch
- no frogs seen, back to
car 1750 hrs
- sky clearing, Temperature dropping
a little - 15.0 @ 1800
light south breeze
Night survey 1930-2020 hrs
- Sunset ~ 1850 - totally
dark along creek by 1930
- No frogs seen - observed
~ 2 steelhead in ditch

in pool beside utility pole
along SFD, and 2-3 in
Pool below culvert outlet
at SFD/Hwy 1
- depart 2030 hrs

6 Oct 11 White House Pool
dewatering - MK & CC

1015 - started catching fish
from pool near utility pole
(4), then pool at outlet
of culvert under Hwy 1

Steelhead YOY 𝍸 𝍸 𝍸
Steelhead 1+ 1 (16)
Dicamptodon larvae 23,
Prickly sculpin 𝍸
stickleback 1111
Mosquitofish 11
~~Dicamptodon (L)~~

1215 - crew moving to
work on double box
culvert - steelhead all
taken (2 trips) to creek
upstream from bear valley

Visitor center
- cofferdam installed at
base of Silver hills creek
then dug out some three
sediment basins
rescued ~25 Dicamptodon
larvae on uphill side
of Hwy 1

1350 - nearly done with
work at double box culvert
Total 23 Dicamptodon in
bucket - should be able to
release them in nearly
the same area they came
from - There is still flow
in the ditch along SFD
& it will be back up pretty
quickly after they stop

6 Oct 11 (Cont) While Home
pumping up at the
cofferdam
- Finished with excavator ~1400
then shut off pump & removed
screen & cofferdam -
2 of 3 sediment basins were
full within 20 minutes,
so we sprinkled salamander
larvae back to the areas
they came from (all were
caught along Bear Valley
Road)
- Of the 16 steelhead, 9 were
caught in the plunge pool
at the SFD/BVR intersection,
6 were caught in the 10 x 2' pool
adjacent to the new utility
pole, and one was rescued
in shallow sandy channel
downstream of double box
culvert - (no other animals
seen)
All the fish except the
last one were taken up

to BV creek above the
visitor center.
The last one I released into
the pool was the SFD/BVR
intersection - it was still 16"
deep, has cover, was relatively
clear, & will be flowing again
by nightfall

- depart 1445

8 Oct 11 ~~Lewis Gulch~~
Lewis Gulch
arr. 1720 hrs walked down gulch to end of project
Air temp 15.2 wind 0-5 mph SW
Water temp 16.8
flow ~ 0.3 cfs
Alder/willow riparian, understory Himalayan blackberry, Calif blackberry wild cucumber, Equisetum
- deepest pool ~ 18" upstream side of bridge (box culvert)
no frogs seen or heard, except chorus frogs heard.
finish day survey 1750 hrs, go get dinner, come back at dark

Night survey 1940 - 2015
air temp 13.9, wind 2.0 SE
- no frogs seen or heard
visibility excellent, water clear
- saw stickleback & prickly sculpin
depart 2020

9 Oct 11 Lewis Gulch
- pre-construction frog survey #2
Arrive ~~0700~~ 1900 hrs, waited until fully dark

1930 hrs:
Air temp 15.2 SW
wind average 1.8, max 5.5
water temp 14.7 ↑
- saw ~12 sculpin (either Cuspers or aleuticus or both) also TSS
- No frogs
- finished 2015, departed

10 Oct 11 Lewis Gulch
dewater MF & LIZL
0800 -
- light rain -
quickly dewatered & defished around culvert & downstream

2 SH H, 2+ ? (2)

Stickleback 25, 10, 10, 15, 10, 15, 10, 5, 10, 10, 5, 5, 3
Sculpin 8, 5, 10, 10, 5, 5, 10, 12, 5, 5, 10, 10, 5, 3, 4

release site
Pine Gulch
then worked on defishing ditch upstream of culvert

10 Oct 11 (cont)

Plan to clear ditch up to area across from intersection — we cleared debris, seined and dip netted, but not much in the ditch: ~ 35 TSS
10 Pr. Sculp..

Lunch 11:45

12:5 - 2:30 worked on upstream ditch, but rain got worse, so they stopped at 2:30

additional 1 gl ant sal
10 TSS
8, Sculpin
depart 245

11 Oct 11 Lewis Gulch MF & CC
- finish dewater day
arrive 0740
air temp 17.0 water 14.6
no wind

- putting dock in coffer dam at upstream end, then pumping w/ 4" pump at culvert, 2" pump at upper end
overcast, fog

- pumping both sides of culvert & upstream at end of project

0930 - captured 1 Dicamptodon moved upstream
& 4 prickly sculpin
10 TSS (downstream of upper cofferdam

11 Oct 11

sculpin ~~||||~~ ~~||||~~ |||

TSS ~~||||~~

1330 - now excavating only downstream of the culvert - had to stop excavating the other side because they're running out of space to stockpile wet mud

departed 1450

12 Oct 11 Lewis Gulch

MF & Laurie

arr 0745, nothing happening - looked for frogs & fish around culvert, then up channel on north side of road - started out blasting mud out from under Bridge

~ 0815, also resumed cleaning ditch upstream w/ small excavator

1130 - finished both jobs & rescued one TSS, nothing else sighted

depart 1145

Marin County Department of Public Works West Marin Culvert Maintenance for 2011

Maintenance work by the DPW Roads crew involves sediment removal from roadside ditches, culverts and in streams in west Marin. Implementation of these projects improve water quality and salmonid habitat by minimizing sediment delivery to creeks and bays, removing barriers to fish passage, restoring channel function and drainage patterns and improving public safety on our roads prior to winter storms.

Our 2011 work is complete as of October 13, 2011.

All sites had a biological monitor onsite to watch for species and to verify that erosion control measures were in place. Biological monitors completed pre-construction surveys of the sites and staging areas for California red-legged frogs, western pond turtles, Point Reyes mountain beaver, badgers, and rails. None were noted. Monitors stayed on-site during the entire construction period at all sites.

Sites completed this year:

Near Bolinas:

- Olema-Bolinas Road at mile marker 0.01, 0.03, 0.06, 0.21, 1.47, 1.51, 1.56

Near Inverness:

- Bear Valley Road at mile markers 1.11 and 2.08
- Sir Francis Drake at mile markers 25.20, 25.44,28.23, 29.09

Before and after pictures of the sites are included in this report. Maps included at the end of the report are for reference and were submitted with our permit application and not maps developed for the work this year. Some maps show additional sites not completed in 2011.

Fish Hatchery Creek (25.86) was not completed this year because the Park Service removed sediment downstream of our site. The site across from the Abalone Inn (25.96) was not completed because the conditions at the site were too wet to allow for equipment access.

Mile Marker 1.11 Bear Valley Road

Sediment removal from upstream and downstream roadside ditch and culvert.

Before and after along upstream ditch at 1.11 Bear Valley Road (above)

Before and after along downstream culvert outfall at 1.11 Bear Valley Road (above)

Mile Marker 2.08 Bear Valley Road

Sediment removal from downstream roadside culvert.

Before and after at 2.08 Bear Valley Road downstream culvert clearing

Mile Markers 14.59-14.64 Fairfax-Bolinas Road (near the intersection with Hwy 1)

Before and after looking from mile marker 14.60 towards 14.59

Sediment control BMPs at culvert inlets 14.59 Fairfax Bolinas Road (left) and 14.60 Fairfax Bolinas Road (right).

Before and after at the downstream culvert at 14.60 Fairfax Bolinas Road

Before and after at 14.64 Fairfax Bolinas Road

Brush clearing under the cattle crossing at 14.64 Fairfax Bolinas Road

Mile Markers 0.01-0.06 Olema Bolinas Road

Roadside ditch clearing at the Bolinas Wye. Sediment removal occurred along both sides of the road.

Before and after looking from mile marker 0.03 towards 0.06

Before and after looking back towards Hwy 1

Mile Marker 0.21 Olema Bolinas Road

Sediment clearing upstream and downstream at a culvert crossing under the road.

Before and after at the downstream outlet of the culvert

Before and after of the culvert inlet

Mile Markers 1.47-1.56 Olema Bolinas Road

This site is located adjacent to Bolinas County Park in Bolinas near the school and Star Route Farms. Sediment removal was completed in ditches along both sides of the road and at culvert inlets and outlets.

Before and after looking east from mile marker 1.47

Before and after between 1.47 and 1.51 in the downstream culvert outlet (photos are from reverse perspectives)

Before and after looking west from 1.56

Before and after at 1.56 in the downstream culvert outlet

Mile Marker 25.20 Sir Francis Drake

Project site is between Bear Valley Road and the community of Inverness Park. Work at the downstream site only.

Erosion control in place after sediment removal.

Mile Marker 25.44 Sir Francis Drake

Sediment removal work at the downstream culvert outlet. Work improves drainage across Sir Francis Drake.

Before and after at site south of the town of Inverness Park

Mile Marker 25.86 Sir Francis Drake: Fish Hatchery Creek

Work not completed this year due to improved site conditions.

Mile Marker 25.96 Sir Francis Drake (across from the Abalone Inn)

Work not completed this year. Site too wet for access.

Mile Marker 28.23 Sir Francis Drake: Inverness Store

Sediment removal adjacent to the Inverness Store to improve drainage across Sir Francis Drake Blvd. in Inverness.

Before and after looking towards Tomales Bay

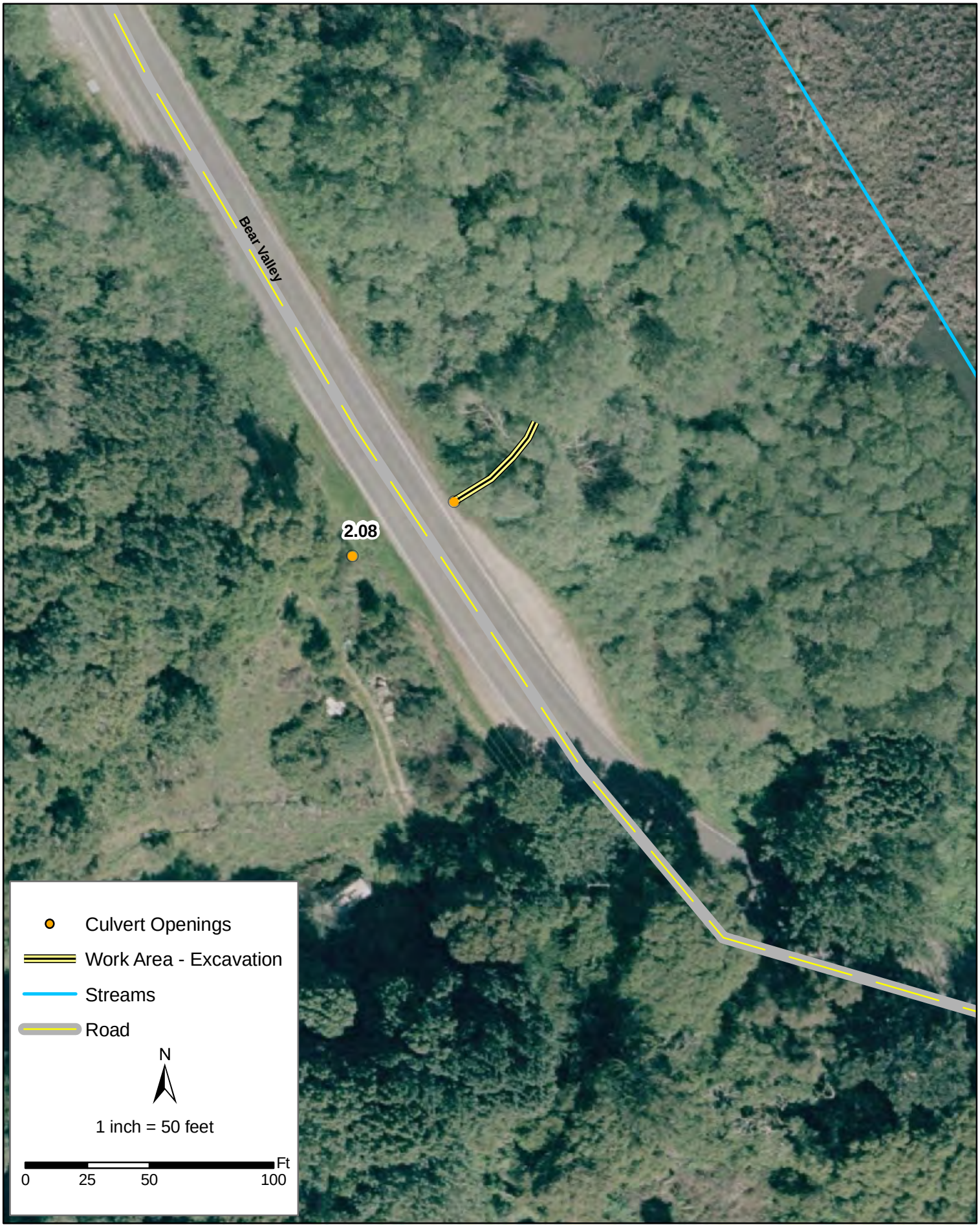
Mile Marker 29.09 Sir Francis Drake at Rannoch

Sediment removal at the downstream culvert outlet. No work at the upstream inlet.

Before and after looking at the roadside ditch along Sir Francis Drake

Maintenance Clearing of Sediment from 48 Culverts and Drainages in West Marin County
Mile Marker: 1.11 Bear Valley Rd
Project Plan

County of Marin
Feb 2009



Maintenance Cleaning of Sediment from 47 Culverts and Drainages in West Marin County
Mile Marker: 2.08 Bear Valley Road
Project Plan

County of Marin
March 2010

Maintenance Clearing of Sediment from 47 Culverts and Drainages in West Marin County
Mile Markers: 14.59, 14.60 & 14.64 Fairfax - Bolinas Rd
Project Plan

County of Marin
Feb 2009

Maintenance Cleaning of Sediment from 47 Culverts and Drainages in West Marin County
Mile Markers: 0.01, 0.03 & 0.06 Olema - Bolinas Rd
Project Plan

County of Marin
Feb 2010

Maintenance Cleaning of Sediment from 47 Culverts and Drainages in West Marin County
Mile Marker: 0.21 Olema - Bolinas Rd
Project Plan

County of Marin
July 2008

Maintenance Cleaning of Sediment from 47 Culverts and Drainages in West Marin County
Mile Markers: 1.47, 1.51, 1.56, & 1.61 Olema-Bolinas Rd
Project Plan

Flood Control and Water Conservation District
Marin County
March 2010

Maintenance Cleaning of Sediment from 47 Culverts and Drainages in West Marin County
Mile Marker: 25.20 Sir Francis Drake Blvd
Project Plan

County of Marin
Feb 2009

Maintenance Cleaning of Sediment from 48 Culverts and Drainages in West Marin County
Mile Marker: 25.44 Sir Francis Drake Blvd
Project Plan

County of Marin
Feb 2009

Maintenance Cleaning of Sediment from 47 Culverts and Drainages in West Marin County
Mile Marker: 25.86 Sir Francis Drake Blvd
Project Plan

County of Marin
Nov 2009

Maintenance Cleaning of Sediment from 48 Culverts and Drainages in West Marin County
Mile Marker: 25.96 Sir Francis Drake Blvd
Project Plan

County of Marin
Feb 2009

Maintenance Cleaning of Sediment from 48 Culverts and Drainages in West Marin County
Mile Marker: 28.23 Sir Francis Drake Blvd
Project Plan

County of Marin
May 2009

Maintenance Cleaning of Sediment from 47 Culverts and Drainages in West Marin County
Mile Marker: 29.09 Sir Francis Drake Blvd
Project Plan

County of Marin
July 2008