Date Posted: 7/13/2018

NORTH MARIN WATER DISTRICT

NORTH MARIN WATER DISTRICT
AGENDA - REGULAR MEETING
July 17, 2018 – 6:00 p.m.
District Headquarters
999 Rush Creek Place
Novato, California

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Est. Time	Item	Subject
6:00 p.m.		***CALL TO ORDER***
	1.	***APPROVE MINUTES FROM REGULAR MEETING,*** June 26, 2018
	2.	***GENERAL MANAGER'S REPORT***
	3.	***OPEN TIME: (Please observe a three-minute time limit)***

This section of the agenda is provided so that the public may express comments on any issues not listed on the agenda that are of interest to the public and within the jurisdiction of the North Marin Water District. When comments are made about matters not on the agenda, Board members can ask questions for clarification, respond to statements or questions from members of the public, refer a matter to staff, or direct staff to place a matter of business on a future agenda. The public may also express comments on agenda items at the time of Board consideration.

4. ***STAFF/DIRECTORS REPORTS***
5. ***MONTHLY PROGRESS REPORT w/Customer Service Questionnaire***

CONSENT CALENDAR

The General Manager has reviewed the following items. To his knowledge, there is no opposition to the action. The items can be acted on in one consolidated motion as recommended or may be removed from the Consent Calendar and separately considered at the request of any person.

	Consent - Approve Water Agreement	***Type***	***DU***	***EU***	
6.	***Consent –Approve:*** 405 Gage Lane, Novato-Maiero	SF	0	0	**Resolution**
7.	***Consent – Approve:*** Amend Consulting Engineering Services Agreement Kennedy/Jenks Consultants				

INFORMATION ITEMS

8. 2017 Novato Creek Steelhead Habitat Assessment Study – ICF International Consulting
9. New Water-Use Efficiency Legislation (SB606 & AB 1668) Update
10. NBWA Meeting – July 13, 2018
11. ***MISCELLANEOUS***
    Disbursements – Dated June 28, 2018
    Disbursements – Dated July 5, 2018
    Disbursements – Dated July 12, 2018
    Public Outreach Update – 4th of July Parade
    FY 18 4th Quarter Labor Cost Report

All times are approximate and for reference only.
The Board of Directors may consider an item at a different time than set forth herein.

(Continued)

Est. Time	Item	Subject
		Self Insured Worker's Comp – 4th Quarter Status Report Salinity Notice – 7/10/2018 News Articles: New Groundwater Woes, and Regulations, in California Wine Country Study of workforce housing planned by city, schools Wildfire-watch camera network being planned Employee contracts: $20M over three years Novato officials work to solve housing woes California sea-level report sounds alarm on erosion
	12.	***CLOSED SESSION:*** Conference with Labor Negotiators (Joe Wiley, Christopher Boucher, Drew McIntyre and Julie Blue) to Provide Direction, California Government Code Section 54957)
	13.	***CLOSED SESSION:*** Conference with Real Property Negotiators as allowed under Government Code 54956.8. Property: Recycled Water Agreement between North Marin Water District and Marin Country Club; District Negotiators: General Manager and Counsel; Negotiating Party: Marin Country Club; under Negotiation: Price and Terms
7:30 p.m.	14.	***ADJOURNMENT***

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DRAFT
NORTH MARIN WATER DISTRICT
MINUTES OF REGULAR MEETING
OF THE BOARD OF DIRECTORS
June 26, 2018

CALL TO ORDER

President Fraites called the regular meeting of the Board of Directors of North Marin Water District to order at 6:00 p.m. at the Dance Palace, 503 B Street, Point Reyes Station and the agenda was accepted as presented. Present were Directors Jack Baker, Rick Fraites, James Grossi, Michael Joly, and Stephen Petterle. Also present were General Manager Drew McIntyre, District Secretary Terrie Kehoe, Auditor-Controller Julie Blue and Chief Engineer Rocky Vogler.

District employees, Tony Arendell (Construction Supervisor), and Robert Clark (Maintenance/Operations Superintendent) were also in attendance. Richard and June Haydock of Oceana Marin and Leonard Charles (consultant) were in the audience.

MINUTES

On motion of Director Joly, seconded by Director Baker the Board approved the minutes from the June 19, 2018 meeting as presented by the following vote:

AYES: Director Baker, Fraites, Grossi, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: None

PUBLIC HEARING

Mr. Vogler presented information on the Mitigated Negative Declaration for the PRE Tank 4A Replacement Project. He reminded the Board that the project consists of the construction of a 125,000 gallon concrete water tank to replace the existing aging redwood 50,000 gallon PRE Tank 4B and the 25,000 gallon PRE 4A redwood tank destroyed in the 1995 Mt. Vision fire. Mr. Charles, the District's permitting consultant, provided a general overview of the project. At the end of the presentation there was a general discussion on the role of Marin County with respect to Local Coastal Program permit review and approval. Director Baker commented on his concern that tank landscaping should not block a clear view for oncoming traffic. Mr. Charles responded that landscape work will be done at the very end of the road near the tank and would not be an issue for traffic. There was a discussion about the possibility to abandon the existing tank access road

easement in lieu of a more favorable access alignment using the neighbor's driveway. Director Joly asked a question about the potential new easement and Mr. Vogler explained that the easement will run with the land not the owner.

President Fraites opened the public hearing at 6:14.

Hearing no further comment, President Fraites closed the public hearing at 6:14.

On the motion of Director Petterle and seconded by Director Baker the Board approved Resolution 18-15,:entitled: "Resolution Of The Board Of Directors Of The North Marin Water District Authorizing The Adoption Of A Mitigated Negative Declaration For The PRE Tank 4A Replacement Project, Making Findings Pursuant To The California Environmental Quality Act, and Directing the Filing Of A Notice Of Determination"; Approved the Mitigation Monitoring and Reporting Program, Authorized the General Manager to file a Notice of Determination with Marin County, by the following vote:

AYES: Director Baker, Fraites, Grossi, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: None

GENERAL MANAGER'S REPORT

During the General Manager's report, Mr. McIntyre announced he will be attending an Upper Russian River Water Manager's meeting on the evening of June 28 in Cloverdale. He also reminded the Board of the upcoming North Bay Watershed Association meeting at 9:30 a.m. on July 13th.

OPEN TIME

President Fraites asked if anyone in the audience wished to bring up an item not on the agenda and there was no response.

STAFF/DIRECTORS REPORTS

President Fraites asked if staff or Directors wished to bring up an item not on the agenda and the following items were discussed:

Mr. Vogler gave an update on the Ridge Road Pipeline Replacement Project. He stated that the new pipeline is 100% installed and that patch paving and a final micro-seal overlay will be performed in the following weeks. He also reported that during paving operation access will be restricted and both Novato Fire Protection District and Novato Police Department will be notified.

Director Joly asked if the the road will be open on the 4th of July and Mr. Vogler confirmed that it would.

Mr. Clark updated the Board on the continued need to use potable water to make up for the loss of recycled water delivery to the South Service Area by Las Gallinas Valley Sanitary District due to problems they are having with their system. In addition, Robert reported that staff is continuing to work on locating the cause of the recent high water loss in the Point Reyes system. He added that part of the loss has been attributed to an increase in water used by Marin County Fire Department for trainings at the Coast Guard Housing Property. Robert also advised the Board that the lab finished performing lead testing at the West Marin Elementary School and all samples had no lead.

PUBLIC HEARING

Ms. Blue presented the final review of the West Marin Water Rate Increase and the West Marin Water FY 2018/2019 Budget. She stated that a 4.5% water rate increase was proposed for the West Marin Water System, along with approval of the FY2018/19 $1.962M budget. Ms. Blue commented that, similar to Novato, the water rate increase will be applied to both the commodity rate and the bimonthly service charge and that the increase for the typical West Marin customer using 49,300 gallons per year is $2.50 per month or $30 per year. She reviewed planned Capital Expenditures and informed the Board that they are forecast to total $3.5M over the next five years. Ms. Blue added that, even with the proposed rate increase, West Marin water customers will maintain the least cost of service as compared to other Marin County coastal area water agencies.

President Fraites opened the public hearing at 6:27.

Hearing no further comment, President Fraites closed the public hearing at 6:27.

On the motion of Director Baker and seconded by Director Grossi the Board approved Resolution 18-16 entitled: "Resolution Of The Board Of Directors Of North Marin Water District Amending Regulation 54-Water Rates" pertaining to Water Rates and Charges to reflect an increase averaging 4.5% for the typical residential customer in the West Marin Water Service Area effective July 1 of 2018, Adopting FY19 West Marin Water system budget as presented, Authorized the General Manager to pay demands arising from execution of budgeted FY19 West Marin Water expenditure plan by the following vote:

AYES: Director Baker, Fraites, Grossi, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: None

PUBLIC HEARING

Ms. Blue provided a final review of the proposed Oceana Marin Sewer Service Charge Increase and Oceana Marin Sewer FY2018/2019 Budget. She stated that a 5% or $4 per month increase in the Oceana Marin sewer service charge was proposed to be collected on the property tax roll. She advised the Board that the budgeted expenditures for next year total $760K and that the 231 existing Oceana Marin customers are facing $3.1M of capital improvement projects over the next 20 years. Ms. Blue also noted that new connections are anticipated at one per year and operating expenses are projected to decrease 2% next year. Director Joly commented that the five year plan is transparent and includes future rate increases to address ongoing expenses.

President Fraites opened the public hearing at 6:29.

Hearing no further comment, President Fraites closed the public hearing at 6:29

On the motion of Director Baker and seconded by Director Joly , the Board approved Ordinance No. 36 entitled: "Ordinance Of The Board of Directors Of North Marin Water District Electing To Have Oceana Marin Sewer Charges Be Collected On The Tax Roll Of The County Of Marin, State Of California Commencing Fiscal Year 2018-2019", Approved Resolution No. 18- 17 entitled: "Revision Of North Marin Water District Regulation 109 Oceana Marin Sewer Service-Rates And Charges" amending Regulation 109, effective July 1, 2018, to increase the Oceana Marin Sewer Service Rate to $1,080 per dwelling unit per year; Adopted the FY19 Oceana Marin Sewer System Budget as proposed, Authorized the General Manger to pay demands arising from execution of the budget FY19 Oceana Marin expenditure plan by the following vote:

AYES: Director Baker, Fraites, Grossi, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: None

INFORMATION ITEMS

WEST MARIN CAPITAL IMPROVEMENTS PROJECTS – FY 17-18 PRELIMINARY YEAR-END PROGRESS REPORT

Mr. Vogler presented the West Marin Capital Improvements Projects – FY 17-18 Preliminary Year-End Progress Report. He stated that the District started with eight projects, five were added and two were deferred and one deleted. He advised the Board that overall progress in completing West Marin CIPs was close to 60% and that this low percentage rate was primarily attributed to the extended timeframe to complete environmental permitting for the PRE Tank 4A project. Director

Grossi commented that consulting firms are running into the same permitting issues with their projects and it slows progress down. Mr. Vogler added that Inverness Public Utilities District is also trying to get new tanks constructed and they are experiencing similar issues. He added that discussions have occurred recently with Supervisor Rodoni on how to streamline this process.

JANUARY 2017 STORM RECOVERY UPDATE

Mr. Clark updated the Board on the January 2017 Storm Recovery. He stated that the District submitted six claims to FEMA for reimbursement and three were approved for grant funds. Mr. Clark advised the Board that each application is for a specific pot of money allocated by FEMA, and this process is taking longer than expected. Director Baker questioned if the time it takes to process these FEMA applications is worth it. Mr. Vogler replied that this is worth the effort because we have a chance to receive $1.3 million dollars. Mr. McIntyre added that we have a small customer base in Ocean Marin and the District needs to be as proactive as possible to try and obtain grant funds to help pay for the projects.

MISCELLANEOUS

The Board received the following miscellaneous item: Disbursements-Dated June 22, 2018.

The Board also received the following news article: Decades-old project to raise Lake Mendocino dam gets a boost.

ADJOURNMENT

President Fraites adjourned the meeting at 6:47 p.m.

Submitted by

Theresa Kehoe
District Secretary

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NORTH MARIN WATER DISTRICT
MONTHLY PROGRESS REPORT FOR ***June 2018***
July 17, 2018

Item #5

1.

Novato Potable Water Prod - RR & STP Combined - in Million Gallons - FYTD

Month	*FY17/18*	*FY16/17*	*FY15/16*	*FY14/15*	*FY13/14*	*18 vs 17 %*
July	331	310	227	319	385	7%
August	303	300	235	301	360	1%
September	292	302	210	276	332	-3%
October	274	203	299	221	313	35%
November	164	144	145	173	229	14%
December	152	148	145	129	182	3%
January	131	121	130	137	168	8%
February	135	119	111	121	119	14%
March	130	146	149	195	154	-11%
April	152	136	152	217	177	11%
May	237	232	200	185	283	2%
June	292	277	285	226	308	5%
FYTD Total	2,593	2,437	2,288	2,501	3,010	6%

West Marin Potable Water Production - in Million Gallons - FY to Date

Month	*FY17/18*	*FY16/17*	*FY15/16*	*FY14/15*	*FY13/14*	*18 vs 17 %*
July	9.5	7.9	6.6	8.6	9.3	19%
August	8.8	7.4	7.0	8.5	9.3	19%
September	8.4	6.4	6.4	7.8	8.5	31%
October	7.9	5.2	6.5	5.4	8.0	52%
November	5.4	4.2	4.7	4.6	6.8	29%
December	5.1	3.7	3.9	4.7	6.4	37%
January	4.5	3.6	3.7	4.4	5.9	28%
February	4.5	3.3	3.8	3.9	4.4	35%
March	5.1	4.4	4.2	5.2	5.0	18%
April	5.1	4.8	4.9	4.7	5.0	6%
May	7.5	6.8	6.5	5.7	7.3	10%
June	9.0	8.1	7.0	6.2	8.3	12%
FYTD Total	80.9	65.8	65.2	69.7	84.1	23%

Stafford Treatment Plant Production - in Million Gallons - FY to Date

Month	*FY17/18*	*FY16/17*	*FY15/16*	*FY14/15*	*FY13/14*	*18 vs 17 %*
July	113	70	108	83	98	61%
August	81	90	79	61	83	-10%
September	123	97	38	26	56	27%
October	102	94	50	0	82	9%
November	54	64	58	8	5	-16%
December	0	0	0	0	2	-
January	0	0	0	0	0	-
February	0	0	0	24	0	-
March	0	39	0	95	0	-
April	5	61	49	104	0	-91%
May	85	122	111	82	75	-30%
June	83	120	108	91	78	-31%
FYTD Total	646	756	601	573	479	-15%

Recycled Water Production* - in Million Gallons - FY to Date

Month	*FY17/18*	*FY16/17*	*FY15/16*	*FY14/15*	*FY13/14*	*18 vs 17 %*
July	27.7	27.1	21.3	21.8	27.6	2%
August	26.1	26.0	26.2	26.0	26.2	0%
September	25.0	23.5	15.7	19.2	18.6	6%
October	19.1	8.3	15.8	9.4	15.8	130%
November	2.5	1.2	3.2	3.7	6.4	108%
December	0.8	0.4	0.8	1.6	1.6	122%
January	1.0	0.3	0.2	0.8	1.2	206%
February	3.3	0.0	0.6	0.8	1.8	-
March	1.7	0.5	0.3	9.5	1.2	214%
April	5.1	2.7	11.0	14.1	8.3	89%
May	17.0	22.9	20.2	21.1	23.0	-26%
June	25.8	30.9	24.0	19.9	24.6	-17%
FYTD Total*	155.0	143.8	139.3	147.8	156.2	8%

*Excludes potable water input to the RW system: FY 18=15.35MG; FY 17=1.4MG; FY 16=7.4MG; FY 15=6.9MG; FY 14=9.6MG

2. Stafford Lake Data

	June Average	June 2017	June 2018
Rainfall this month	0.20 Inches	0.14 Inches	0 Inches
Rainfall this FY to date	26.86 Inches	43.17 Inches	20.55 Inches
Lake elevation*	190.2 Feet	191.6 Feet	187.3 Feet
Lake storage**	997 MG	1084 MG	818 MG

* Spillway elevation is 196.0 feet

** Lake storage less 390 MG = quantity available for delivery

Temperature (in degrees)

	Minimum	Maximum	Average
June 2017 (Novato)	52	116	70
June 2018 (Novato)	51	104	69

3. Number of Services

June 30	Novato Water			Recycled Water			West Marin Water			Oceana Marin Swr		
	FY18	FY17	Incr %	FY18	FY17	Incr %	FY18	FY17	Incr %	FY18	FY17	Incr %
Total meters installed	20,760	20,777	-0.1%	70	50	40.0%	791	787	0.5%	-	-	-
Total meters active	20,543	20,544	0.0%	66	47	40.4%	783	780	0.4%	-	-	-
Active dwelling units	24,018	24,003	0.1%	0	0	-	832	829	0.4%	232	230	0.9%

4. Oceana Marin Monthly Status Report (June)

Description	June 2017	June 2018
Effluent Flow Volume (MG)	0.443	0.489
Irrigation Field Discharge (MG)	1.148	0
Treatment Pond Freeboard (ft)	7.4	6.2
Storage Pond Freeboard (ft)	6.8	7.5

5. Developer Projects Status Report (June)

Job No.	Project	% Complete	% This month
1.2784.00	Novato Village (801 State Access)	85	30
1.2800.00	Novato Theatre	99	1
1.2815.00	86 Hamilton Dr. FS	95	10
1.2812.00	Chase Bank FS & Hydrant	95	5

District Projects Status Report - Const. Dept. (June)

Job No.	Project	% Complete	% This month
1.6221.21	San Mateo Tank	100	5
1.7161.00	Ridge Rd. Pipe Replacement	90	40

Employee Hours to Date, FY 17/18

As of Pay Period Ending June 30, 2018
Percent of Fiscal Year Passed = 100%

Developer Projects	Actual	Budget	% YTD Budget		District Projects	Actual	Budget	% YTD Budget
Construction	1030	1,400	74%		Construction	5,439	4,920	111%
Engineering	706	1,414	50%		Engineering	2,939	4,000	73%

6. Safety/Liability

	Industrial Injury with Lost Time				Liability Claims Paid	
	Lost Days	OH Cost of Lost Days ($)	No. of Emp. Involved	No. of Incidents	Incurred (FYTD)	Paid (FYTD) ($)
FY 18 through June	54	$26,420	3	2	5	$3,930
FY 17 through June	129	$63,584	2	2	5	$4,147

Days without a lost time accident through June 30, 2018 **247 Days**

7. Energy Cost

		June			*Fiscal Year-to-Date thru June*		
FYE		*kWh*	*¢/kWh*	*Cost/Day*	*kWh*	*¢/kWh*	*Cost/Day*
2018	Stafford TP	80,554	19.7¢	$530	701,085	19.6¢	$376
	Pumping	150,187	20.5¢	$1,028	1,424,591	20.9¢	$816
	Other*	44,046	27.7¢	$420	495,498	24.9¢	$338
		274,787	21.4¢	$1,978	2,621,174	21.3¢	$1,531
2017	Stafford TP	78,259	19.2¢	$500	679,266	19.1¢	$355
	Pumping	149,442	20.8¢	$1,005	1,218,239	20.4¢	$682
	Other*	44,289	28.1¢	$415	495,351	24.3¢	$330
		271,990	21.5¢	$1,920	2,392,856	20.9¢	$1,367
2016	Stafford TP	69,127	18.6¢	$429	624,919	18.5¢	$316
	Pumping	139,454	20.3¢	$944	1,151,101	18.7¢	$590
	Other*	40,953	26.9¢	$368	467,246	23.2¢	$298
		249,533	20.9¢	$1,741	2,243,266	19.6¢	$1,204

*Other includes West Marin Facilities

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8. Water Conservation Update

	Month of June 2018	Fiscal Year to Date	Program Total to Date
High Efficiency Toilet (HET) Rebates	14	147	3882
Retrofit Certificates Filed	20	249	6070
Cash for Grass Rebates Paid Out	3	18	903
Washing Machine Rebates	4	24	6781
Water Smart Home Survey	31	301	3206

9. Utility Performance Metric

SERVICE DISRUPTIONS (No. of Customers Impacted)	**June 2018**	**June 2017**	**Fiscal Year to Date 2018**	**Fiscal Year to Date 2017**
PLANNED				
Duration Between 0.5 and 4 hours	22	6	313	248
Duration Between 4 and 12 hours		144	101	147
Duration Greater than 12 hours				
UNPLANNED				
Duration Between 0.5 and 4 hours	11	6	93	77
Duration Between 4 and 12 hours		10	92	27
Duration Greater than 12 hours			1	2
SERVICE LINES REPLACED				
Polybutylene	14	12	114	113
Copper (Replaced or Repaired)			15	17

NORTH MARIN WATER DISTRICT

Summary of Complaints & Service Orders June 2018

7/9/2018

Type	Jun-18	Jun-17	Action Taken June 2018
Consumers' System Problems			
Service Line Leaks	11	20	Notified Consumer
Meter Leak Consumer's Side	5	1	Notified Consumer
House Plumbing	1	0	Notified Consumer
Noisy Plumbing	0	0	Notified Consumer
House Valve / Meter Off	11	8	Notified Consumer
Nothing Found	13	6	Notified Consumer
Low Pressure	1	0	Notified Consumer
High Pressure	5	0	Notified Consumer
Total	**47**	**35**	
Service Repair Reports			
Meter Replacement	4	0	Notified Consumer
Meter Box Alignment	4	0	Notified Consumer
Box and Lids	1	1	Notified Consumer
Water Off/On Due To Repairs	17	5	Notified Consumer
Misc. Field Investigation	4	2	Notified Consumer
Total	**30**	**8**	
Leak NMWD Facilities			
Main-Leak	2	0	Notified Consumer
Service- Leak	9	8	Repaired
Services-Nothing Found	0	5	Notified Consumer
Fire Hydrant-Leak	0	1	Repaired
Fire Hydrants-Damaged	1	0	Repaired
Washer Leaks	9	6	Repaired
Total	**21**	**21**	
High Bill Complaints			
Consumer Leaks	4	3	Notified Consumer
Meter Misread	2	3	Notified Consumer
Nothing Found	15	9	Notified Consumer
Excessive Irrigation	1	0	Notified Consumer
Total	**22**	**15**	
Low Bill Complaints			
Stuck Meter	1	0	~
Total	**1**	**0**	

NORTH MARIN WATER DISTRICT

Summary of Complaints & Service Orders June 2018

7/9/2018

Type	Jun-18	Jun-17	Action Taken June 2018
Water Quality Complaints			
Taste and Odor	1	1	***Customer reported chlorine odor. (Sequoia Glen Ln)*** Chlorine was normal for NMWD supply. Customer was notified of results.
Color	2	1	***Customer reported brown water. (Marion Ave)*** Metals not detected in lab samples and has not reoccured. Customer was notified of results. ***Customer reported yellow water. (Glenhill Ct)*** Water was normal for NMWD supply. Customer was notified of results.
Other	1	3	***Customer reported grungy clothes after wash. (Lynwood Dr)*** Results for NMWD supply was normal. Customer was notified of results.
Total	**4**	**5**	
TOTAL FOR MONTH:	**125**	**84**	**49%**

Fiscal YTD Summary				**Change Primarily Due To**
Consumer's System Problems	397	372	7%	Increase In Meter Leak Consumer's side
Service Repair Report	177	121	46%	Increase In Misc. Field Investigation
Leak NMWD Facility	219	192	14%	Increase In Washer Leaks
High Bill Complaints	510	619	-18%	Decrease In Nothing Found
Low Bills	3	3	0%	~
Water Quality Complaints	38	55	-31%	Decrease In Taste and Odor
Total	**1,344**	**1,362**	**-1%**	

"In House" Generated and Completed Work Orders		
Check Meter: possible consumer/District leak, high bill, flooded, need read, etc.	210	209
Change Meter: leaks, hard to read	4	2
Possible Stuck Meter	1	1
Repair Meter: registers, shut offs	0	0
Replace Boxes/Lids	4	0
Hydrant Leaks	0	0
Trims	23	20
Dig Outs	34	51
Letters to Consumer: meter obstruction, trims, bees, gate access, etc. get meter number, kill service, etc.	0	0
	276	**283**

NORTH MARIN WATER DISTRICT

Summary of Complaints & Service Orders June 2018

7/9/2018

Type	Jun-18	Jun-17	Action Taken June 2018
Bill Adjustments Under Board Policy:			
June 18 vs. June 17			
Jun-18	16	$9,586	
Jun-17	17	$8,862	
Fiscal Year vs Prior FY			
FY 17/18	357	$162,321	
FY 16/17	438	$147,573	

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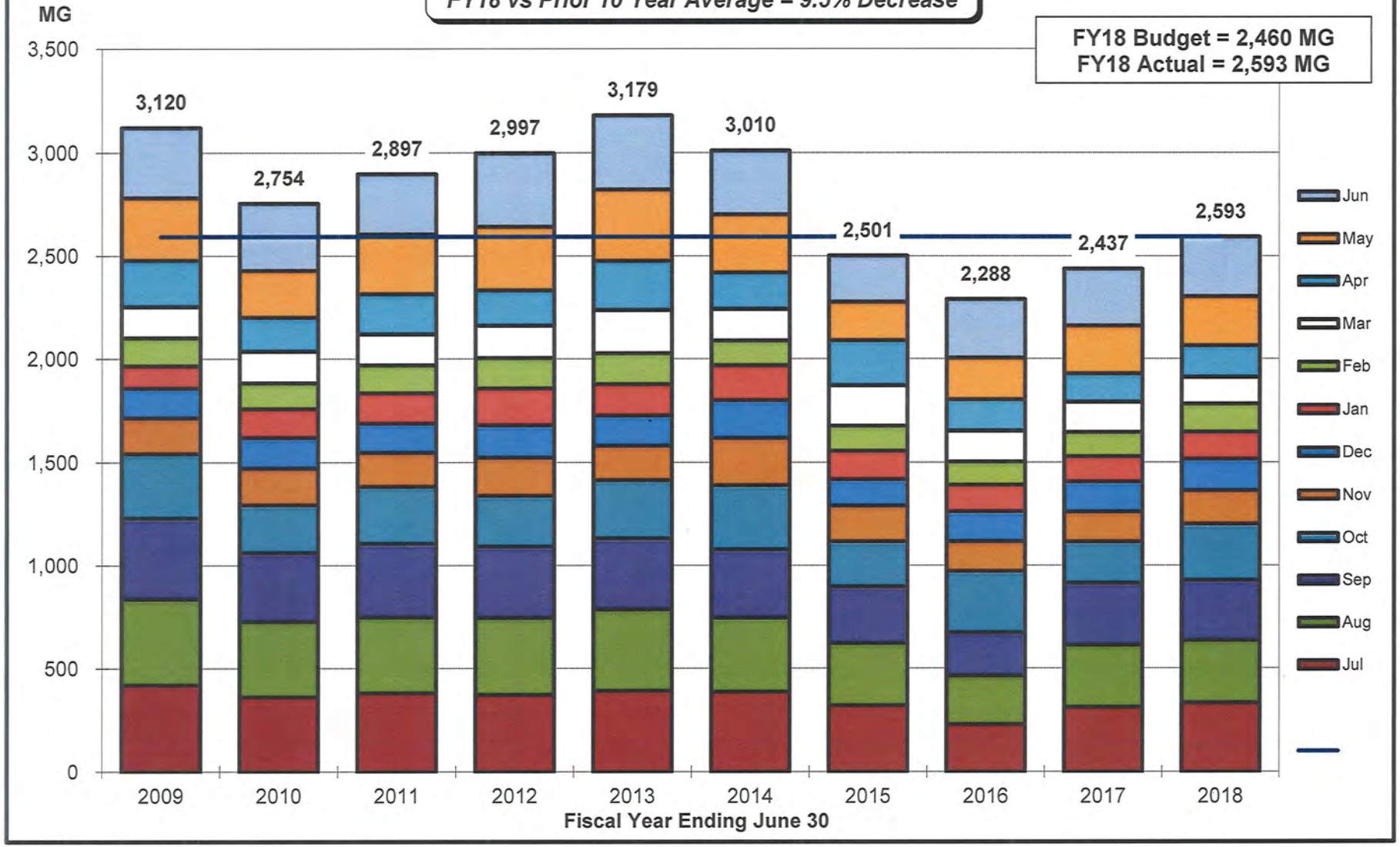
7/13/18

t:\ac\excel\wtr use\productn.xls chart - total prod by mo

Novato Potable Water Production

FY18 vs FY17 = 6% Increase
FY18 vs Prior 10 Year Average = 9.5% Decrease

FY18 Budget = 2,460 MG
FY18 Actual = 2,593 MG



Customer Service Questionnaire Quarterly Report

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Quarter Ending 06/30/18

NMWD

	Response		
Water Quality	Agree	Neutral	Disagree
Courteous & Helpful	5		
Accurate Information	5		
Prompt Service	5		
Satisfactorily Resolved	5		
Overall Experience	5		
	25	0	0

	Response		
Pressure	Agree	Neutral	Disagree
Courteous & Helpful	1		
Accurate Information	1		
Prompt Service	1		
Satisfactorily Resolved	1		
Overall Experience	1		
	5	0	0

Leak	Agree	Neutral	Disagree
Courteous & Helpful	8	3	
Accurate Information	9	1	1
Prompt Service	11		
Satisfactorily Resolved	7	4	
Overall Experience	10	1	
	45	9	1

Noisy Pipes	Agree	Neutral	Disagree
Courteous & Helpful			
Accurate Information			
Prompt Service			
Satisfactorily Resolved			
Overall Experience			
	0	0	0

Billing	Agree	Neutral	Disagree
Courteous & Helpful	4	1	
Accurate Information	3	2	
Prompt Service	5		
Satisfactorily Resolved	4	1	
Overall Experience	5		
	21	4	0

Other	Agree	Neutral	Disagree
Courteous & Helpful			
Accurate Information			
Prompt Service			
Satisfactorily Resolved			
Overall Experience			
	0	0	0

Grand Total	96	13	1
	87%	12%	1%

Questionnaires Sent Out	55	100%
Questionnaires Returned	22	40%

Customer Service Questionnaire Quarterly Report			t:\cons srvc\cust. quest reports\2018\[jun18.xls]comments
Quarter Ending 06/30/18			
		Issues NMWD Should Address	
Customer Comments	Staff Response to Negative Comments	In The Future	
WATER QUALITY			
They were great.			
Thank you for your prompt service.			
Very intelligent.			
Very helpful.			
LEAK			
Staff is always courteous.			
Thank you for coming so quickly.			
Very prompt service.			
BILLING			
Thank you for addressing problem.		Higher prices on those with fixed incomes.	

MEMORANDUM

To: Board of Directors

July 13, 2018

From: Julie Blue, Auditor-Controller JB
Nancy Holton, Senior Accountant NH

Subj: Auditor-Controller's Monthly Report of Investments for June 2018
I:\ac\word\invest\18\investment report 0618.doc

RECOMMENDED ACTION: Information

FINANCIAL IMPACT: None

At month end the District's Investment Portfolio had an amortized cost value (i.e., cash balance) of $15,135,143 and a market value of $15,101,472. During June the cash balance decreased by $2,048,852. The market value of securities held decreased $33,671 during the month. The ratio of total cash to budgeted annual operating expense stood at 97%, down 13% from the prior month.

At June 30, 2018, 25% of the District's Portfolio was invested in California's Local Agency Investment Fund (LAIF), 31% in Time Certificates of Deposit, 20% in Federal Agency Securities, 17% in US Treasury Notes, 6% in the Marin County Treasury, and 1% retained locally for operating purposes. The weighted average maturity of the portfolio was 219 days, compared to 190 days at the end of May. The LAIF interest rate for the month was 1.85%, compared to 1.76% the previous month. The weighted average Portfolio rate was 1.64%, compared to 1.50% the previous month.

NORTH MARIN WATER DISTRICT
AUDITOR-CONTROLLER'S MONTHLY REPORT OF INVESTMENTS
June 30, 2018

Type	Description	S&P Rating	Purchase Date	Maturity Date	Cost Basis[1]	6/30/2018 Market Value	Yield[2]	% of Portfolio
LAIF	State of CA Treasury	AA-	Various	Open	$3,828,888	$3,819,461	1.85% [3]	**25%**
Time Certificate of Deposit								
TCD	Merrick Bank	n/a	7/19/16	7/19/18	249,000	249,000	1.00%	2%
TCD	BMO Harris Bank	n/a	8/18/16	8/17/18	248,000	248,000	1.05%	2%
TCD	Ally Bank	n/a	10/4/16	9/28/18	248,000	248,000	1.15%	2%
TCD	Everbank	n/a	11/17/16	11/15/18	248,000	248,000	1.20%	2%
TCD	Investors Bank	n/a	12/16/16	12/17/18	248,000	248,000	1.35%	2%
TCD	Morgan Stanley Private Bank	n/a	11/22/17	5/22/19	248,000	248,000	1.60%	2%
TCD	Capital One Bank	n/a	7/19/17	7/19/19	247,000	247,000	1.70%	2%
TCD	Capital One NA	n/a	8/9/17	8/9/19	247,000	247,000	1.70%	2%
TCD	American Express FSB	n/a	9/6/17	9/6/19	247,000	247,000	1.75%	2%
TCD	Goldman Sachs Bank USA	n/a	10/11/17	10/11/19	247,000	247,000	1.70%	2%
TCD	Morgan Stanley Bank	n/a	11/9/17	11/12/19	247,000	247,000	1.75%	2%
TCD	American Express Centurion	n/a	12/5/17	12/5/19	247,000	247,000	1.90%	2%
TCD	Sallie Mae Bank	n/a	1/10/18	1/10/20	247,000	247,000	2.20%	2%
TCD	Discover Bank	n/a	2/13/18	2/24/20	247,000	247,000	2.35%	2%
TCD	Wells Fargo Bank	n/a	3/28/18	3/30/20	248,000	248,000	2.55%	2%
TCD	Citibank	n/a	4/11/18	4/13/20	246,000	246,000	2.55%	2%
TCD	UBS Bank	n/a	5/30/18	6/1/20	249,000	249,000	2.70%	2%
TCD	Enerbank	n/a	6/18/18	5/18/20	249,000	249,000	2.75%	2%
TCD	BMW Bank	n/a	6/15/18	6/15/20	246,000	246,000	2.75%	2%
					$4,703,000	**$4,703,000**	**1.88%**	**31%**
US Treasury Notes								
Treas	1.375%	n/a	11/17/16	12/31/18	$1,001,634	$995,898	1.05%	7%
Treas	1.500%	n/a	1/10/17	2/28/19	1,001,766	995,000	1.24%	7%
Treas	1.380%	n/a	1/10/18	7/31/19	497,326	494,473	1.88%	3%
					$2,500,726	**$2,485,371**	**1.29%**	**17%**
Federal Agency Securities								
FNMA	0.875% MTN	n/a	7/19/16	7/27/18	999,952	999,193	1.00%	7%
FHLB	1.625% MTN	n/a	11/21/17	6/14/19	999,663	993,333	1.70%	7%
FFCB	2.00 MTN%	n/a	4/12/18	5/8/19	998,987	997,187	2.24%	7%
					$2,998,602	**$2,989,713**	**1.65%**	**20%**
Other								
Agency	Marin Co Treasury	AAA	Various	Open	$954,904	$954,904	0.75%	6%
Other	Various	n/a	Various	Open	149,023	149,023	0.41%	1%
			TOTAL IN PORTFOLIO		**$15,135,143**	**$15,101,472**	**1.64%**	**100%**

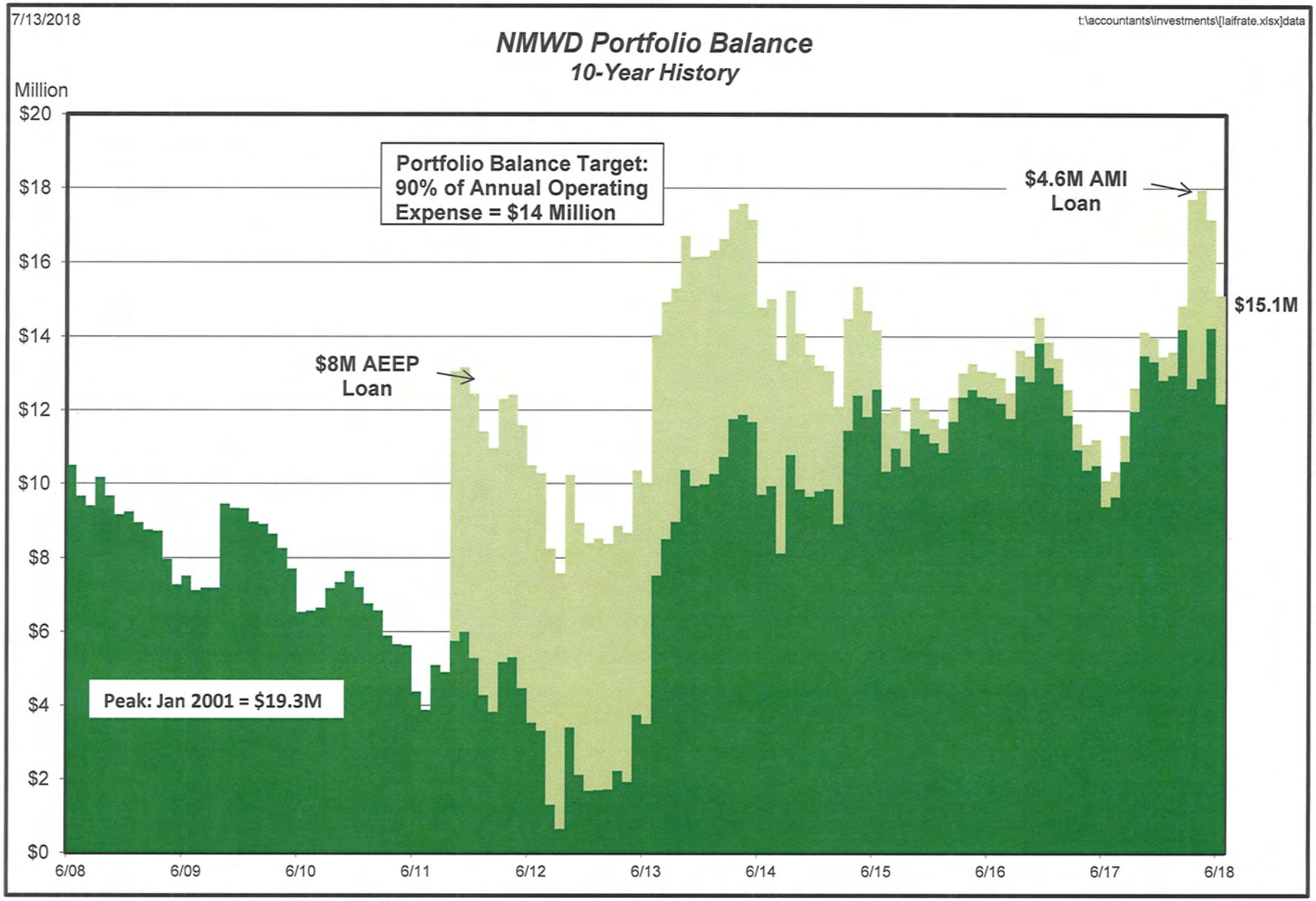
Weighted Average Maturity = **219 Days**

LAIF: State of California Local Agency Investment Fund.
TCD: Time Certificate of Deposit, Treas: US Treasury Notes with maturity of 5 years or less.
FICO: Financing Corporation, FNMA: Federal National Mortgage Association, FHLB: Federal Home Loan Bank,
FFCB: Federal Farm Credit Bank
Agency: STP State Revolving Fund Loan Reserve.
Other: Comprised of 4 accounts used for operating purposes. US Bank Operating Account, US Bank STP SRF Loan Account, Bank of Marin AEEP Checking Account & NMWD Petty Cash Fund.

1 Original cost less repayment of principal and amortization of premium or discount.
2 Yield defined to be annualized interest earnings to maturity as a percentage of invested funds.
3 Earnings are calculated daily - this represents the average yield for the month ending June 30, 2018.

Interest Bearing Loans	Loan Date	Maturity Date	Original Loan Amount	Principal Outstanding	Interest Rate
StoneTree Golf Loan	6/30/06	2/28/24	$3,612,640	$1,302,617	2.40%
Marin Country Club Loan	1/1/18	11/1/47	$1,265,295	$1,247,164	1.00%
Marin Country Club Loan	1/1/18	11/1/27	$430,463	$411,675	2.80%
Employee Housing Loans (6)	Various	Various	1,209,200	1,209,200	Contingent
	TOTAL INTEREST BEARING LOANS		**$6,517,598**	**$4,170,657**	

The District has the ability to meet the next six months of cash flow requirements.


7/13/2018
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NMWD Portfolio Balance
10-Year History
Million
$20
$18
$16
$14
$12
$10
$8
$6
$4
$2
$0
Portfolio Balance Target:
90% of Annual Operating
Expense = $14 Million
$4.6M AMI
Loan
$15.1M
$8M AEEP
Loan
Peak: Jan 2001 = $19.3M
6/08
6/09
6/10
6/11
6/12
6/13
6/14
6/15
6/16
6/17
6/18

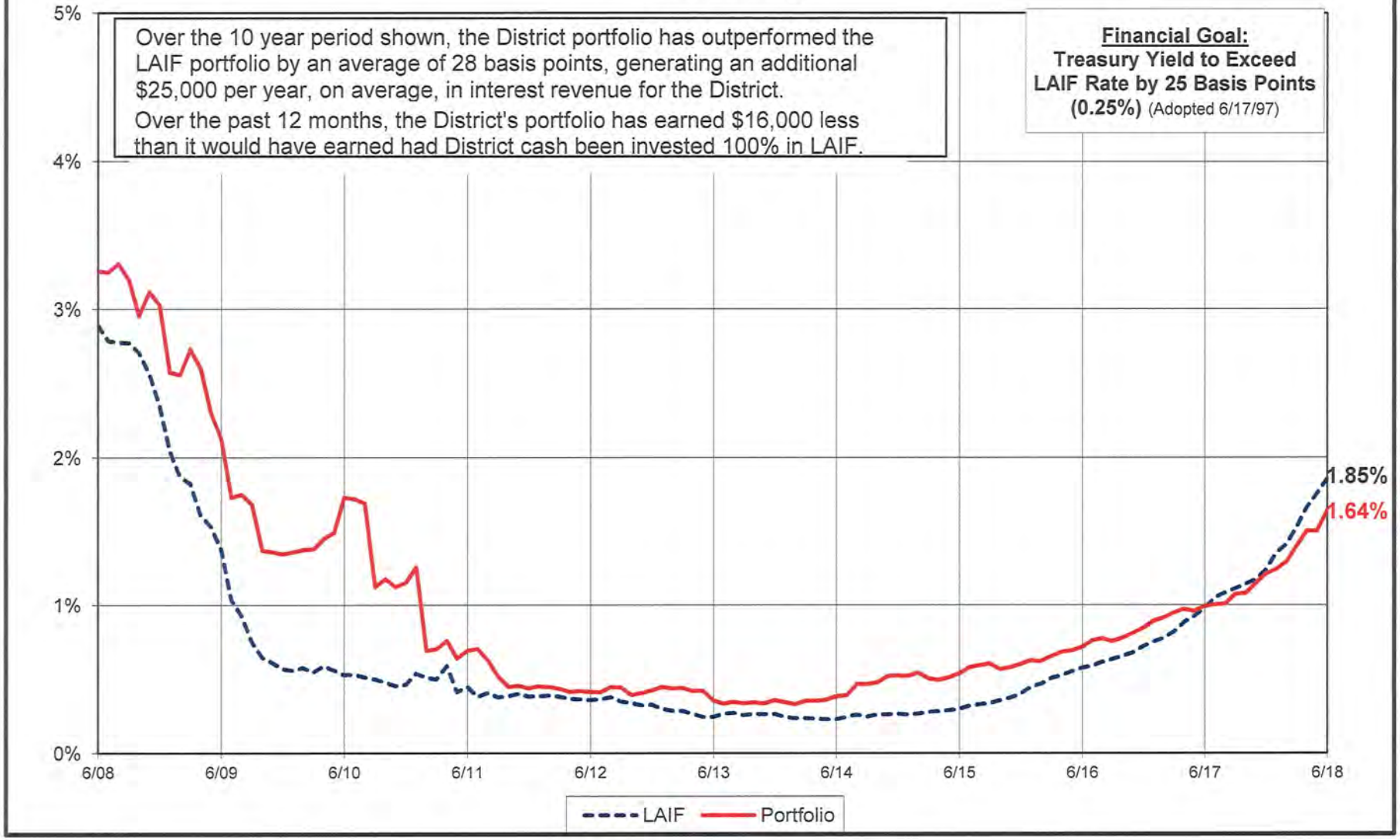
7/13/2018

t:\acountants\investments\[laifrate.xls]chart3

NMWD Portfolio Rate of Return

State of CA Local Agency Investment Fund vs District Portfolio

10-Year History



6

MEMORANDUM

To: Board of Directors July 13, 2018

From: Rocky Vogler, Chief Engineer RV

Subject: Water Service Agreement – 405 Gage Lane, Novato Maiero
APN 146-310-05
R:\Folders by Job No\2800 Jobs\2814 405 Gage Lane\2814 BOD Memo.doc

RECOMMENDED ACTION: Approve authorization of this agreement

FINANCIAL IMPACT: None (Developer funded)

The Maiero Residence – 405 Gage Lane project proposes to construct a single family home and a barn upon a 45-acre parcel located on the end of Gage Lane (see attached map, Attachment A). The existing service was established in 1954 and is a low pressure service for two residences on one lot. It is listed as a horse ranch on the service sheet. The project will still consist of two residences: one new single family residence and one existing single family residence. This agreement will relocate potable water service from Zone 2 to Zone 3 via the Old Ranch Road Tank, 50,000 gallons capacity. Since this Zone 3 system has insufficient water storage to meet current Novato Fire Department requirements, on site storage will be provided by the applicant. Water service to the fire protection system will be limited to 50 gpm due to the limited capacity of the Davies Pump Station, which serves this isolated zone. The Novato area five year CIP plan includes funds to build a 250,000 gallon tank to replace the existing redwood tank. The new tank will be placed on a parcel to be granted to the District by the Applicant as a part of this water service agreement, (see vicinity map, Attachment A).

New Zone 3 water facilities are one (1) 1-inch meter for the existing residence and one (1) 1-1/2-inch meter for the new residence and the fire protection storage tanks. The existing service in Gage Lane from Zone 2, will be killed. Both new meters will be high pressure services. This project will have no new water demand, since the existing service was for two residences.

Sewer service will be provided by a private septic system on site. The Design Review for this project was approved by County of Marin on September 5, 2017.

Environmental Document Review

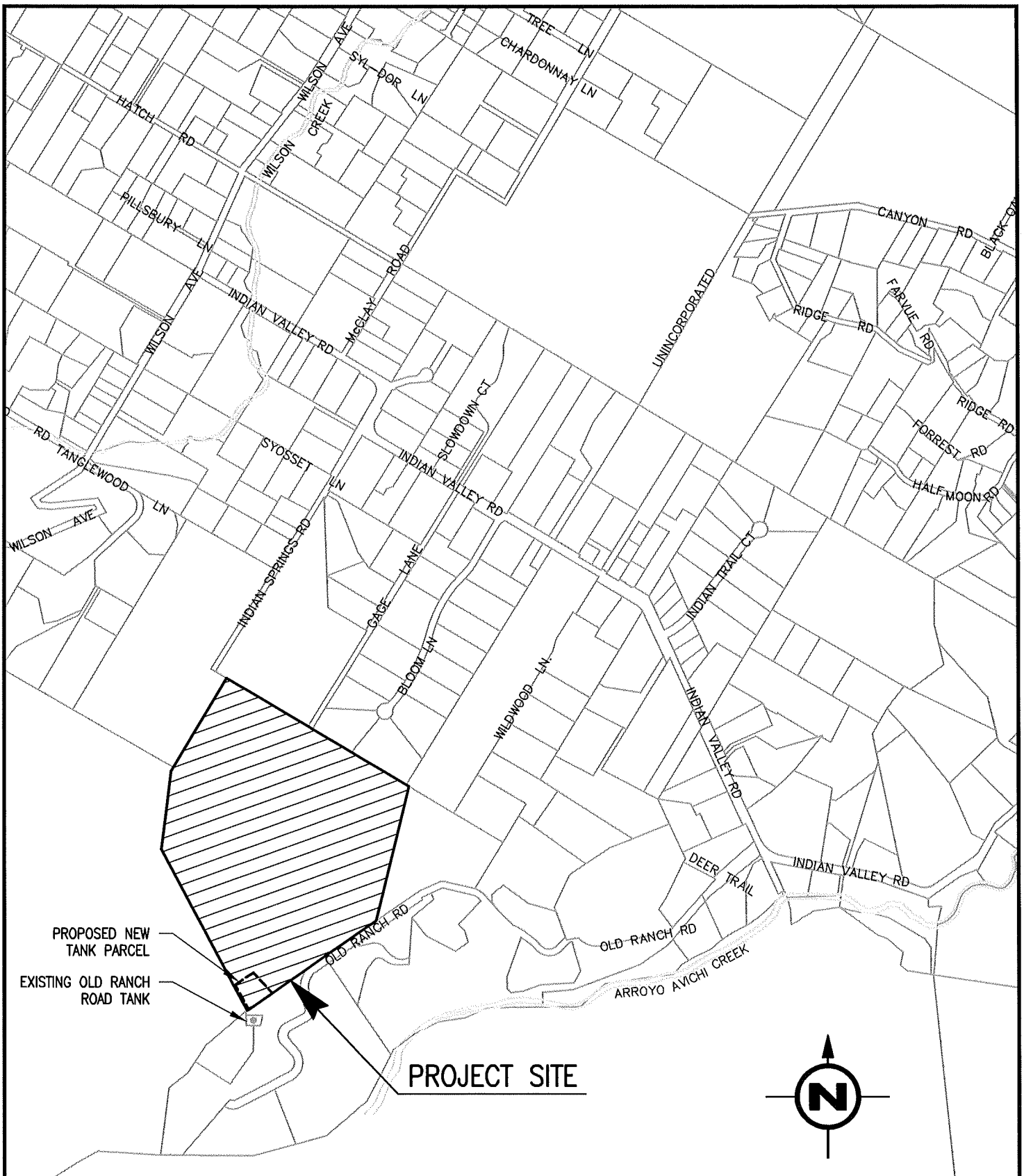
The County of Marin determined that this project is exempt, under Section 15301.

RECOMMENDATION:

That the Board approve authorization of this agreement.

Approved by GM _____

Date 7.13.18



MAIERO RESIDENCE – 405 GAGE LANE WATER SERVICE IMPROVEMENTS APN 146-310-05			
DATE	SCALE	JOB. NO.	DWG. NO.
7/12/18	NTS	2814	MAP

Jul 12, 2018 - 9:52am W:\JOB\1_NOVATO\2814\3_ISSUED\A\2814.001_Vicinity Map.dwg User: SDOVE

ATTACHMENT A

RESOLUTION NO. 18-
AUTHORIZATION OF EXECUTION
OF HIGH PRESSURE
WATER SERVICE FACILITIES CONSTRUCTION AGREEMENT
WITH
MAIERO RESIDENCE – 405 GAGE LANE

BE IT RESOLVED by the Board of Directors of NORTH MARIN WATER DISTRICT that the President and Secretary of this District be and they hereby are authorized and directed for and on behalf of this District to execute that certain water service facilities construction agreement between this District and Thomas P. Maiero, 1998 Family Trust, providing for the installation of water distribution facilities to provide domestic water service to that certain real property known as 405 Gage Lane, Marin County Assessor's Parcel Number 146-310-05, NOVATO, CALIFORNIA.

* * *

I hereby certify that the foregoing is a true and complete copy of a resolution duly and regularly adopted by the Board of Directors of NORTH MARIN WATER DISTRICT at a regular meeting of said Board held on the 17th day of July, 2018, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAINED:

(SEAL)

Theresa Kehoe, Secretary
North Marin Water District

PART ONE
HIGH PRESSURE
WATER SERVICE FACILITIES CONSTRUCTION AGREEMENT
FOR
MAIERO RESIDENCE – 405 GAGE LANE

THIS AGREEMENT, which consists of this Part One and Part Two, Standard Provisions, attached hereto and a part hereof, is made and entered into as of _____, 2018, by and between NORTH MARIN WATER DISTRICT, herein called "District," and Thomas P. Maiero, 1998 Family Trust, herein called "Applicant."

WHEREAS, the Applicant, pursuant to District Regulation 1, the State of California Subdivision Map Act and all applicable ordinances of the City of Novato and/or the County of Marin, has pending before the City or County a conditionally approved Tentative Subdivision Map, Precise Development Plan, Tentative Parcel Map or other land use application for the real property in the District commonly known as Marin County Assessor's Parcel Number 146-310-05 and the project known as MAIERO RESIDENCE – 405 GAGE LANE, consisting of one (1) lot for residential development; and

WHEREAS, prior to final approval by the City or County of a Subdivision Map, Precise Development Plan, Parcel Map or other land use application and recording of a final map for the project, the Applicant shall enter into an agreement with the District and complete financial arrangements for water service to each lot, unit or parcel of the project; and

WHEREAS, the Applicant is the owner of real property in the District commonly known as 405 Gage Lane, Novato (Marin County Assessor's Parcel 146-310-05): and

WHEREAS, the District established low pressure service to 405 Gage Lane (a horse ranch) on July 13, 1954, with a single 5/8-inch meter to supply two residences; and

WHEREAS, the Applicant will construct one new single family residence and a barn to replace a demolished structure and will keep the other existing single family residence in tact; and

WHEREAS, the Applicant has applied for separate meters for the two (2) residences and for on-site fire protection water storage; and

WHEREAS, the Old Ranch Road tank (50,000 gal) has insufficient storage to meet current Novato Fire Protection District fire flow requirements;

NOW THEREFORE, the parties hereto agree as follows:

1. The Applicant hereby applies to the District for water service to said real property and project and shall comply with and be bound by all terms and conditions of this agreement, the District's regulations, standards and specifications and shall construct or cause to be constructed the water facilities required by the District to provide water service to the real property and project. Upon acceptance of the completed water facilities, the District shall provide water service to said real property and project in accordance with its regulations from time to time in effect.

2. Prior to the District issuing written certification to the City, County or State that financial arrangements have been made for construction of the required water facilities, the Applicant shall complete such arrangements with the District in accordance with Section 5 of this agreement.

3. Prior to release or delivery of any materials by the District or scheduling of either construction inspection or installation of the facilities by the District, the Applicant shall:

a. deliver to the District vellum or mylar prints of any revised utility plans approved by the City or County to enable the District to determine if any revisions to the final water facilities construction drawings are required. The proposed facilities to be installed are shown on Drawing No. 1.2814.001, entitled, "MAIERO RESIDENCE – 405 GAGE LANE", a copy of which is attached, marked Exhibit "A", and made a part hereof. (For purposes of recording, Exhibit "A" is not attached but is on file in the office of the District.)

b. agree to grant a parcel of land to NMWD for construction of a 250,000 gallon water tank. The parcel will be approximately 24,000 square feet. The exact dimensions of the grant will be determined after the new water tank site grading and drainage plans have been completed.

c. agree that southerly corner of the new tank parcel will be located adjacent to the southerly corner and 10 feet from the westerly boundary of the Maiero property.

d. agree to grant to NMWD an access easement or a grant deed from Old Ranch Road to the new tank site parcel. The exact dimensions of this easement or deed will be determined after the grading and drainage plans for a new access road have been completed.

e. agree to hire a consultant to perform a topographic survey of the new tank site and possible nearby access routes to serve the new tank. Consultant will prepare a topographic base map based on the survey. Consultant will prepare grading and drainage plans for the access road and the tank site for review and approval by NMWD. Consultants costs for this work shall be paid by Applicant.

f. agree that Consultant will survey and set three-quarter inch iron pipes at the corners of

the new tank site parcel. Consultant will prepare a deed from Applicant to NMWD for the tank site parcel. Consultant will prepare an easement or a grant deed for the access road on the Maiero property. Applicant will pay Consultant for this work.

g. deliver to the District a written construction schedule to provide for timely withdrawal of guaranteed funds for ordering of materials to be furnished by the District and scheduling of either construction inspection or construction pursuant to Section 5 hereof.

4. Except for fire service, new water service shall be limited to the number and size of services for which Initial Charges are paid pursuant to this agreement. Initial Charges for new services, estimated District costs and estimated applicant installation costs are as follows:

Initial Charges

Meter Charges (Included in material estimate) (Existing Residence)...	One 1-inch @	$ 0.00	$ 0.00
Meter Charges (included in material estimate) (New Residence).....	One 1 1/2-inch @	$ 0.00	$ 0.00
Reimbursement Fund Charge (Existing Residence).....	.....One 1-inch @	$ 1055.00	$ 1055.00
Reimbursement Fund Charge (New Residence).....	One 1 1/2-inch @	$ 1055.00	$ 1055.00
Facilities Reserve Charges.....	.....Two @	$ 28,600.00	$ 57,200.00
Credit for Existing Services To Be Removed (2 FRC & RFC $420)	.....One 5/8@	$<57,620.00>	$<57,620.00>

Subtotal - Initial Charges..... $ 1,690.00

Estimated District Costs

Pipe, Fittings & Appurtenances.....	$ 4,837.00
District Construction Labor.....	$ 9,424.00
Engineering & Inspection.....	$ 2,440.00
Bulk Materials.....	$ 1,330.00

Subtotal –Estimated District Costs..... $18,031.00

Estimated Applicant Installation Costs

Installation Labor.....	$ 0.00
Contractor Furnished – Pipe Fittings & Appurtenances.....	$ 0.00
Bulk Materials.....	$ 0.00

Subtotal- Estimated Applicant Installation Costs..... $ 0.00

TOTAL ESTIMATED WATER FACILITIES COSTS..... $19,721.00

(Bulk materials are such items as crushed rock, imported backfill, concrete, reinforcing steel, paving materials, and the like, which are to be furnished by the contractor performing the work.)

5. Financial Arrangements to be made by the Applicant shall consist of the following:

Initial Charges and Estimated District Costs

The Applicant shall either pay to the District or provide a two (2) year irrevocable letter of credit in form satisfactory to the District and payable at sight at a financial institution in the Novato area

the sum of Initial Charges and Estimated District Costs as set forth in Section 4 hereof in the amount of **$19,721.00**. If the Applicant provides the two (2) year irrevocable letter of credit, the District shall immediately draw down Initial Charges and shall draw upon the remaining funds guaranteed by the letter at any time the District deems appropriate to recover the Estimated District Costs which normally will be at least thirty (30) days prior to the anticipated start of construction for the ordering of materials to be furnished by the District.

Estimated Installation Costs

Installation By District: Due to the proprietary nature of construction required to install said facilities, the District reserves the right to install the facilities utilizing District construction forces. The Applicant shall either pay to the District the total Estimated Installation Costs set forth in Section 4 hereof in the amount of **$19,721.00** or shall include such amount in the irrevocable letter of credit provided for the Initial Charges and Estimated District Costs set forth above. The District shall draw upon installation funds guaranteed by the letter at any time the District deems appropriate which normally will be at least thirty (30) days prior to the anticipated start of construction.

Whenever an irrevocable letter of credit is required by this agreement, the Applicant may substitute a certificate of deposit at a financial institution in the Novato area provided the certificate may be cashed at sight by the District at any time.

6. The applicant will install 4 tanks totaling 16,400 gallons of on-site storage to provide fire protection for new residence and the barn in accordance with Novato Fire Protection District approved fire protection design drawings. No direct connection from District water service to private fire protection system shall be made. Should the private fire protection system be filled through the District service, an appropriate air gap system shall be used to prevent any potential cross connection. The private fire protection system and connection thereto either through hydrants or standpipes or hose bibs shall have appropriate signage identifying that the water is not for human consumption.

7. The Applicant acknowledges and agrees that the water service to be provided by the District pursuant to this Agreement will be limited service, particularly with regard to flow rate and storage of water to be used in emergencies, and will not include facilities for delivery of water for fire protection. The flow rate through the 1-1/2 inch meter will be limited 50 gpm delivery of water for fire protection. The Applicant further acknowledges and agrees that water to be provided pursuant to this Agreement shall be for domestic use for two single family residences and that sizing of said NMWD facilities does not provide sufficient capacity for fire protection or emergency storage.

8. The Applicant acknowledges and agrees that the Applicant and/or its successors have full responsibility for construction, operation, and maintenance of on-site facilities for fire protection, and that it shall be Applicant's sole responsibility to make the necessary arrangements with the Novato Fire

Protection District. The Applicant shall hold the District harmless from any and all claims arising out of or in any way related to inadequate fire protection including any temporary interruptions in domestic water service.

9. High pressure water service will be rendered to this project in accordance with District Regulation 12 entitled "High Pressure Service". The Applicant shall install a private pressure regulating device for each service to said parcel as required by local ordinances and plumbing codes prior to occupancy of any structures, shall inform the buyer or buyers of said parcel of the water service conditions herein described, and shall provide each buyer a copy of this agreement prior to any final sales transaction. Said private pressure regulating devices shall be in accordance with District Standard 28 but shall not be a part of the District's water system. The maintenance and operation of said devices shall be the responsibility of the property owners.

10. Water service through the facilities to be installed pursuant to this agreement will not be furnished to any building unless the building is connected to a public sewer system or to a waste water disposal system approved by all governmental agencies having regulatory jurisdiction. This restriction shall not apply to temporary water service during construction.

11. New construction in the District's Novato service area is required to be equipped with high efficiency water conserving equipment and landscaping specified in Regulation 15 sections e. and f.

12. All estimated costs set forth in this agreement shall be subject to periodic review and revision at the District's discretion. In the event the Applicant has not completed financial arrangements with the District in accordance with Section 5 hereof prior to expiration of six (6) months from the date of this agreement, all Initial Charges and estimated costs set forth in Section 4 hereof shall be revised to reflect then current District charges and estimates. In the event the Applicant has not secured final land use approval for the project from the City of Novato or County of Marin, recorded a final map and diligently commenced construction of improvements required by those agencies and the District prior to expiration of one (1) year from the date of this agreement, the District may, at its option, either retract financial certifications issued to City, County and State agencies and terminate this agreement or require amendment of this agreement and review of all Initial Charges and estimated costs contained herein. The Applicant shall pay any balance due upon demand or furnish a guarantee of such payment satisfactory to the District.

13. In the event of sale of this parcel, the Applicant shall provide to the buyer(s) a copy of this Agreement so that there is complete disclosure of the limited nature of the water service. In addition, upon execution of this Agreement, District shall have it recorded.

14. All extensions of time granted by the City of Novato or the County of Marin for the Applicant to comply with conditions of land use approval or to construct improvements pursuant to a subdivision improvement agreement shall require concurrent extensions of this agreement and shall be cause for review and revision of all Initial Charges and estimated costs set forth in Section 4 hereof. The Applicant shall apply to the District for extension of this agreement prior to approval of the Applicant's requests for such extensions by either the City of Novato or the County of Marin.

15. This agreement shall bind and benefit the successors and assigns of the parties hereto; however, this agreement shall not be assigned by the Applicant without the prior written consent of the District. Assignment shall be made only by a separate document prepared by the District at the Applicant's written request.

NORTH MARIN WATER DISTRICT
"District"

NOTARIZE:

_____
Rick Fraites, President

_____
Theresa Kehoe, Secretary

(SEAL)

THOMAS P. MAIERO 1998 Family Trust,
Family Trust
Thomas Maiero Trustee
"Applicant"

_____

(SEAL)

NOTES: *If the Applicant executing this agreement is a corporation, a certified copy of the bylaws or resolutions of the Board of Directors of said corporation authorizing designated officers to execute this agreement shall be provided.*

This agreement must be executed by the Applicant and delivered to the District within thirty (30) days after it is authorized by the District's Board of Directors. If this agreement is not signed and returned within thirty days, it shall automatically be withdrawn and void. If thereafter a new agreement is requested, it shall incorporate the Initial Charges (connection fees) and cost estimates then in effect.

ALL SIGNATURES MUST BE ACKNOWLEDGED BEFORE A NOTARY PUBLIC.

7

MEMORANDUM

To: Board of Directors July 13, 2018

From: Rocky Vogler, Chief Engineer RV

Re: Amend Consulting Engineering Services Agreement – Kennedy/Jenks Consultants
R:\NON JOB No ISSUES\Consultants\Kennedy Jenks\KJ Amend Contract BOD memo 7-17-18.doc

RECOMMENDED ACTION: Authorize General Manager to Amend the Consulting Engineering Services Agreement with Kennedy/Jenks Consultants

FINANCIAL IMPACT: $35,000

The purpose of this memo is to request an amendment to the Consulting Engineering Services Agreement with Kennedy/Jenks Consultants (KJ) for assistance with the preparation of the District's 2018 Water Master Plan Update for the Novato Service Area. KJ is a civil engineering consulting firm located in Santa Rosa, CA. On September 19, 2017, the Board approved the Agreement with KJ and established an initial budget of $90,000, which included a $10,000 contingency.

Primary work performed by KJ under the Agreement includes the following tasks:

- Demand Analysis
- Evaluate Storage and Pumping
- Prepare Hydraulic Model
- Hydraulic Evaluation
- Capital Improvement Plan

The previous 2012 Water Master Plan Update for the Novato Service Area included an analysis of a skeletonized model of pressure zones 1 and 2. The 2018 Update will include modeling analysis of the entire distribution system containing all 27 pressure zones and sub-zones, producing these benefits:

- Since all the zones and sub-zones will be included in a single model, impacts based on changes in operation of one zone/sub-zone may be readily understood in adjacent zones/sub-zones. This will provide a deeper awareness of system impacts when operational changes are being considered.
- Allows engineering analysis of hydraulic bottlenecks for fire protection in high risk zones.
- Adds geospatial distribution of demands based on District billing data and the most recent Urban Water Management Plan planning data, by leveraging the recent investment in the District's GIS. This enables the District to target capacity upgrades where they are needed for planned growth.

Approved by GM _____ Date 7-13-18

Since 2012, the District has been developing a Geographical Information System (GIS) model of the entire Novato Service Area as well as West Marin. When the scope and fee for KJ's work was established, it was assumed that little or no effort would be required to refine the GIS data. However, once the work began, it became clear that significant effort was required to "clean up" the GIS data in order for the hydraulic model to function properly. The work included research to add pipe diameter and material type where missing, provide connectivity between pipe segments, and refine boundaries between zones and sub-zones. This additional effort forms the basis for the requested increase in KJ's budget.

The original budget for the entire project was $140,000, broken down as $110,000 for FY18 and $30,000 for FY19. This budget includes provision for both the KJ effort as well as staff time required to assist with data preparation, analysis and report writing. As of June 30, 2018, the budget expended includes $61,159 for KJ and $15,292 for staff time, for a total of $76,451. To complete the project, FY19 expenditures including $63,841 for KJ ($125,000-$61,159 = $63,841), and $15,000 for staff time will be required. Only $76,451 of the full FY18 budget of $110,000 was expended, leaving $33,459 unspent. By applying unspent FY18 dollars to the FY19 project budget, the difference required to complete the project is $16,292 [$140,000 - $125,000 (KJ) - $31,292 (NMWD) = -$16,292 *]. The table below provides the breakdown.

Original Project Budget FY18	Original Project Budget FY19	Amount Expended FY18 (KJ)	Additional Budget to complete FY19 (KJ)	Amount Expended FY18 (NMWD)	Additional Budget to complete FY19 (NMWD)	Total Additional Budget Required
$110,000	$30,000	$61,159	$63,841	$15,292	$16,000	$16,292 *

* To be funded by unspent reserves in the FY19 budgeted $150,000 Local Water Supply Enhancement Study

RECOMMENDATION

That the Board authorize the General Manager to amend the Consulting Engineering Services Agreement between NMWD and KJ and increase that budget by $35,000.

8

MEMORANDUM

To: Board of Directors July 13, 2018

From: Drew McIntyre, General Manager

Subj: 2017 Novato Creek Steelhead Habitat Assessment Study – ICF International Consulting

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RECOMMENDED ACTION: Information Only

FINANCIAL IMPACT: None at this time

In January 2016, the Board authorized staff to send comments on the October 2015 National Marine Fisheries Service (NMFS) Coastal Multi-Species Recovery Plan (Public Draft). The 2015 Recovery Plan included a discussion on the feasibility of fish passage at Stafford Dam. A key comment in the District's response letter was that Novato Creek upstream of Stafford Dam provides highly degraded steelhead spawning and rearing habitat thereby raising the question as to the value of any fish passage feasibility study. This conclusion was based on initial reconnaissance investigations conducted in December, 2015. Since early 2016, the District has worked with consultants to conduct more comprehensive assessments of steelhead habitat suitability within Novato Creek above Stafford Dam.

At the September 6, 2016 Board of Directors Meeting, staff was authorized to enter into a $21,000 agreement with ICF to perform a Steelhead Habitat Survey in Upper Novato Creek. As part of the 2016 Agreement scope, a fish habitat survey was conducted in November 2016 to add on to the initial stream assessment conducted in December 2015.

At the April 4, 2017 Board of Directors meeting, staff was authorized to enter into a $16,000 contract amendment with ICF to expand upon the November 2016 fish habitat survey and perform additional monitoring in 2017 to help better evaluate steelhead habitat suitability. The attached 2017 Novato Creek Stream Habitat Assessment study is a compilation of the work performed between 2015 and 2017 and completes the current contractual obligations by ICF. The attached Study was finalized March 2018 after review by me as well as past General Manager, Chris DeGabriele (under a Board approved Consulting Services agreement with Mr. DeGabriele).

The Study includes an Executive Summary that captures the key findings of the work. The Study concludes that Upper Novato Creek is generally dry, with little to no stream flow suitable for over-summering steelhead. Therefore, the upper watershed appears to be incapable of supporting steelhead in the numbers identified in the 2015 Recovery Plan.

PATH FORWARD

The 2017 Novato Creek Stream Habitat Assessment study meets the 2015 Recovery Plan's Strategy 11.1 to conduct more comprehensive assessments within Novato Creek regarding steelhead habitat suitability as it relates to fish passage feasibility at Stafford Dam. The next step is to make outreach to California Department of Fish and Wildlife (CDFW) and NMFS local staff to review the Study with both agencies prior to submitting record copies for their files. It is anticipated that some additional consulting services will be required by ICF with respect to preparation and participation in these meetings. Any contract amendment above $5,000 will be brought back to the Board for approval.

Once on file, the 2017 Novato Creek Stream Habitat Assessment study will provide valuable baseline information when working with CDFW and NMFS on future water rights and/or improvement projects at Stafford Dam

2017 Novato Creek Stream Habitat Assessment

March 27, 2018

Project No. 00619.16

Submitted to:
North Marin Water District
999 Rush Creek Place
Novato, CA 94945

Submitted by:
ICF
601 W 5th St #900
Los Angeles, CA 90071

Technical Memorandum

To:	Drew McIntyre, North Marin Water District
From:	Jean Baldrige, ICF Sarah Horwath, ICF Thomas DeGabriele, HDR, Inc.
Date:	March 27, 2018
Re:	**2017 Novato Creek Stream Habitat Assessment**

Table of Contents

Appendices and Attachments:

Executive Summary

In the Final Coastal Multispecies Recovery Plan for the North Central California Coast Recovery Domain (Recovery Plan), National Marine Fisheries Service (NMFS) identified Novato Creek as playing an "essential" role in recovery of steelhead (*Oncorhynchus mykiss*) and as a stream that needs to support a potentially independent population of steelhead in order to delist the species (NMFS 2016). As described in comments submitted to NMFS on the Draft Recovery Plan, North Marin Water District (NMWD) is concerned that the target spawner densities of Novato Creek are unachievably high, based on how dry the Upper Novato Creek Watershed is upstream of Stafford Dam, especially considering historical evidence of many years with low run off and likely ephemeral stream flow. A total spawner abundance target of 1,100 fish would be required for Novato Creek to attain "low extinction risk" and satisfy steelhead recovery criteria. As portrayed in NMWD 's previously submitted comments on the Draft Recovery Plan, achieving this number of returning spawners in Novato Creek watershed would require production of 110,000 fry (assuming a 1% survival) in the 107 miles of stream within the watershed, only approximately 18.6 miles of which are upstream of Stafford Lake. In order to further evaluate the potential for steelhead production in Novato Creek, NMWD resolved to work with NMFS and other agencies to acquire site-specific information on habitat quality in Novato Creek upstream of Stafford Dam.

Two reconnaissance-level stream habitat surveys of Upper Novato Creek upstream of Stafford Dam were conducted on December 18, 2015 and on November 4, 2016. To further evaluate habitat availability and suitability for steelhead, aquatic biologists conducted a stream habitat mapping survey on May 8-9, 2017. The two objectives of the 2017 habitat survey were to: 1) document habitat conditions of Upper Novato Creek following a large rainfall season for comparison with the preliminary habitat evaluations which were conducted during a multi-year drought, and 2) conduct quantitative habitat mapping within the three of the four study reaches above Stafford Dam that were accessible.

No suitable steelhead habitat was observed during the December 2015 and November 2016 reconnaissance-level surveys, when little to no surface flow was present in Upper Novato Creek. These observations indicate Upper Novato Creek was also dry during the previous summers. During the May 2017 survey, surface flow was continuous through the surveyed areas of Upper Novato Creek in Reaches 1, 2, and 4 (Figure 1); however, the 2016-2017 winter was extremely wet, and the observed amount of streamflow present in May 2017 was likely higher than under normal late-spring to early-summer conditions. Even though suitable spawning substrate (approximately 0.5–5.1 inches in diameter [Moyle 2002]) was present for salmonids, most wetted habitats observed were fairly shallow, and there was a scarcity of deep pools (greater than 2 feet deep) available for juvenile rearing habitat or for adult fish holding habitat.

To further evaluate the persistence of streamflow and water quality in Upper Novato Creek into summer during a wet year, data loggers that monitored depth of flow and water temperature were deployed at two locations (in Reach 1 and Reach 4) during the May 2017 fieldwork (Figure 1). The data loggers were retrieved at the end of July 2017 and the data collected indicated that water surface elevations in the two monitored pools generally declined slowly during the monitoring period, until the pools became disconnected and fully isolated from surface flow at the beginning of July. Following isolation, pool depths decreased more quickly, likely to due to evaporation without

surface water input, as the pools decreased in size. Water temperatures in the wetted areas remained suitable for juvenile steelhead during the monitoring period until pools became isolated and water volume reduced. On July 24th, approximately 1,200 feet of stream channel upstream of the logger location in Reach 2 was examined. The channel consisted of a series of isolated pools separated by long sections of dry channel ranging from approximately 20 to 200 feet. Approximately 1,500 feet of channel observed in Reach 4, upstream of the logger location, was dry, and other spot locations observed from the access road leading downstream toward the bottom of Reach 4 were also dry.

Overall, monitoring data and spot checks showed that continuous surface flow did not persist in upper Novato Creek through the summer, despite water year 2017 being a very wet year. Isolated pools became unsuitable for steelhead rearing due to insufficient pool depth and/or water temperatures approaching physiologically stressful or potentially lethal thresholds. The pools shrank dramatically when surface flow ceased. The study found that, even during a wet year, Upper Novato Creek had extremely limited suitability for over-summering steelhead.

Additionally, two sections in Reach 4 exhibited extreme changes in stream gradient creating natural impediments to upstream fish migration, and may act as total barriers under low-flow conditions. Thus, there could be less available habitat in Reach 4 of Upper Novato Creek than is assumed by NMFS in the Recovery Plan. The first high gradient section is located approximately 0.7 mile upstream of Novato Boulevard, and may preclude upstream migration to approximately 75% of the approximately 2.8-mile long reach at most, if not all, flows.

Based on observations made from 2015 through 2017, the most limiting factors for steelhead habitat suitability in upper Novato Creek are lack of surface flow during summer months, even in wet years, and scarcity of juvenile rearing and adult holding pool habitats with sufficient depth when surface water is present. The Upper Novato Creek Watershed is generally dry, with little to no stream flow available during the over-summering months. Isolated pools are relatively shallow and water temperatures become unsuitably high for rearing steelhead as pools shrink. Due to the scarcity of deep pool habitats and lack of surface flows during summer months, Upper Novato Creek is unlikely to provide suitable habitat for juvenile or adult steelhead during late summer through the return of wet-season rains, which in some years might not occur until December. Therefore, the upper watershed appears incapable of supporting the reproductive capacity that NMFS expected in this area as described in the Recovery Plan, which was estimated using assumptions of habitat availability and productivity at broad geographic scales (including evaluating historical potential of habitats based on attributes of channel gradient, valley width, and mean annual discharge) because detailed habitat and abundance data were not available (NMFS 2016, Appendix C).

Introduction

In the Final Coastal Multispecies Recovery Plan for the North Central California Coast Recovery Domain (Recovery Plan), Novato Creek was identified as playing an “essential” role in recovery of steelhead (*Oncorhynchus mykiss*) (NMFS 2016, page 142) and is identified as a stream that could support a potentially independent population of steelhead contributing to the delisting of steelhead. (NMFS 2016, page 140). NMFS modeling of intrinsic potential habitat in Novato Creek gave an estimated 28.3 intrinsic potential per kilometer (IPkm) score, and a target density of 38.3 spawners/IPkm, for a resulting target abundance of approximately 1,100 returning adult spawners

(NMFS 2016, pages 142 and 140). The Draft Recovery Plan was finalized in October 2016, and the final numbers were slightly adjusted from the previous values of 28.7 IPkm and a target density of 38.2 spawners/IPkm, but the same target spawner abundance of 1,100 returning adults was maintained (NMFS 2015, pages 148 and 584).

As described in comments submitted to NMFS on the Draft Recovery Plan, North Marin Water District (NMWD) is raise the issue that the target spawner densities of the Coastal San Francisco Bay Diversity Strata (including Novato Creek) are the highest of all diversity strata in the Plan, much higher than nearby streams (such as Petaluma River and Sonoma Creek) and much higher than other less urbanized streams in the vicinity (such as the Upper Russian River, Dry Creek, Walker Creek, Lagunitas Creek) (NMWD 2016, page 1). In order to further evaluate the potential for steelhead production in Novato Creek, NMWD resolved to work with National Marine Fisheries Service (NMFS) and other agencies to acquire site-specific information on habitat quality in Novato Creek upstream of Stafford Dam (NMWD 2016, page 3). On October 11, 2016, NMWD, ICF, and NMFS met to discuss results of the previous Novato Creek reconnaissance-level habitat assessments (completed in 2015 and 2016) and plans and methodology for a detailed habitat mapping survey (to be completed in 2017).

To evaluate habitat suitability for steelhead, aquatic biologists conducted a stream habitat mapping survey on May 8-9, 2017. The survey was conducted in three of the four study reaches of Novato Creek upstream of Stafford Dam (Upper Novato Creek, Figure 1) where landowner permission to access the stream was acquired. Prior to the 2017 survey, two reconnaissance-level stream habitat surveys of Novato Creek were conducted: one by Bill Hearn and Thomas DeGabriele on December 18, 2015 (Hearn 2015) and another by Thomas DeGabriele on November 4, 2016 (Baldrige et al. 2017). The two objectives of the 2017 habitat survey were to: 1) document habitat conditions of Upper Novato Creek for comparison with the preliminary habitat evaluations, and 2) conduct quantitative habitat mapping within the three accessible study reaches above Stafford Dam. During the habitat mapping, data loggers were deployed in two pools in reaches upstream (in Reach 4) and downstream (in Reach 1) of Novato Boulevard to evaluate persistence of flow and water temperature into the summer (Figure 1).

The 2017 habitat mapping and pool monitoring studies were conducted following an extremely wet 2016-2017 winter, in contrast to the multi-year drought that was ongoing when the 2015 and 2016 reconnaissance-level surveys were completed. During 2017, the lack of persistence in surface flows through the summer following an extremely wet year is indicative of the flashy and generally dry nature of the upper Novato Creek watershed. However, it should be noted that the previous drought lasted for five years (water years 2012 through 2016), and it is unknown if the precipitation of water year 2017 fully ameliorated the effects of the drought on the watershed. Thus, the results described in this report are considered preliminary in nature.

Methods

For the purpose of surveys, Upper Novato Creek was divided into four stream reaches (Figure 1). Reach delineation was based on general habitat conditions and stream features observed during the 2015 survey and based on access to private property. The results of the 2016 and 2017 surveys are described in this memo by reach.

2016 Reconnaissance-Level Habitat Assessment

During the 2016 survey, qualitative observations of flow in the stream channel were made, observations of aquatic wildlife in the stream or immediate vicinity were noted, and potential fish passage barriers were identified. Additionally, representative and accessible study areas for subsequent habitat mapping surveys in 2017 and locations for potential habitat monitoring efforts were identified.

2017 Stream Habitat Mapping

The stream habitat mapping methodology was based on habitat typing methods described in the California Salmonid Stream Habitat Restoration Manual (Flossi et al. 1998). An example of the habitat inventory data form that was used to collect the data listed below is provided in Attachment 2.

Data collected per study reach included:

- Beginning and ending survey points (latitude/longitude), recorded using the World Geodetic System 1984 datum
- Beginning and ending survey times
- Air temperature
- Water temperature
- Measured streamflow (in Reaches 1 and 4)
- Channel type, which is determined by substrate types, channel entrenchment, stream gradient, and other morphological characteristics (see Flossi et al. 1998 for full definitions of all possible channel types)
- Bankfull width, which is the estimated maximum width the stream attains at typical flood flows, approximately every 1.5 years on average
- Bank erosion severity, qualitatively evaluated (categorized as none, minor, moderate, severe)

Data collected per habitat unit included:

- Habitat type: pool, riffle, or flatwater
- Habitat unit dimensions: length, mean width, mean depth, maximum depth, and depth of pool tail crest
- Dominant streambed substrates. Substrate composition of the 2 most dominant types and their estimated percentages were recorded: silt/clay, sand, gravel (0.08–2.5 inches diameter), small cobble (2.5–5 inches diameter), large cobble (5–10 inches diameter), boulder (greater than 10 inches), or bedrock (immovable-sized rock).
- Pool tail-out substrate and embeddedness. The depth of substrate embeddedness was estimated at pool tail-outs using a scale from 1 to 5. A value of 1 indicates low substrate embeddedness appropriate for spawning, a value of 4 indicates high substrate embeddedness, and a value of 5 is assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

- Percentage of substrate exposed to air within a habitat unit
- Counts of large woody debris pieces. Large woody debris is defined as downed logs greater than 1 foot in diameter.
- Dominant types of instream cover that could provide shelter for aquatic species. Dominant cover types and percentage of total habitat unit area covered were recorded.
- Riparian canopy data were recorded as percentage total canopy coverage of the stream.
- Bank substrate composition and bank vegetation data were recorded for the right and left banks.
    - Substrate composition: dominant substrate type of the bank (silt/clay/sand, cobble/gravel, boulder, or bedrock)
    - Bank vegetation: percentage of the bank that was vegetated and the dominant vegetation type (grass, brush, hardwood trees, or bare bank)

Data were collected using the iForm application (Zerion, Inc. 2017) and ArcCollector (ESRI 2017) application on an iPad. Field photos were taken using an iPad and cameras. Representative field photos from the 2016 habitat assessment and the 2017 habitat mapping survey are included in Attachment 1.

Each study reach was surveyed in an upstream direction and habitat unit lengths were measured using a hip chain. Water depths were measured using a stadia rod, and flow was measured once in Reach 1 and once in Reach 4 using a calibrated Swoffer water velocity meter. Based on stream gradient, flow was assumed to be continuous between Reaches 1 and 2. Canopy was estimated visually, using a densitometer to periodically calibrate the observers' estimates.

Precipitation data discussed in this report are from the Novato Library rain gauge in central Novato, California (Marin County 2018).

2017 Pool Water Surface Elevation and Water Temperature Monitoring

After habitat mapping had been conducted, pools were chosen for monitoring based on their potential suitability for salmonid rearing (relatively deep compared to other pool habitats encountered), presence of cover, accessibility, and location security (unlikely to be disturbed by human activities). Data loggers (Onset HOBO U20 Series) that measure water surface elevation and water temperature were deployed in two pools: one in Reach 1 and one in Reach 4 (Figure 1 and Figure 11 – Sheets 1, 2 and 3). The loggers recorded data every 15 minutes during their deployment. After logger retrieval, data was analyzed to transform the recorded absolute pressure to water surface elevation and pool depth. Water temperature data were evaluated for daily maximum temperature and 7-day average of daily maximum temperature (7-DADM) for comparison against salmonid water temperature thresholds suitable for steelhead rearing (Table 1).

Results

Survey Timing and Setting

2016 Reconnaissance-Level Habitat Assessment

The initial habitat assessment survey was conducted from 09:00 to 14:20 on November 4, 2016. Weather was partly cloudy to clear. Precipitation accumulation recorded over the previous 30 days in central Novato at the Novato Library rainfall gage was uncharacteristically high for the time of year, at 4.4 inches (Marin County 2018). During the November 2016 survey, isolated wetted areas were observed in Reach 1, intermittent flow was observed in Reach 2, and dry conditions were observed in Reach 4.

For comparison, prior to the December 18, 2015 survey, precipitation accumulation at the Novato Library during the previous 30 days was 1.8 inches (Marin County 2018), and no stream flow was observed in Upper Novato Creek during that survey. Table 2 lists monthly rainfall data for Black Point, Novato, California (County of Marin 2018).

2017 Stream Habitat Mapping

The stream habitat mapping survey was conducted from 08:45 to 17:30 on May 8, 2017 and from 09:30 to 16:30 on May 9, 2017. Weather was clear and warm. Precipitation accumulation recorded over the previous 30 days (from April 9-May 8, 2017) was 0.60 inches in central Novato at the Novato Library gage (Marin County 2018)), and approximately 47.36 inches of precipitation had been recorded at the gage during the 2016-2017 winter through the end of April(Marin County 2018).

During the May 2017 survey, surface flow was observed in all study reaches visited, although flows were lowest in Reach 4. Reach 3 was not accessible during the survey, and it is assumed surface flow continued through Reach 3. Streamflow was measured in Reach 4 on May 8, 2017 to be approximately 0.19 cubic feet per second (cfs) using a Swoffer water velocity meter. Flow was nearly immeasurable due to shallow water depth, so this measurement is considered an estimate. Streamflow was measured in Reach 1 on May 9, 2017 to be approximately 1.04 cfs. Water temperatures taken during the survey period ranged from 57 degrees Fahrenheit (°F) to 62°F. Air temperatures ranged from 55°F to 80°F during the surveys.

All portions of upper Novato Creek that were inventoried during the habitat mapping were determined to be Class F channel type, which is characterized by entrenched meandering riffle-pool complexes on low gradients (<2%), with moderate to high width to depth ratio (>12) (Flossi et al. 1998). Upstream of the Reach 4 study area, the high-gradient step pool and boulder cascade would be categorized as a Class A channel type, which is characterized by steep, narrow, cascading, step-pool streams that are high energy, on high gradients (4–10%), and with low width to depth ratio (<12).

Results of the upper Novato Creek habitat mapping are summarized in Table 3 using habitat mapping protocol Level II habitat types (Flossi et al. 1998), and are discussed in detail below by study reach.

2017 Pool Water Surface Elevation and Water Temperature Monitoring

Pressure transducers were deployed in two pools to monitor water surface elevation in order to evaluate persistence of surface flow into the summer of 2017. Water temperature was also recorded by the data loggers. One logger was deployed in Reach 1 on May 9th, 2017 and one was deployed in Reach 4 on May 8, 2017 (Figure 11 – Sheets 1, 2, and 3). The results of pool water surface elevation and water temperature monitoring are discussed below by reach.

Reach 1 Observations

2016 Reconnaissance-Level Habitat Assessment

Reach 1 is Upper Novato Creek from the upstream end of Stafford Lake to the second bridge crossing (river mile [RM] 12.5 to 13.5).

The first 2,000 feet of the reach, almost up to Bridge 1, is heavily overgrown with willow and blackberry. Substrate in the area is primarily sand and silt with some small gravel. When the lake is full, this stream section is likely inundated by the reservoir.

Upstream of the overgrown section, the stream channel is wider and more open. Substrate is predominantly sandy, with interspersed sections of small to medium gravel. Upon further inspection, it was observed that the gravels were present on top of the substrate surface, which was predominantly sandy sub-surface substrate.

On November 4, 2016, ponded water was located in isolated larger depressions in the stream channel. No surface flow was observed until the upstream end of Reach 1, below Bridge 2. Observed surface flow was roughly 0.5 to 1 gallons per minute. The mid-channel bridge drop structure appeared to hold back surface water, possibly acting as a concentration point of subsurface flow, and as the surface water source. Threespine stickleback (*Gasterosteus aculeatus*) were observed in one of the small pools.

2017 Stream Habitat Mapping

Starting from just below the first bridge and moving upstream, approximately 1,622 feet of Reach 1 were inventoried during the stream habitat mapping, from just downstream of the first bridge upstream (Table 3, Figure 1 and Figure 11 – Sheet 1). Streamflow was measured in Reach 1 on May 9, 2017 to be approximately 1.04 cfs. Water temperature measured in the late morning was 61°F (16 degrees Celsius [°C]) and air temperature was 70.7°F (21.5°C).

Pools were the most prevalent habitat type by length (59%), followed by flatwater (22%), then riffles (19%) (Figure 4) and by frequency (Figure 3). At the time of the survey, the study area of Reach 1 was mostly characterized by long pools and flatwaters (most measured approximately 40 feet to a few hundred feet in length, with an average length of 64 feet) that were mostly less than 1 foot deep, and the deep areas of pools were typically small relative to an entire habitat unit's wetted area. Individual pools and flatwater habitats were most often divided by short riffle sections. Some step complexes were observed where long pool or flatwater habitat units transitioned at small gradient changes or debris breaks without the presence of riffles.

Figure 5 shows a summary of maximum residual pool depths[1] by study reach. Pool quality for salmonids increases with depth. Within Reach 1, four of the 15 pools measured (26.7%) had a residual depth of 2 feet or greater. The mean of residual pool depths in Reach 1 was 1.6 feet, and the maximum residual pool depth observed in Reach 1 was 2.5 feet.

Sand was the dominant substrate in pool and flatwater habitats of Reach 1; gravel was dominant in riffles and pool tail-outs (Table 3, Figure 6). Of the 15 pool tail-outs observed within the Reach 1 study area, 13 had an embeddedness rating value of 1 (86.7%) indicating good spawning substrate quality and two had a value of 2 (13.3%) indicting relatively higher embeddedness but still appropriate for spawning.

Small and large woody debris were the most prevalent cover types in pools within Reach 1, and overhanging terrestrial vegetation also provided notable cover in pools (Figure 7). Total percentage cover in individual habitat units ranged from 0 to 55%. Only 2 of the 32 habitat units mapped in Reach 1 completely lacked cover (both units were riffles), and 2 flatwater units had less than 5% cover. Multiple large debris jams were observed in the study area of Reach 1.

Reach 1 banks were primarily composed of sand, and gravel/cobble banks were also prevalent (Figure 8). The banks of Reach 1 were mostly vegetated by brush and hardwood trees, and some portions of the banks were bare (Figure 9). Hardwood trees provided a mostly closed riparian canopy, with approximately 74% mean canopy cover (Figure 10). Erosion severity was moderate in Reach 1; parts of the study area had sloughing of low banks, while other portions of did not have substantial erosion.

Approximately a total of 60–100 threespine stickleback were observed in Reach 1, within six habitat units (five pools and one flatwater). A few Sierran treefrog tadpoles (*Pseudacris sierra*) were also observed.

2017 Pool Water Surface Elevation and Water Temperature Monitoring

In Reach 1, a data logger was deployed on May 9, 2017, to monitor water surface elevation and water temperature, in a relatively large scour pool containing large woody debris (Figure 11 – Sheet 1). Photo numbers "2017-03" and "2017-04" in Attachment 1, taken at Photo Point 10 (Figure 11 – Sheet 1), show the Reach 1 pool monitored for water surface elevation on May 9th at the time of deployment and on July 24th when the logger was retrieved, respectively. On May 9th, when the logger was deployed, the pool total depth was 1.19 feet. The pressure transducer data indicate that water surface elevation in the Reach 1 pool declined gradually from May through the end of June (Figure 12). The pool experienced a couple of short disconnections from surface water flow on June 22nd, June 23rd, followed by longer disconnections beginning on July 1st, and then the pool remained disconnected from July 5th until the logger was removed on July 24th. Following pool isolation in early July, pool water surface elevations dropped more dramatically, likely to due to evaporation without surface water input. When the data logger was recovered on July 24th, the pool total depth was 0.23 feet, and the pool was greatly reduced in extent and depth compared to when the logger was deployed.

[1] Residual depth is the difference in depth or bed elevation between the bottom of a pool and the downstream riffle crest, which represents pool depth at lowest flowing conditions.

Water temperature monitoring data for the Reach 1 pool is shown in Figure 13. Water temperature generally increased during the monitoring period, as shown by the 7-DADM water temperature in Figure 13. Water temperatures mostly remained suitable for steelhead; 7-DADM water temperatures were generally below 20-22°C, which are considered the behaviorally stressful threshold and physiologically stressful thresholds for steelhead). However, 7-DADM water temperature exceeded 20°C on two days in mid-June. It is expected that water temperatures would have continued to rise above stressful thresholds as the pool shrank further in extent later into the summer, as was observed in the data from Reach 4 monitoring (discussed below).

On July 24, 2017, after the Reach 1 data logger was retrieved, the biologist walked approximately 1,200 feet upstream of the logger deployment pool. Eleven isolated pools were observed upstream of the logger pool. Maximum pool depths observed were generally 0.5 to 0.25 feet, and four pools had depths between 1-2 feet (one of which was enhanced by woody debris). All isolated pools were separated by sections of dry streambed ranging from approximately 20 feet to 200 feet in length.

Reach 2 Observations

2016 Reconnaissance-Level Habitat Assessment

Reach 2 runs from the second bridge crossing up to the western Grossi property boundary (RM 13.5 to 14.9). On November 4, 2016, pools observed in Reach 2 were larger than those observed in Reach 1. Stream flow was more regular compared to Reach 1. Intermittent flow was present in the middle and upper portions of the reach, although surface water was discontinuous in areas where flow went subsurface. Overall, flow conditions were very low and flow was estimated at 0.75 to 1 gallon per minute (0.001-0.002 cfs).

In the lower portion of Reach 2, between Bridge 2 and Bridge 3, substrate composition was similar to the upstream end of Reach 1. Sand was the dominant substrate in pool and flatwater habitats, and gravel was dominant in riffles and pool tail-outs (Table 3, Figure 6). The channel in Reach 2 was relatively confined and evidence of previous bank failure was apparent throughout the lower portion of the reach below Bridge 3 (e.g., bank slumping). Given the steep banks, thick understory, and presence of many downed trees, poison oak (*Toxicodendron diversilobum*), and blackberry (*Rubus* sp.), access for biologists through the lower end of Reach 2 is difficult.

On November 4, 2016, similar to as observations at Bridge 2, the mid-channel drop structure of Bridge 3 was acting as a small dam, holding back surface waters from recent rains and or seepage from the surrounding pastures. Downstream of Bridge 3, where flow appeared to have been concentrated by the drop structure, flow was estimated at 1 to 2 gallons per minute. The backwater from the drop structure extended approximately 350 feet upstream of Bridge 3.

Upstream of the inundation, intermittent surface flow was observed and estimated at 0.75 to 1.5 gallons per minute. Substrates in this area appeared similar to that observed lower in Reach 2 and in the upper portion of Reach 1. Moving farther upstream of the Bridge 3 backwater, substrates became noticeably coarser. Substrate composition was estimated to be 80% large gravel and 20% small cobble in some sections. The first noticeable change in natural stream gradient was observed to be generally correlated to the presence of coarser substrates. Short step sections (series of small pool-riffle-pool habitat units), each approximately 100 feet in length, were present at the slightly higher gradient. The stream channel was generally similar to that found downstream of Bridge 3,

but was more confined than downstream areas, and in some small sections the stream meandered within a slightly less confined channel.

In the upstream end of Reach 2, recent bank failure and fine sediment point sources were much more apparent compared to downstream areas. Horsetail ferns (*Equisetum* sp.) were observed mid-channel in the upstream end of the reach, suggesting a small on-stream spring. Minimal stream flow was present at the upstream end of the reach, estimated at 0.75 to 1.5 gallons per minute (0.001 – 0.002 cfs), and connectivity between wetted habitats was much more irregular than that observed in the downstream end of Reach 2. Five to ten threespine stickleback were observed in a small isolated pool found at the upstream end of Reach 2.

2017 Stream Habitat Mapping

Approximately 1,456 feet of Reach 2 were inventoried during the stream habitat mapping, starting from just upstream of Bridge 3 (Table 3, Figure 1 and Figure 11 – Sheet 2). Streamflow was not measured in this reach, but appeared comparable to flow measured in Reach 1 at approximately 1.04 cfs earlier in the morning on May 9, 2017. Water temperature measured in the afternoon was 62°F (16.5°C), within the acceptable range for salmonids, and air temperature was 73.4°F (23°C).

Pool habitats (37%) and riffle habitats (37%) were the most prevalent habitat types by length, followed by flatwater habitats (26%) (Figure 4). At the time of the survey, pools observed in the study area of Reach 2 were similar to those in Reach 1, mostly characterized by long pools (most measured approximately 40–100 feet in length, with an average length of 59 feet) less than 1 foot deep. Individual pools and flatwater habitats were divided by short riffle sections. Some relatively longer riffle sections were observed where shallow water flowed across cobble substrates.

Within Reach 2, three of the nine pools measured (33.3%) had a residual depth of 2 feet or greater (Figure 5). The mean of residual pool depths in Reach 2 was 1.75 feet, and the maximum residual pool depth observed in Reach 2 was 2.3 feet. As was the case for pools in Reach 1, the deepest portion of pools observed in Reach 2 was typically a relatively small area compared to the shallower water of most the habitat unit.

Sand was the dominant substrate in pool and flatwater habitats of Reach 2; small gravel was dominant in riffles and pool tail-outs (Table 3, Figure 6). Of the nine pool tail-outs observed within the Reach 2 study area, eight had an embeddedness rating value of 1 (88.9%) and one had a value of 2 (11.1%).

Instream cover was notably less available in Reach 2 compared to Reach 1. Small and large woody debris were the most prevalent cover types in Reach 2, and a small amount of overhanging terrestrial vegetation and undercut bank was also observed (Figure 7). Total percentage cover in individual habitat units ranged from 0 to 50%, and four of the 27 habitat units mapped in Reach 1 completely lacked cover and five other habitat units had less than 5% cover.

Reach 2 banks were primarily composed of sand; gravel/cobble banks were also prevalent (Figure 8). The banks of Reach 2 were mostly vegetated by brush and hardwood trees, and were slightly more vegetated than Reach 1, with only small bare areas (Figure 9). Hardwood trees provided a mostly closed riparian canopy, with mean canopy cover observed at approximately 71% (Figure 10). Within the study area, erosion severity was moderate in Reach 2, and slightly worse than observed in Reach 1; parts of the study area had sloughing of low banks, and some tall, eroding banks were

observed. As noted above, during the 2016 habitat assessment, severe erosion was observed in the upstream end of Reach 2, upstream of the 2017 study area.

Approximately 10–20 threespine stickleback were observed in a pool in Reach 2. A treefrog was also heard calling within the reach.

Reach 3

Reach 3 was not accessible during the 2016 and 2017 surveys. Reach 3 runs from the western Grossi property boundary to Novato Boulevard (RM 14.9 to 16.3).

There is an elevation change of approximately 100 feet between the downstream end of Reach 3 (at 320 feet above mean sea level) and the upstream end of the reach (at 420 feet above mean sea level). Given this elevation change over the 1.3-mile-long reach, other observations of increased stream gradient in the upstream end of Reach 2, and high-gradient features observed in Reach 4, there is potential for a stream gradient barrier or other barrier feature to be present within Reach 3.

Reach 4 Observations

2016 Reconnaissance-Level Habitat Assessment

Reach 4 is located upstream of Novato Boulevard (RM 16.3 to 19.1).

On November 4, 2016, no ponded water or stream flow was observed in most of Reach 4. Most of the stream channel within Reach 4 is low gradient. Bank failure was present but tended to be limited to one side of the stream at any point.

The majority of Reach 4 is low gradient but there are two extremely high gradient sections within the reach (Figure 1). These are large steps located between low-gradient sections. Substrates alternated between mixed gravel sections and sandy gravel sections in lower gradient areas. In higher gradient areas, substrates consisted of coarser material with large gravel, cobble, and boulders present.

At the time of the survey, very little flow was observed at the two high-gradient sections. Flow through both of these locations was broken through multiple large boulder sections with no observable water depth. These sections are potential natural barriers to upstream fish migration.

2017 Stream Habitat Mapping

Approximately 1,373 feet of Reach 4 were inventoried during the stream habitat mapping (Table 3, Figure 1 and Figure 11 – Sheet 3). On May 8, 2017, streamflow was measured just downstream of the starting location to be approximately 0.19 cfs. Water temperature measured in the morning was 57°F (14°C) and air temperature was 55.4°F (13°C).

Riffle habitats were the most prevalent habitat types by length (both 62%), followed by pool habitats (26.5%) and flatwater habitats (11.5%) (Figure 4). At the time of the survey, pools observed in the study area of Reach 4 were generally smaller (most measured approximately 30–50 feet in length, with an average length of 41 feet) and were relatively shallower than those observed in the lower reaches.

Within Reach 4, none of the nine pools measured, none had a residual depth of 2 feet or greater (Figure 5). The mean of residual pool depths in Reach 4 was 1.4 feet, and the maximum residual pool depth observed in Reach 4 was 1.9 feet. Individual pools and flatwater habitats were divided by long, shallow riffle sections. Substrate exposed to air was much more prevalent in Reach 4 compared to downstream reaches.

Gravel and sand were the dominant substrates in pool habitats of Reach 4; gravel was dominant in flatwaters, riffles, and pool tail-outs (Table 3, Figure 6). Of the nine pool tail-outs observed within the Reach 4 study area, four had an embeddedness rating value of 1 (44.4%), four had a value of 2 (44.4%), and one had a value of 3 (11.1%).

Instream cover was least prevalent in Reach 4 compared to the downstream reaches, but a few habitat units had a large amount of cover. Large woody debris was the most observed cover type in Reach 4, and a small amount of overhanging terrestrial vegetation and boulder was also observed (Figure 7). Total percentage cover in individual habitat units ranged from 0 to 70%. Seventeen of the 27 habitat units mapped in Reach 4 completely lacked cover and one other habitat unit had less than 5% cover.

In Reach 4, the stream banks were primarily composed of gravel/cobble (Figure 8). Sand banks were also prevalent, and some bedrock and boulders were observed on the banks. The banks were mostly vegetated by grasses, and had noticeably more bare banks than downstream reaches (Figure 9). The riparian canopy consisted of hardwood trees and was much more open than the downstream reaches, with mean canopy cover observed at approximately 39% (Figure 10). Within the study area, erosion severity was moderate in Reach 4, similar to erosion severity observed in the parts of Reach 2 and slightly worse than observed in Reach 1. Most of the study area had sloughing of low banks, and some tall, eroding banks were observed.

No aquatic species were observed in Reach 4.

During the 2016 habitat assessment, two sections of extreme changes in stream gradient were observed in Reach 4. These were identified as potential natural barriers to upstream fish migration (Figure 11 – Sheet 3). On May 8, 2017, the downstream potential barrier section was assessed when flow was present to further evaluate barrier severity. The boulder cascade measured 127 feet long, with a 13.7% grade. The California Department of Fish and Wildlife (CDFW) defines a total passage barrier due to slope as an 8–10% grade over 1,000 feet of length, or greater than 20% slope section (Flossi et al. 1998, page IX-8). By the CDFW definition, initial assessment measurements indicate this cascade would not be a total passage barrier; however, it appeared to be a total passage barrier at the observed low flows as plunge pool depths were not greater than 1.2 times the jump heights, as required by Flossi et al. (1998) for passage. At the upstream end of the cascade sequence, flow filtered through a large debris jam comprised of small and large woody material. This debris jam appeared to present a passage barrier to upstream movement, and possibly also to downstream passage. As shown in the Reach 4 Gradient Barrier photos, water was observed falling across boulders, without substantial plunge pools, and between boulder crevices. See Attachment 1, photo numbers “2016-23”, “2017-22”, “2017-23”, “2017-24”, “2017-25” taken at Waypoint 850, and photo number “2016-24” taken at Waypoint 852 (Figure 11 – Sheet 3). It is the professional opinions of the authors that, due to the percolation of flow between crevices in the boulder cascades and due to lack of sufficient depths in small jump pools beneath individual boulders, these high-gradient boulder sections would be barriers to upstream migration at all but the highest of storm flows.

2017 Pool Water Surface Elevation and Water Temperature Monitoring

In Reach 4, a data logger was deployed on May 8, 2017, to monitor water surface elevation and water temperature, in a relatively large scour pool containing a large complex of a living tree (Figure 11 – Sheet 3). Photo numbers "2017-14" and "2017-15" in Attachment 1 show the Reach 4 pool monitored for water surface elevation on May 8th at the time of deployment and on July 24th when the logger was retrieved, respectively. On May 8th, when the logger was deployed, the pool total depth was 1.15 feet. The pressure transducer data indicate that water surface elevation in the Reach 4 pool declined very gradually from May through the end of June (Figure 12). The pool disconnected from surface flow on July 5th and water surface elevation decreased more dramatically, likely to due to evaporation without surface water input, until the data logger became exposed to air on July 20th (when the pool depth fell below 0.2 feet). When the data logger was recovered on July 24th, the pool total depth was 0.17 feet, and the pool was greatly reduced in extent and depth compared to when the logger was deployed.

Water temperature monitoring data for the Reach 4 pool is shown in Figure 15. Water temperature generally increased during the monitoring period, as shown by the 7-DADM water temperature in Figure 15. Water temperatures mostly remained suitable for steelhead; 7-DADM water temperature was generally below 20-22°C (which are considered the behaviorally stressful threshold and physiologically stressful thresholds for steelhead), and 7-DADM water temperature approached the 20°C threshold in mid-June. However, as the pool depth decreased to 0.2 feet, daily maximum water temperature quickly rose and approached the potentially lethal limit of 25°C on July 23rd, indicating conditions become unsuitable for steelhead when isolated pools shrink prior to drying.

On July 24, 2017, after the Reach 4 data logger was retrieved, the biologist walked approximately 2,000 feet upstream of the logger deployment pool. All of the stream channel in this area was dry. Additional locations observed from the fire road downstream of the logger pool while in transit to and from the monitoring location were also dry.

Summary and Discussion

Results of reconnaissance-level surveys, the habitat mapping survey, and preliminary pool monitoring indicate that the factors most limiting for steelhead habitat suitability in upper Novato Creek are lack of surface flow during summer months, and scarcity of juvenile rearing and adult holding pool habitat when surface water is present. In May 2017, during the habitat mapping survey, suitable spawning substrate was present for salmonids and areas were observed that may be suitable for spawning under some winter flow conditions if water depths were sufficient. However, most habitats observed were fairly shallow (less than 2 feet deep); there was a scarcity of deep pools available for juvenile rearing habitat or for adult fish holding habitat. Thus, upper Novato Creek has limited suitability for over-summering for both juvenile and adult steelhead. Steelhead habitat suitability is likely further reduced as flows decline through summer months. During the two previous reconnaissance-level surveys, little to no surface flow was observed in Upper Novato Creek above Stafford Dam at the end of the dry season.

During the December 2015 survey, which occurred following a recent rain event that signaled the end of the dry season, no stream flow was observed in Upper Novato Creek. At the time of the November 2016 survey, also just after the end of the dry season and recent precipitation, stream

flow was present in some areas and was estimated to range from 0.5 to 2 gallon per minute (less than 0.01 cfs); and, flow was not continuous throughout Upper Novato Creek. Stream flow in Reach 1 was also generally intermittent; isolated pools were observed in depressions within the lower portion of Reach 1. The most surface water was observed within Reach 2, at locations where drop structures appeared to provide concentration points for both surface and subsurface flow, and at a location where a small in-channel spring may be present. No surface water was observed in Reach 4.

During the May 2017 habitat mapping, at the beginning of the dry season, stream flow was continuous throughout the survey areas that were visited, and was measured to range from 0.19 cfs in Reach 4 to 1.04 cfs in Reach 1. The 2016-2017 winter was very wet, with 30.7 inches of rain recorded at the Black Point rain gauge in Novato starting January 2017. Forty-two inches of rain were recorded at NMWD's office for the entire wet weather season, and this gauge can be a few inches lower than in the vicinity of Upper Novato Creek. Note that at 42 inches, rainfall for this period was the seventh wettest season on record since 1916. Rainfall at the Novato Library in Central totaled 47.44 inches in water year 2017 (Marin County 2018). The last substantial rainfalls of the season occurred prior to the survey: a series of small storm events of approximately 0.6 inch over April 12–19, 2017, and a storm event of approximately 2.68 inches on April 6–8, 2017, as measured at the Novato Library gage (Marin County 2018). Heavy winter rainfalls and late-season precipitation likely maintained a well-saturated watershed through the wet season. Thus, the observed amount of streamflow present in May 2017 was likely higher than under normal late-spring to early-summer conditions.

During the 2017 survey, habitats in Reach 1 and Reach 2 consisted of long and relatively shallow pool and flatwater habitats, with few areas of relatively deep water (greater than 2 feet deep). The downstream reaches are characterized by primarily sandy habitats with multiple debris jams where scour occurs. Larger gravel substrates were observed in pool tail-outs and riffles. Pool tail-outs had low embeddedness values. Banks in the lower reaches are mostly vegetated with hardwood trees and brush, and the riparian canopy is mostly closed.

At the time of the 2017 survey, Reach 4 was distinct from the lower reaches with noticeably less streamflow, shallower habitats, and coarser substrates. Some pool tail-outs had slightly higher embeddedness values compared to the downstream reaches, but were still within values suitable for spawning. Bare banks were more common than in the downstream reaches. Bank vegetation consisted primarily of grasses rather than trees and shrubs, and the riparian canopy was markedly more open compared to Reach 1 and Reach 2.

To further evaluate the persistence of streamflow and water quality in Upper Novato Creek into summer during an extremely wet year, data loggers that monitored depth of flow and water temperature were deployed at two locations during May 2017. The data loggers were retrieved at the end of July 2017. Water surface elevations in the two monitored pools generally declined slowly during the monitoring period until the pools became disconnected and fully isolated from surface flow at the beginning of July. Following isolation, pool depths decreased more quickly, likely to due to evaporation without surface water input, as the pools decreased in size and depth. On July 24th, approximately 1,200 feet of stream channel upstream of the logger location in Reach 2 was surveyed and a series of isolated pools separated by dry channel was observed. Approximately 1,500 feet of Reach 4 upstream of the logger location in that reach was also walked and observed to be totally dry. Water temperatures mostly remained suitable for steelhead during the monitoring period until pool isolation and volume reduction. Overall, monitoring data showed that continuous surface flow

did not persist in Upper Novato Creek through the summer, despite water year 2017 being a very wet year. Isolated pools became unsuitable for steelhead rearing due to insufficient pool depth and/or water temperatures approaching stressful or potentially lethal thresholds as they shrank dramatically following disconnection of surface flow. Therefore, Upper Novato Creek appears to have little to no suitability for over-summering steelhead.

During the 2016 habitat assessment, two sections with large changes in stream gradient were observed in Reach 4 and were identified as potential natural barriers to upstream fish migration. See photos in Attachment 1 (photo numbers "2016-23", "2017-22", "2017-23", "2017-24", "2017-25", and "2016-24", Figure 11 – Sheet 3). Further assessment of the downstream section during the 2017 survey indicated that, in the authors' professional opinions, the boulder cascade is likely a total passage barrier under all but the highest stormflows. Thus, there would be less available habitat upstream of this barrier than assumed in the NMFS Recovery Plan.

Leidy et al. (2005) provides a compilation of historic and present-day records of steelhead observations in the Novato Creek Watershed. No steelhead were observed during a fish sampling event in Novato Creek upstream of Stafford Dam in 1997 (Leidy 2002, as cited in Leidy et al. 2005). Incidental observations made during the 2015, 2016, and 2017 habitat assessments also indicate *O. mykiss* are not present in Upper Novato Creek. The only native fish observed during the three habitat surveys was threespine stickleback. A small number of stickleback were observed in Upper Novato Creek during the 2016 habitat assessment. During the 2017 habitat mapping survey, approximately 60 to 100 threespine stickleback were observed in Reach 1 and 10 to 20 stickleback were observed in Reach 2. Upper Novato Creek may support native amphibians, including Sierran treefrog. A few treefrog tadpoles were observed in Reach 1 and a treefrog was heard calling in Reach 2. No aquatic species were observed in Reach 4 during the 2016 or 2017 surveys.

Stickleback attain a maximum size of approximately 2 inches, can make migrations upstream from large water bodies (such as lakes and the ocean) to spawn, and prefer shallow water in streams (Moyle 2002). Additionally, stickleback are more tolerant of low dissolved oxygen concentrations than steelhead; stickleback can tolerate concentrations to 2 milligrams per liter (mg/L) (Feldmeth and Baskin 1976, Baskin 1975, as cited in USFWS 2009). Compared to salmonids that generally become stressed below 5 mg/l, stickleback may have lethal conditions below 3 mg/L (Barnhart 1986; Matthews and Berg 1997; Deas and Orlob 1999). Conditions with low dissolved oxygen concentrations typically occur as intermittent streams dry during summer months. Stickleback may be better suited to the low summer flows in Upper Novato Creek compared to salmonids. Stickleback likely migrate upstream into Upper Novato Creek from Stafford Lake when surface water is available in the stream, and/or may migrate downstream from irrigation ponds in the upper watershed during high winter flows associated with large rainfall events.

The Upper Novato Creek Watershed is generally dry, with little to no surface flow available during the over-summering months. Isolated pools are relatively shallow with water temperatures that become unsuitable for rearing steelhead as pools shrink. Due to the scarcity of deep pool habitats and lack of surface flows during summer months, Upper Novato Creek is does not appear to provide suitable habitat for juvenile salmonid habitat and adult holding habitat during late summer through the return of wet-season rains, which in some years could be as late as December. Therefore, the upper watershed likely is incapable of supporting the reproductive capacity that NMFS expected this area to be capable of in the Recovery Plan.

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Appendix A
Tables and Figures

Table 1 Temperature thresholds for steelhead life stages and potential effects.

Life stage	Threshold	Effect	Citation
Incubation	12°C	Reduced incubation survival	Kamler and Kato 1983 and Rombough 1988, both as cited in McCullough et al 2001, Velsen 1987, as cited in Richter and Kolmes 2005
	16°C	Very poor egg incubation survival	Velsen 1987, as cited in Richter and Kolmes 2005
Juvenile rearing	20°C	May decrease feeding and growth	Bjornn and Reiser 1991, Carter 2008, NMFS 2011, R2 Consultants 2012
	22°C	Stressful to juvenile steelhead	Bjornn and Reiser 1991, Carter 2008, NMFS 2011, McBain and Trush 2007, R2 Consultants 2012
	25°C	Potentially lethal	Carpanzo 1996 as cited by Moyle et al. 2008, Matthews and Berg 1997, Boughton et al. 2009, R2 Consultants 2012
Smoltification	13°C	Prevent smoltificaiton	Adams et al. 1973; Zaugg and Wagner 1973; Wedemeyer et al. 1980, McBain and Trush 2007
Adult migration	24°C	Migration avoidance	Rickter and Kolmes 2005

Table 2. Monthly and Total Annual Rainfall Measured at Novato Library, Novato, California: Water Years 2012–2017

Water Year	Monthly Precipitation (inches)												Annual Total
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
2012	2.00	1.44	0.20	3.96	1.44	6.36	1.24	0.00	0.00	0.00	0.00	0.00	16.64
2013	1.32	0.32	9.06	0.52	0.36	0.84	1.04	0.04	0.48	0.00	0.00	0.32	14.30
2014	0.00	1.00	0.88	0.00	7.80	3.04	1.00	0.00	0.00	0.00	0.08	0.28	14.08
2015	1.36	3.00	19.00	0.00	3.92	0.12	1.52	0.16	0.16	0.00	0.00	0.00	29.24
2016	0.00	1.16	4.84	8.04	1.08	6.96	0.68	0.16	0.12	0.00	0.00	0.00	23.04
2017	4.48	2.80	4.44	16.80	11.88	3.68	3.28	0.00	0.08	0.00	0.00	0.00	47.44
Data source: Marin County (2018)													

Table 3. Level II Habitat Types Summary

Reach/ Habitat Unit Type	Number of Habitat Units	Habitat Type (by frequency of occurrence)	Habitat Type Total Length (feet)	Habitat Type (by length)	Habitat Unit Mean Length (feet)	Habitat Unit Mean Width (feet)	Habitat Unit Mean Depth (feet)	Habitat Unit Dominant Substrate Type (by length)	Max Residual Pool Depth[1] (feet)	Mean Residual Pool Depth[1] (feet)	Pool Tail Dominant Substrate Type (by frequency of occurrence)	Mean Count LWD	Mean Total % Instream Cover	Dominant Cover Types (by percent cover)	Dominant Bank Composition	Dominant Bank Vegetation	Mean Total % Canopy
Reach 1																	
Pool	15	46.88%	964	59.42%	64.24	10.44	0.79	sand	2.50	1.61	gravel	0.73	20.00%	large woody debris	-	-	74.00%
Flatwater	6	18.75%	352	21.69%	58.62	6.32	0.47	sand	-	-	-	0.00	8.83%	terrestrial veg	-	-	75.83%
Riffle	11	34.38%	306	18.90%	27.86	6.98	0.25	gravel	-	-	-	0.18	14.73%	small woody debris	-	-	72.55%
All types	32	-	1622	-	50.68	8.48	0.54	sand	-	-	-	0.41	16.09%	small woody debris	silt/sand/clay	brush	73.84%
Reach 2																	
Pool	9	33.33%	533	36.61%	59.24	12.29	0.76	sand	2.30	1.75	gravel	0.56	13.00%	small woody debris	-	-	67.33%
Flatwater	7	25.93%	385	26.42%	54.98	9.91	0.40	sand	-	-	-	0.43	12.71%	small woody debris	-	-	72.71%
Riffle	11	40.74%	538	36.97%	48.94	7.83	0.23	gravel	-	-	-	0.09	5.45%	small woody debris	-	-	74.09%
All types	27	-	1456	-	53.94	9.86	0.45	sand	-	-	-	0.33	9.85%	small woody debris	cobble/gravel	brush	71.48%
Reach 4																	
Pool	9	33.33%	365	26.57%	40.54	7.48	0.83	gravel	1.98	1.44	gravel	1.22	15.44%	large woody debris	-	-	47.22%
Flatwater	6	22.22%	159	11.57%	26.47	6.07	0.27	gravel	-	-	-	0.00	0.00%	no cover	-	-	37.67%
Riffle	12	44.44%	849	61.86%	70.78	5.69	0.17	gravel	-	-	-	0.00	3.67%	terrestrial veg			32.58%
All types	27	-	1373	-	50.85	6.37	0.41	gravel	-	-	-	0.41	6.78%	large woody debris	cobble/gravel	grass	38.59%
All Study Reaches[2]																	
Pool	33	38.37%	1862	41.82%	56.411	10.14	0.79	sand	2.50	1.60	gravel	0.82	16.85%	large woody debris	-	-	64.88%
Flatwater	19	22.09%	895	20.11%	47.123	7.56	0.38	sand	-	-	-	0.16	7.47%	small woody debris	-	-	62.63%
Riffle	34	39.53%	1694	38.06%	49.830	6.80	0.21	gravel	-	-	-	0.09	7.82%	small woody debris	-	-	58.94%
All types	86	-	4451	-	51.76	8.25	0.47	sand	2.50	1.60	gravel	0.38	11.21%	small woody debris	silt/sand/clay	brush	62.03%

[1] Residual pool depth is the difference in depth or bed elevation between a pool and the downstream riffle crest, and is calculated by subtracting the depth of the pool tail crest from the maximum pool depth.
[2] Reach 3 was not accessible during the 2017 habitat mapping survey, and totals are presented for Reaches 1, 2, and 4.

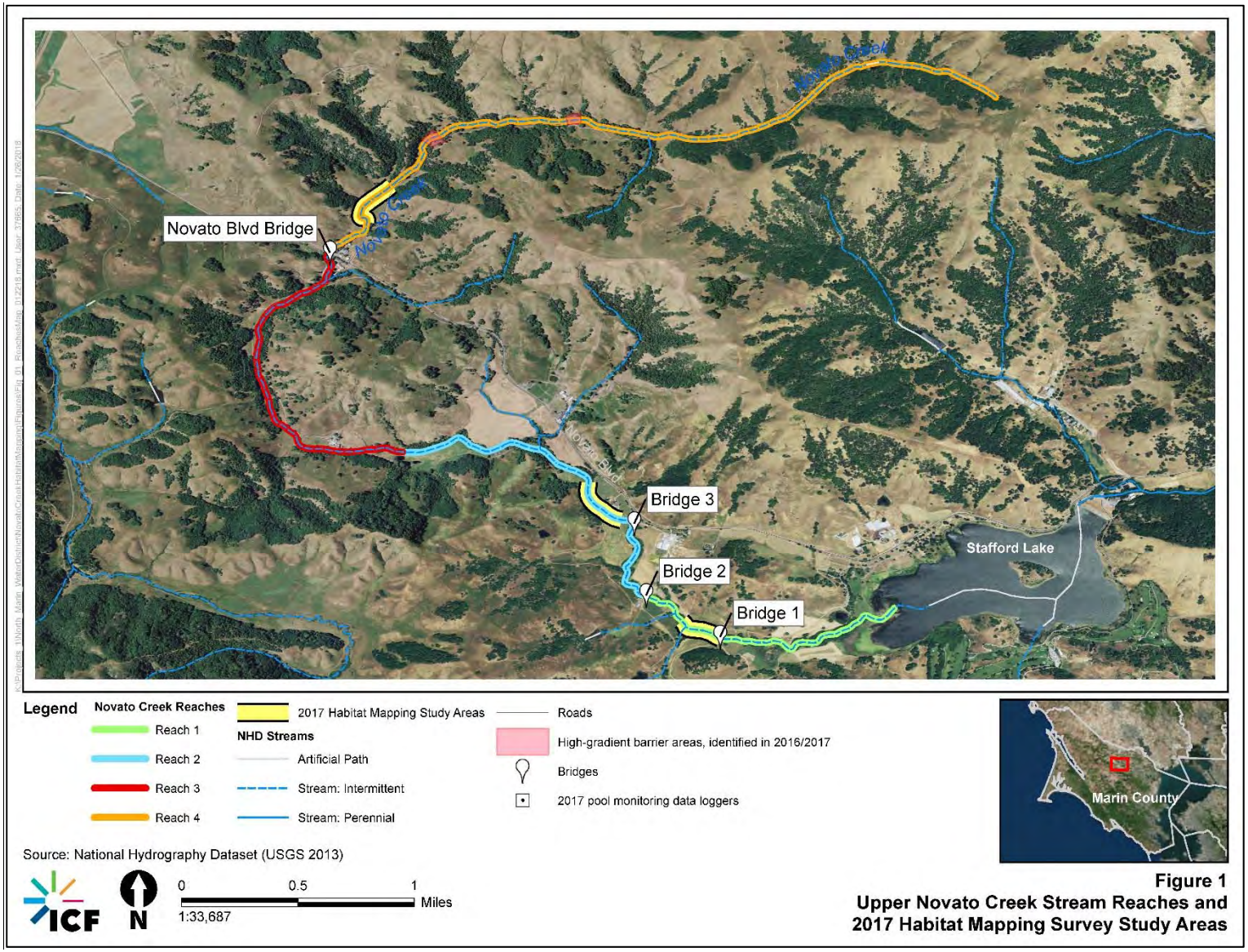


Figure 1. Novato Creek Reach Delineation and Habitat Mapping Study Areas of the 2017 Survey

Figure 2. Monthly Rainfall Totals in Novato, California

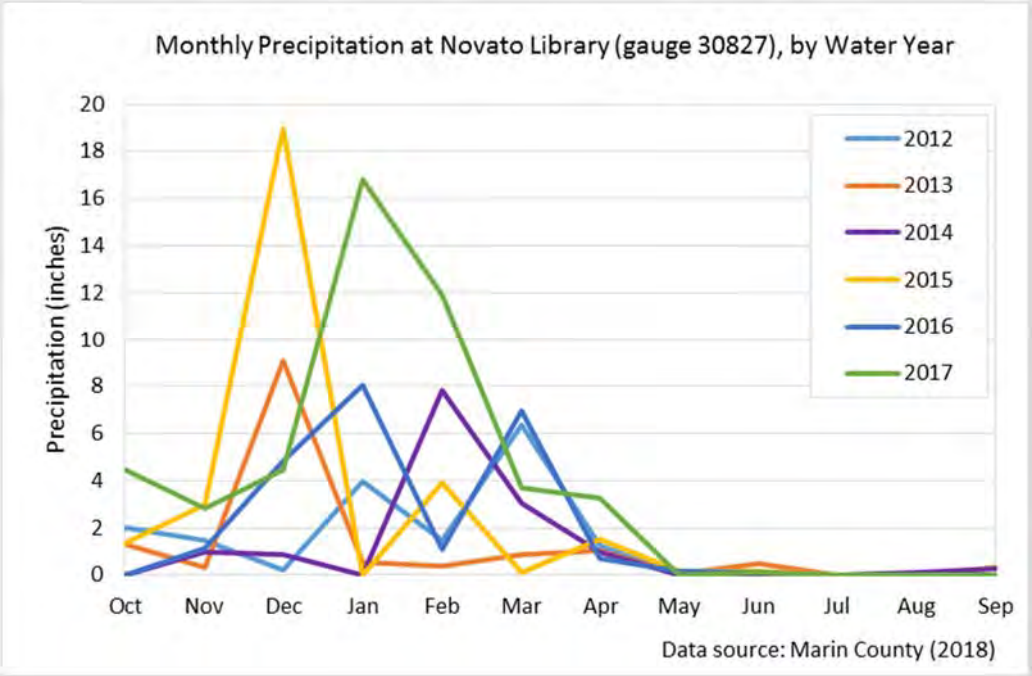


Figure 3. Study Area Habitat Type Frequencies (by Count)

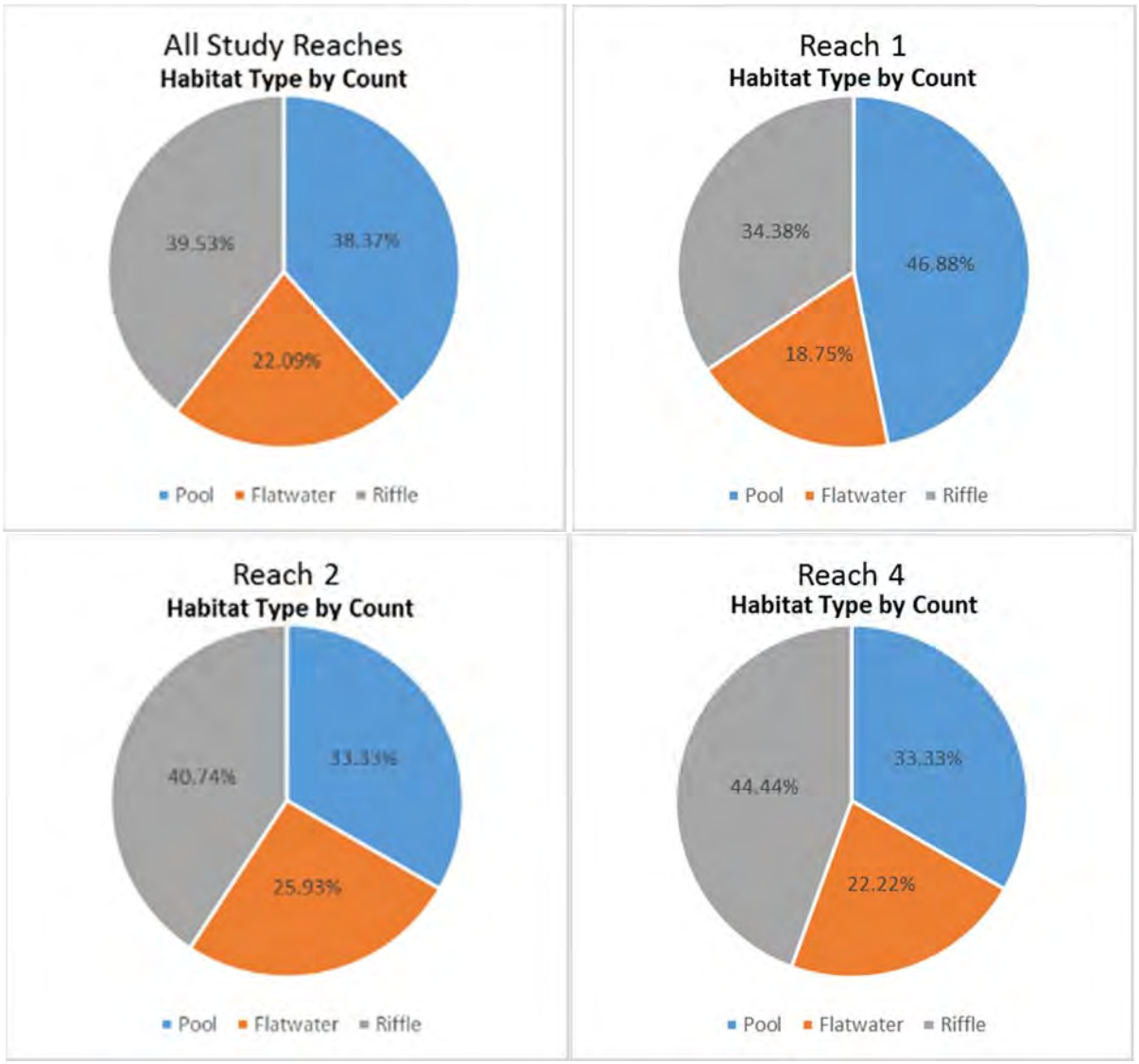


Figure 4. Study Area Habitat Type Frequencies (by Total Length)

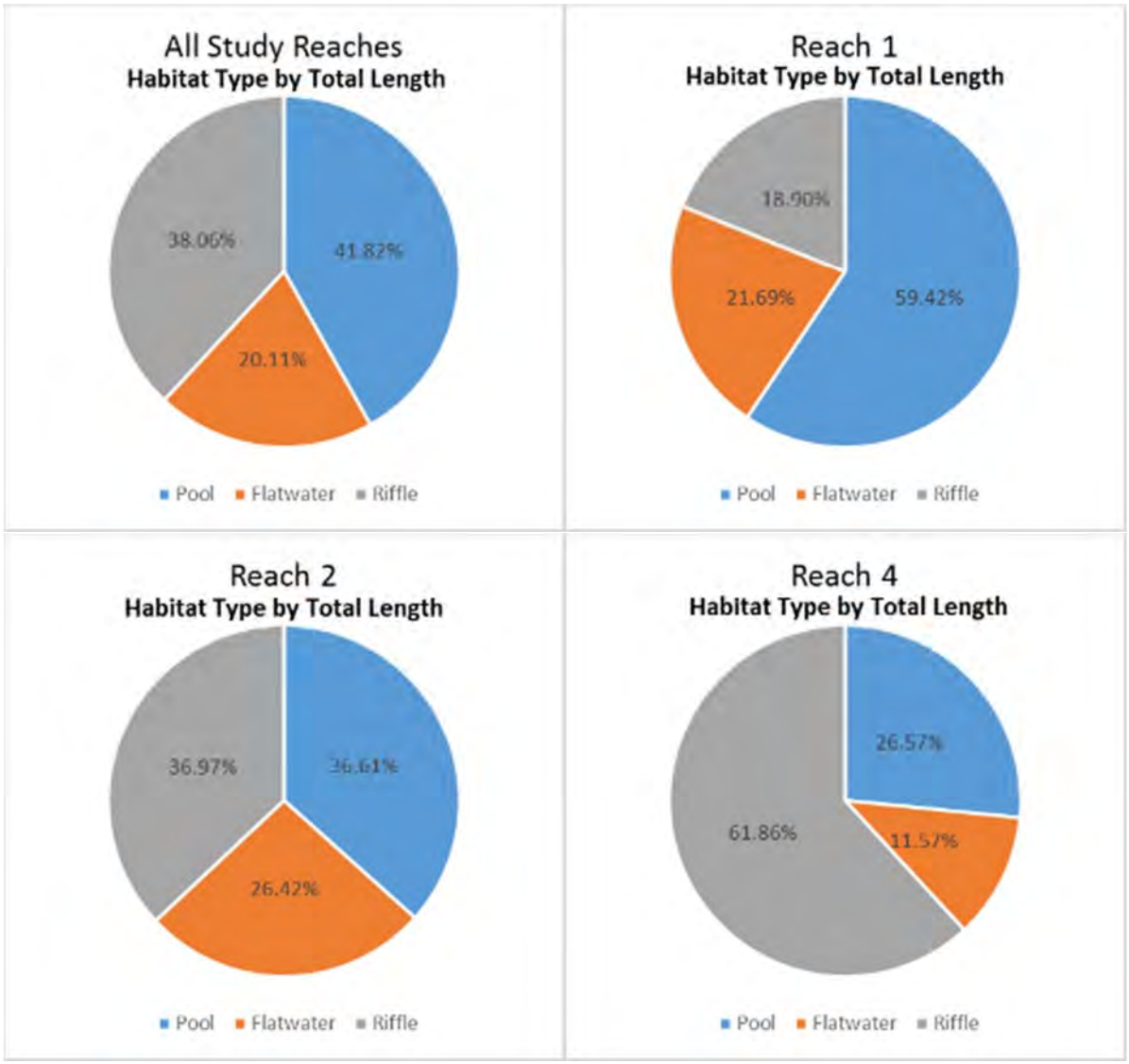
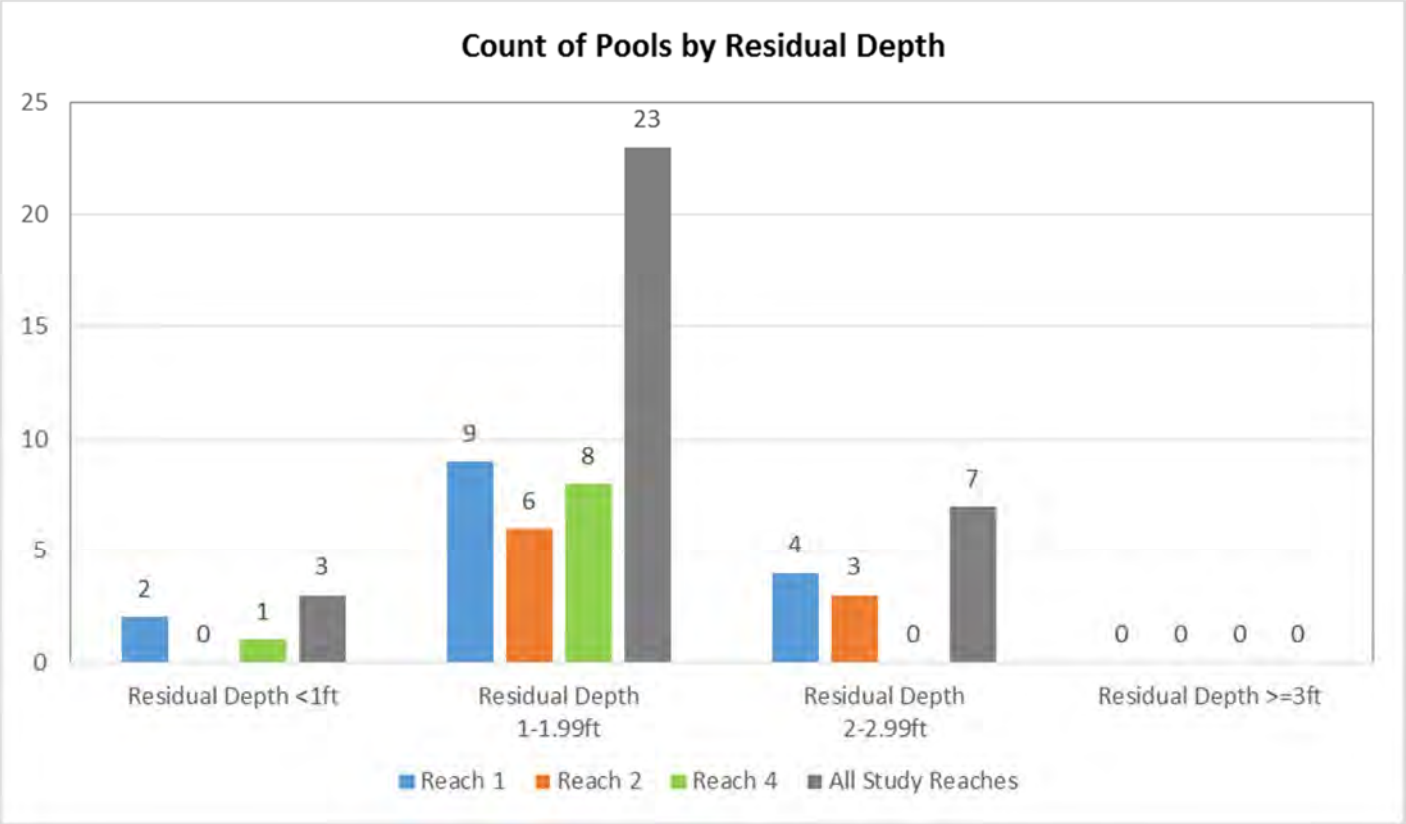


Figure 5. Count of Pools by Residual Depth*, Shown for All Areas and by Reach



* Residual depth is the difference in depth or bed elevation between the bottom of a pool and the downstream riffle crest, which represents pool depth at lowest flowing conditions.

Figure 6. Dominant Substrate in Pool Tail-outs, Shown for All Study Areas and by Reach

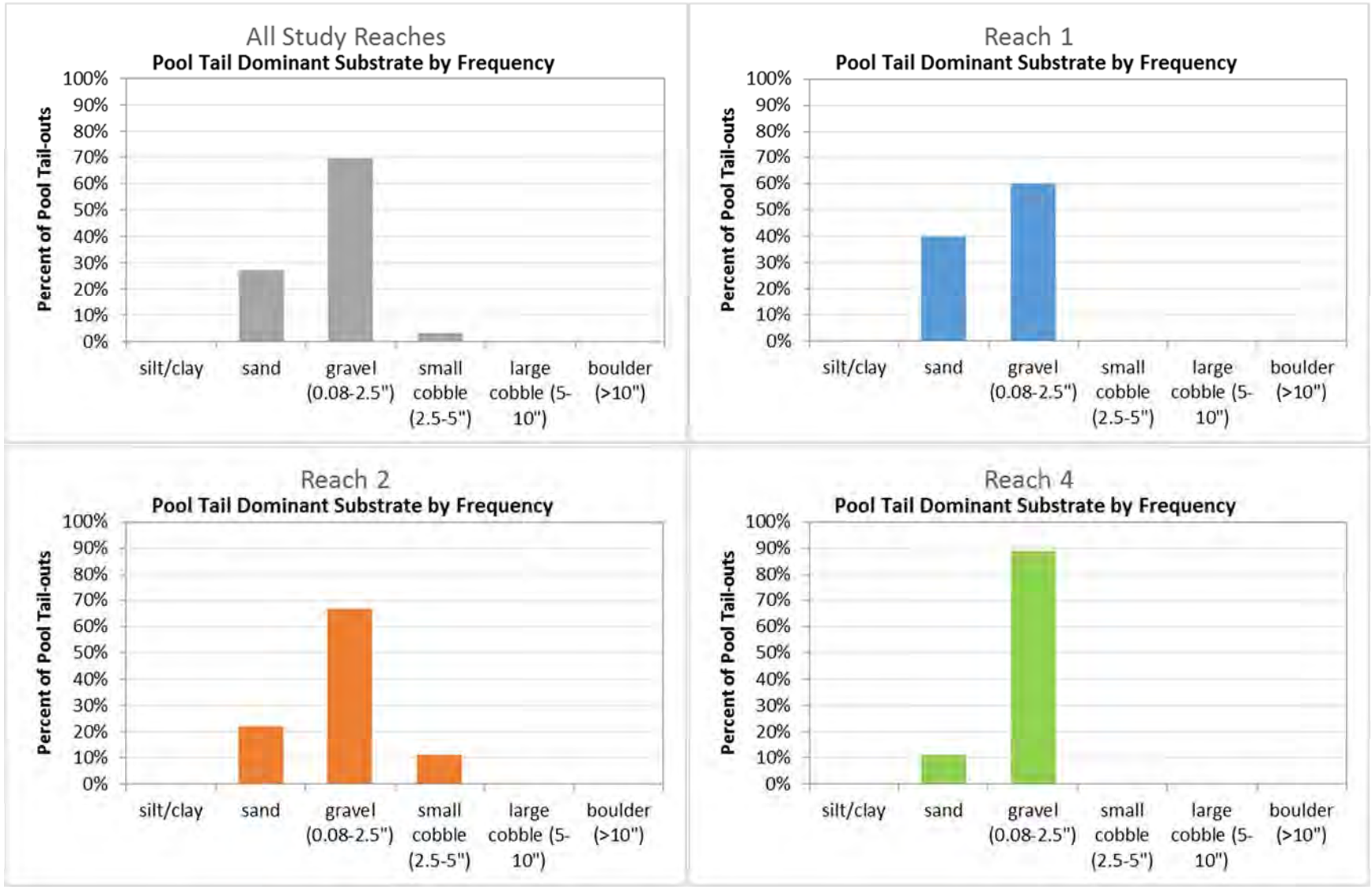


Figure 7. Dominant Cover Types in Pools, Shown for All Study Areas and by Reach

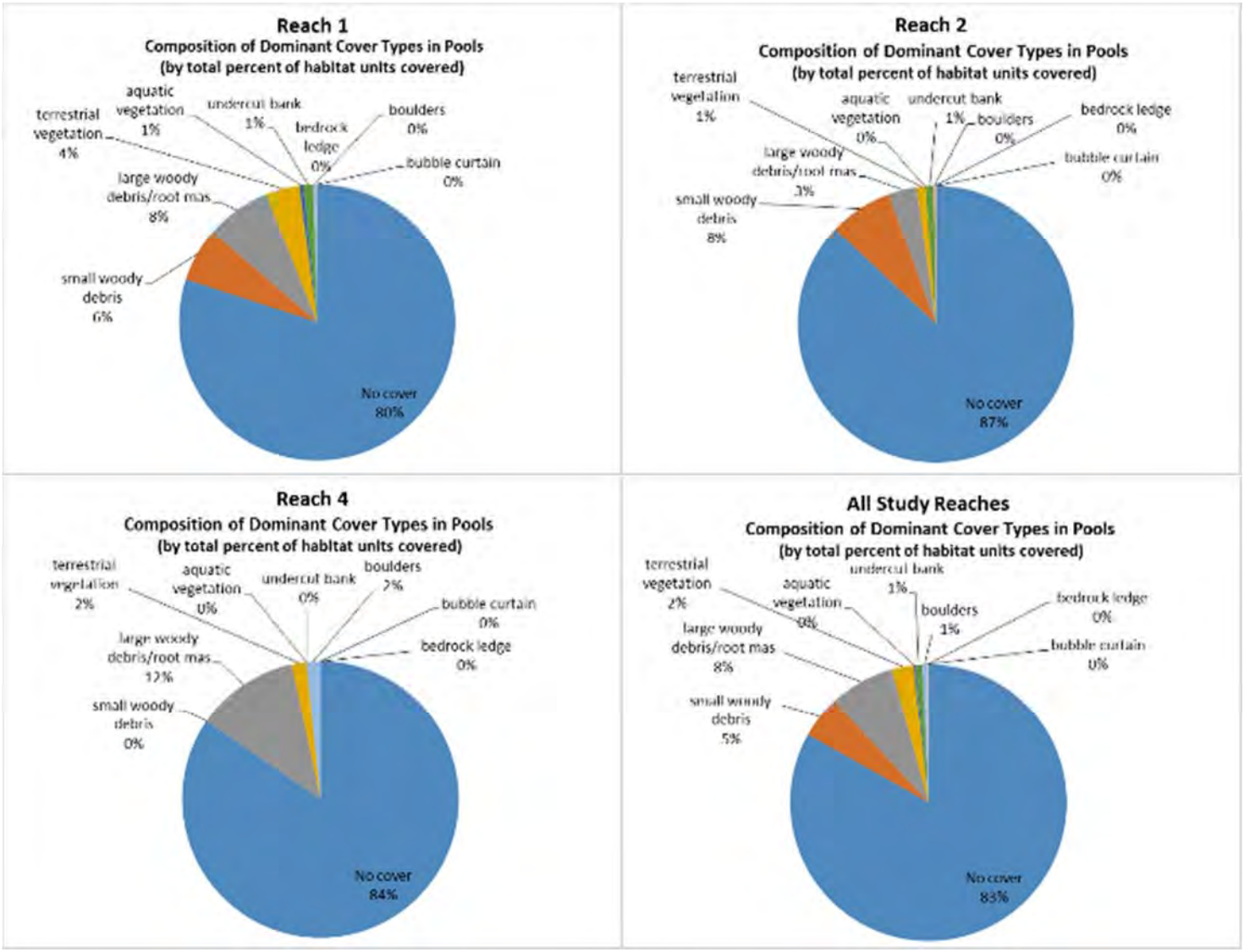


Figure 8. Dominant Bank Composition by Percentage of Habitat Units, Shown for All Study Areas and by Reach

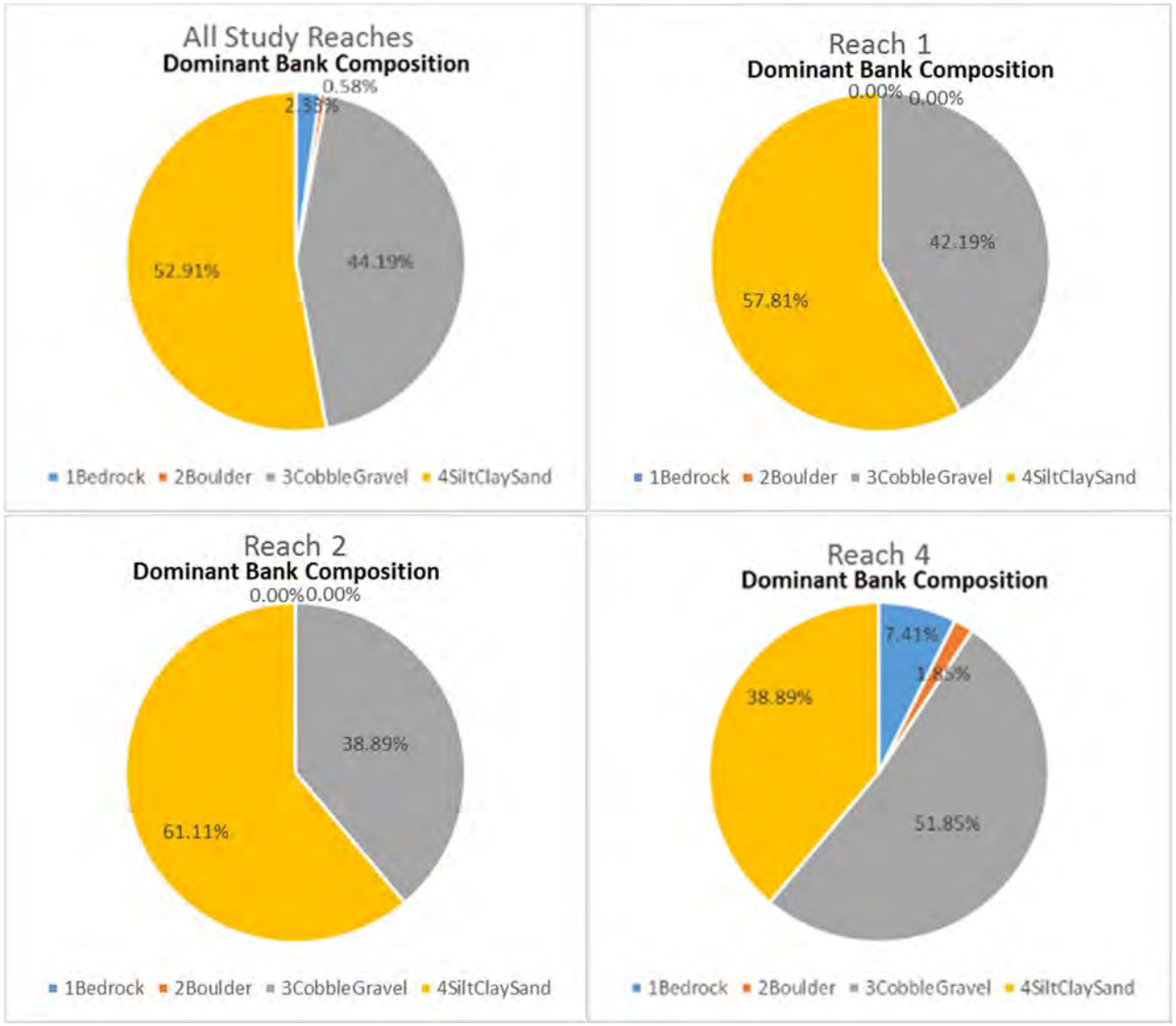


Figure 9 Dominant Bank Vegetation by Percentage of Habitat Units, Shown for All Study Areas and by Reach

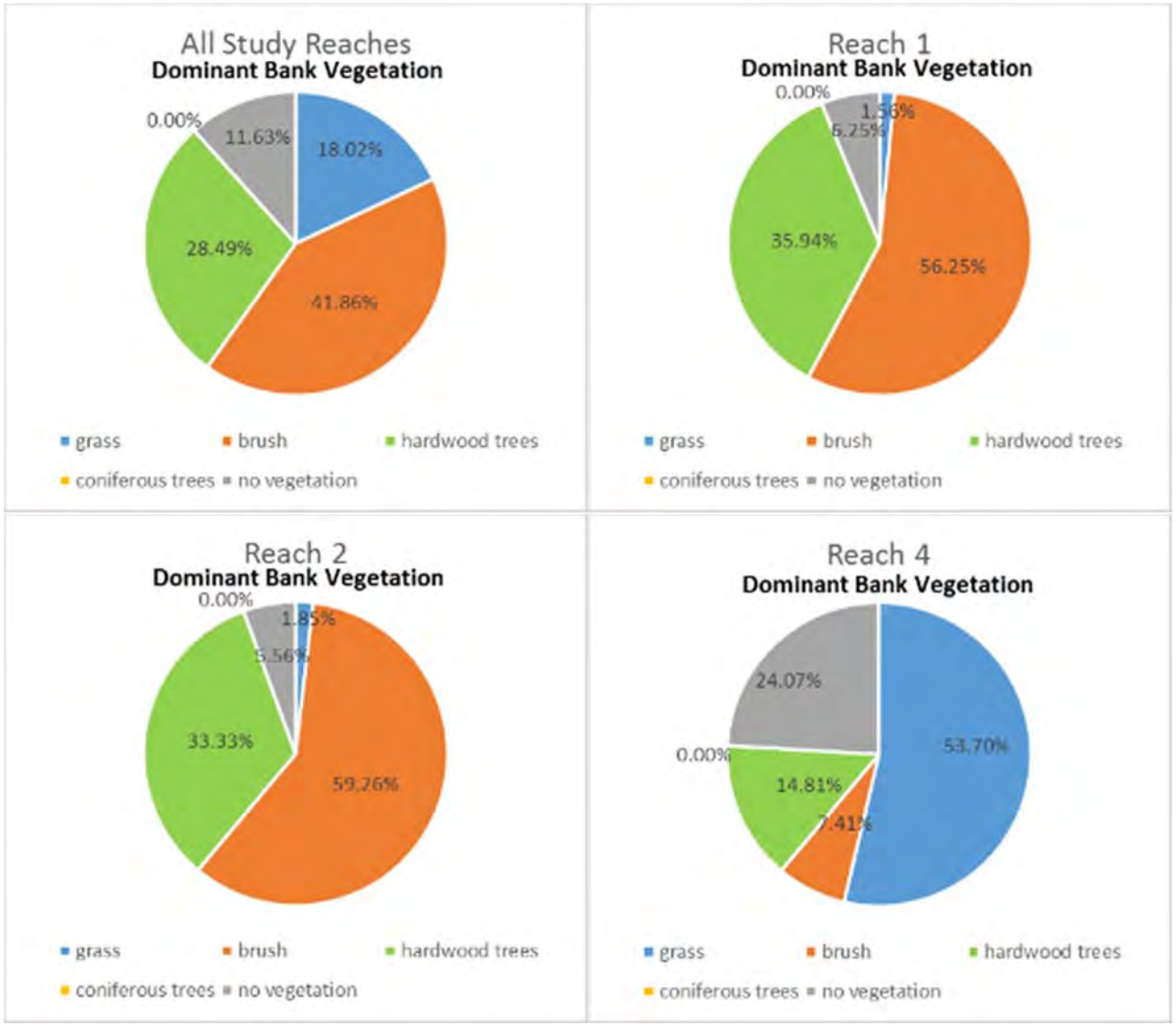
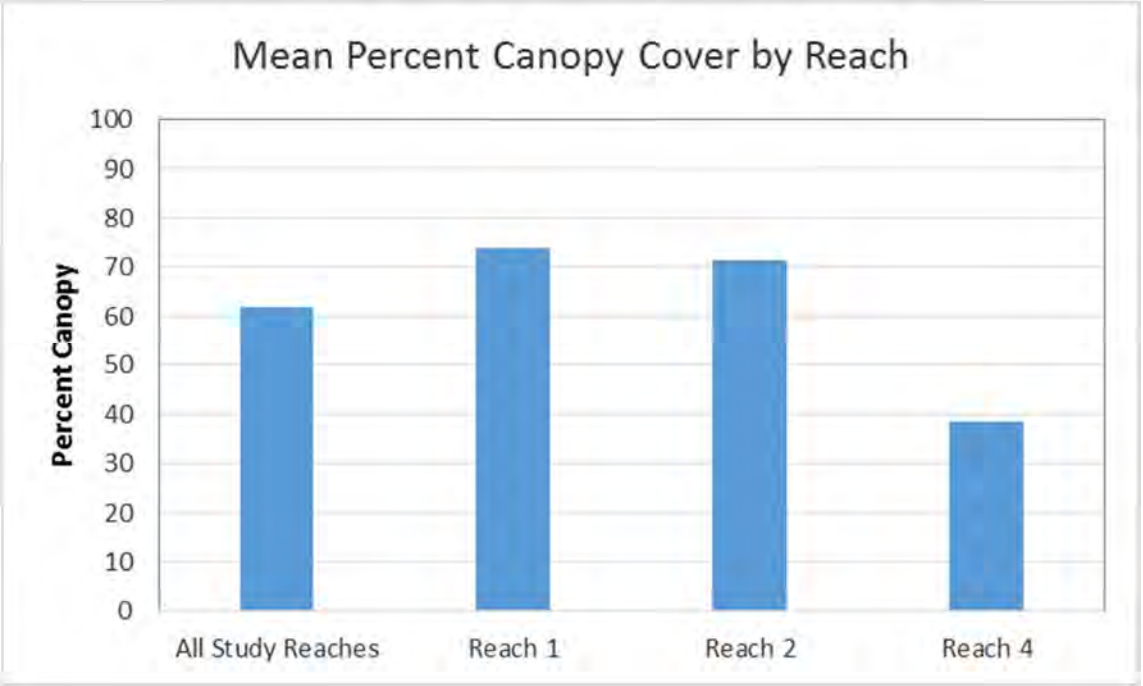


Figure 10 Mean Percentage Canopy Cover (Hardwood Trees) of Habitat Units, Shown for All Study Areas and by Reach



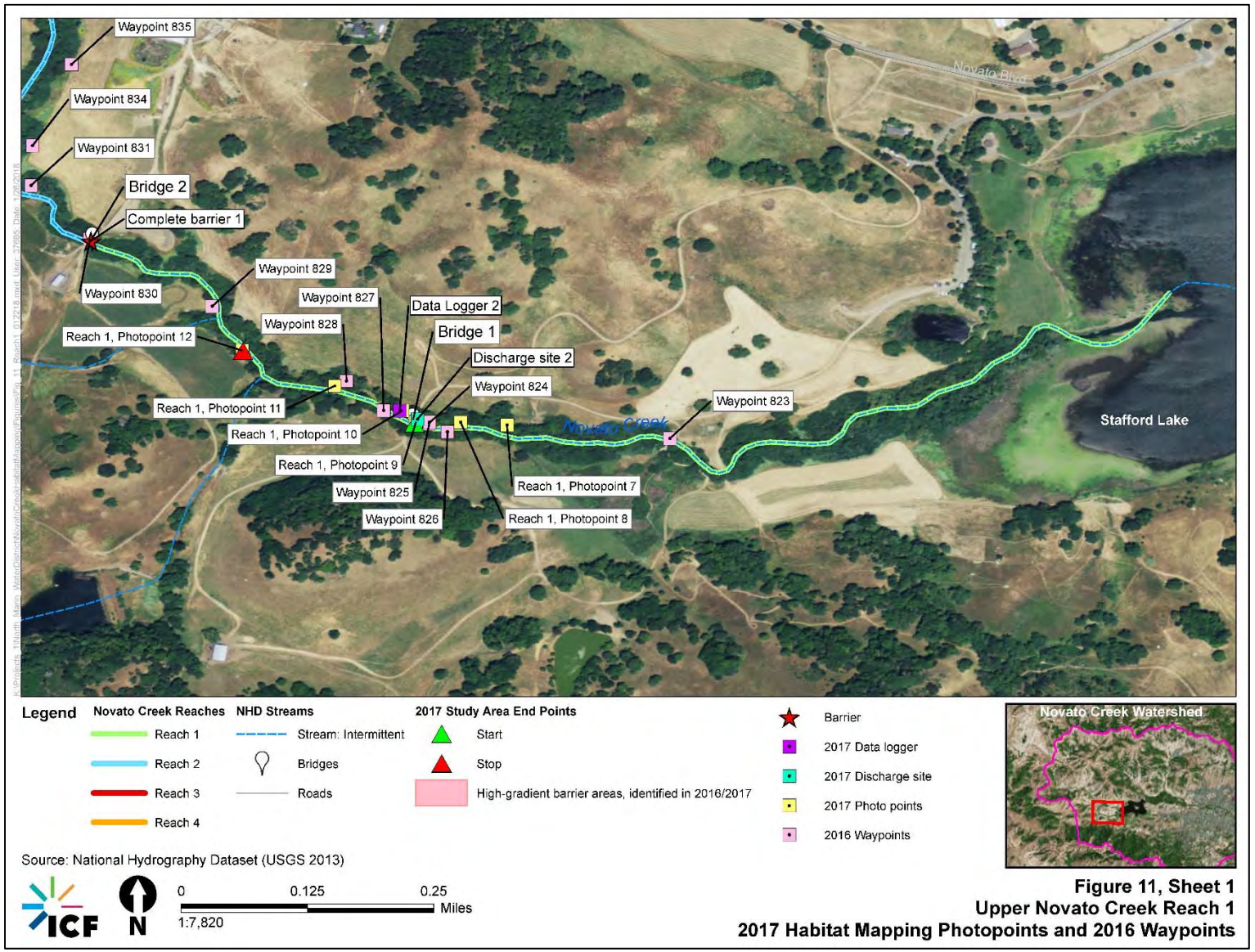


Figure 11. Sheet 1: Reach 1. Georeferenced points of photos and observations made during the 2016 survey and 2017 survey (see Attachment 1)

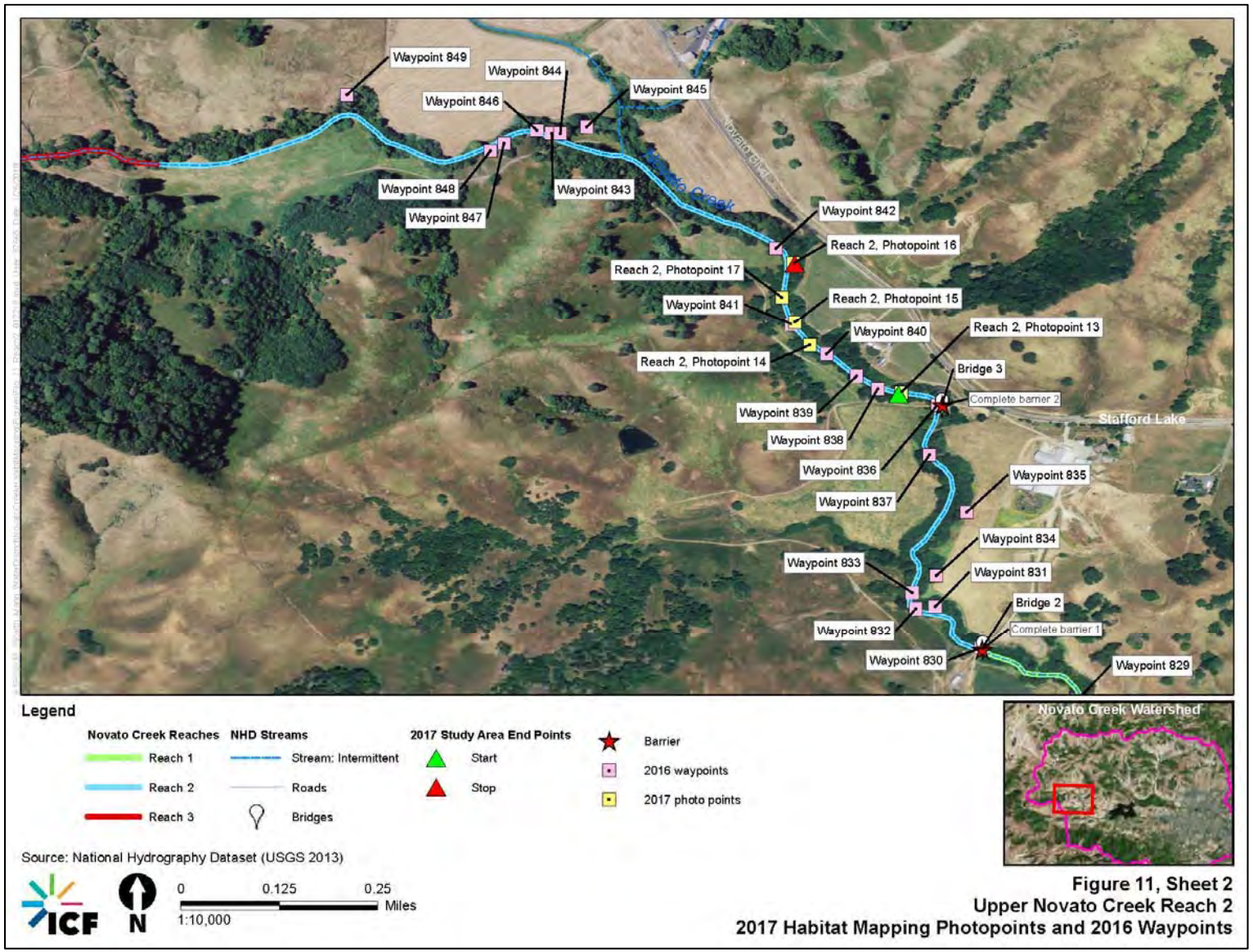


Figure 11. Sheet 2: Reach 2. Georeferenced points of photos and observations made during the 2016 survey and 2017 survey (see Attachment 1)

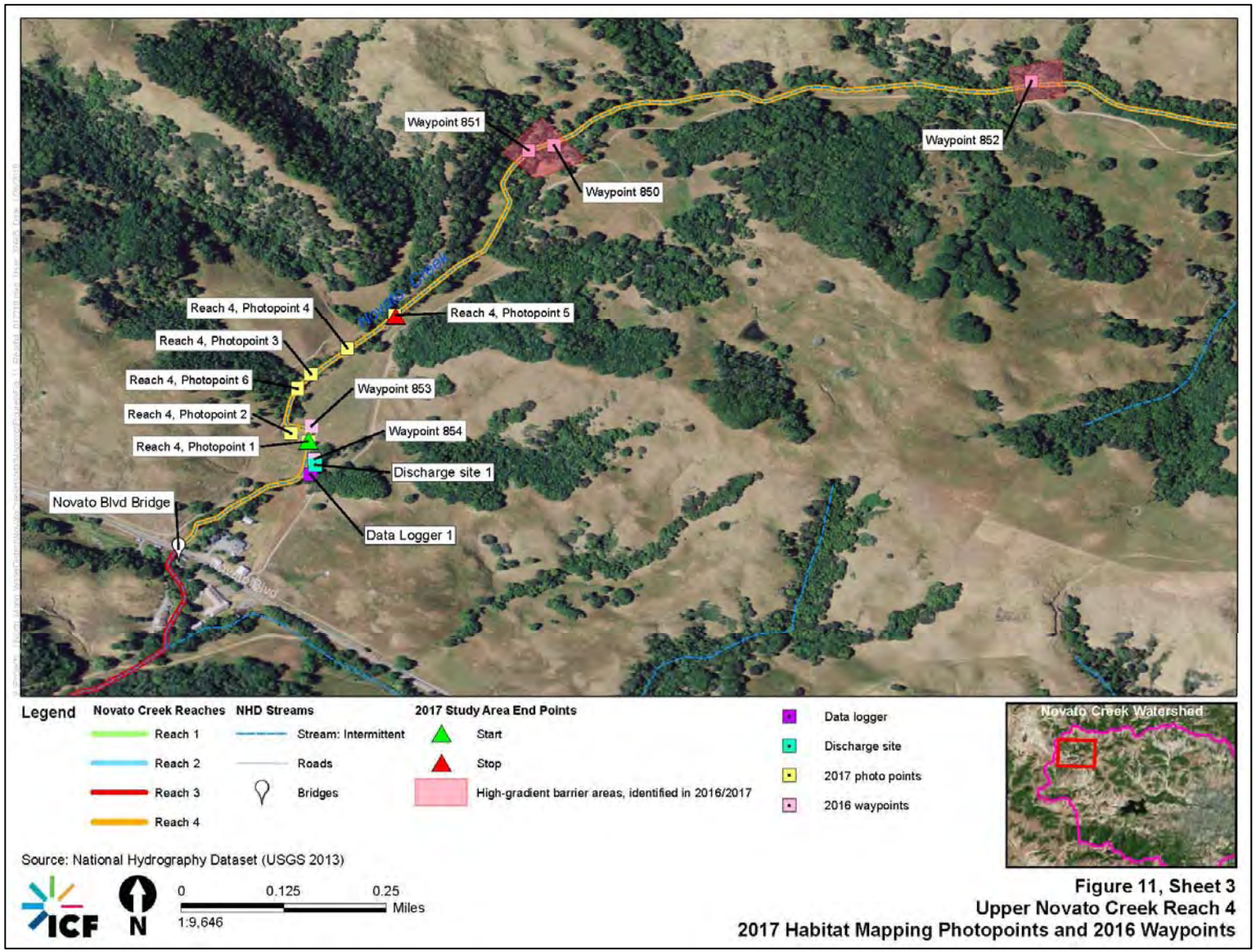


Figure 11. Sheet 3: Reach 4. Georeferenced points of photos and observations made during the 2016 survey and 2017 survey (see Attachment 1)

Figure 12 Reach 1 Water Surface Elevation Monitoring Pool: Pool Depth Data

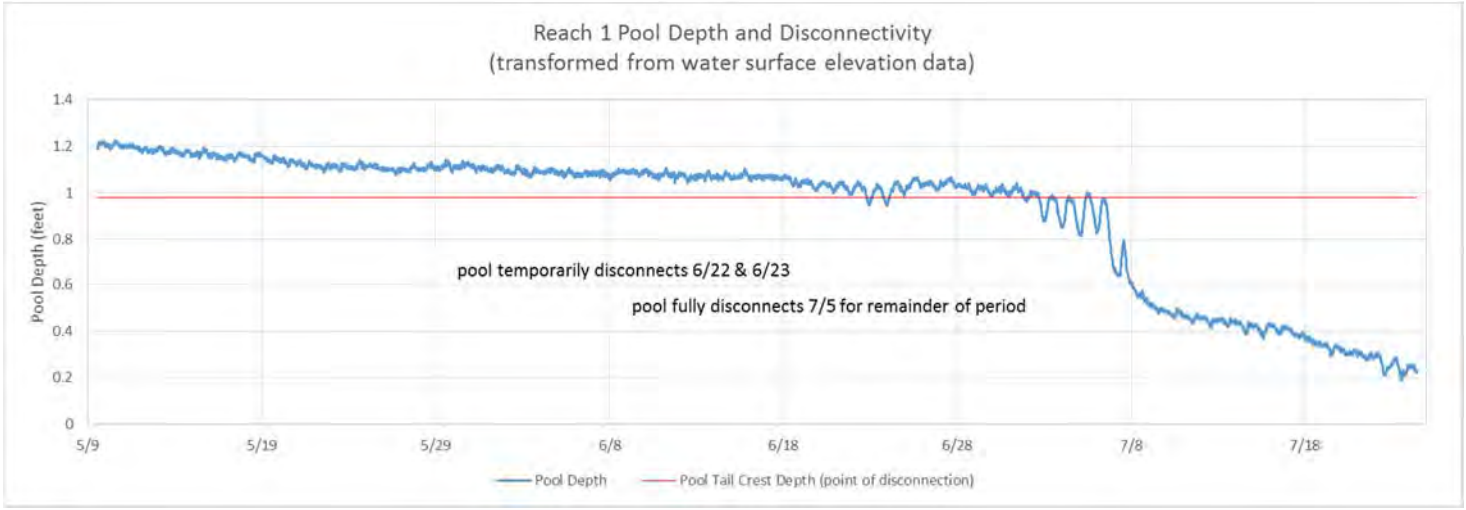


Figure 13 Reach 1 Water Surface Elevation Monitoring Pool: Water Temperature Data

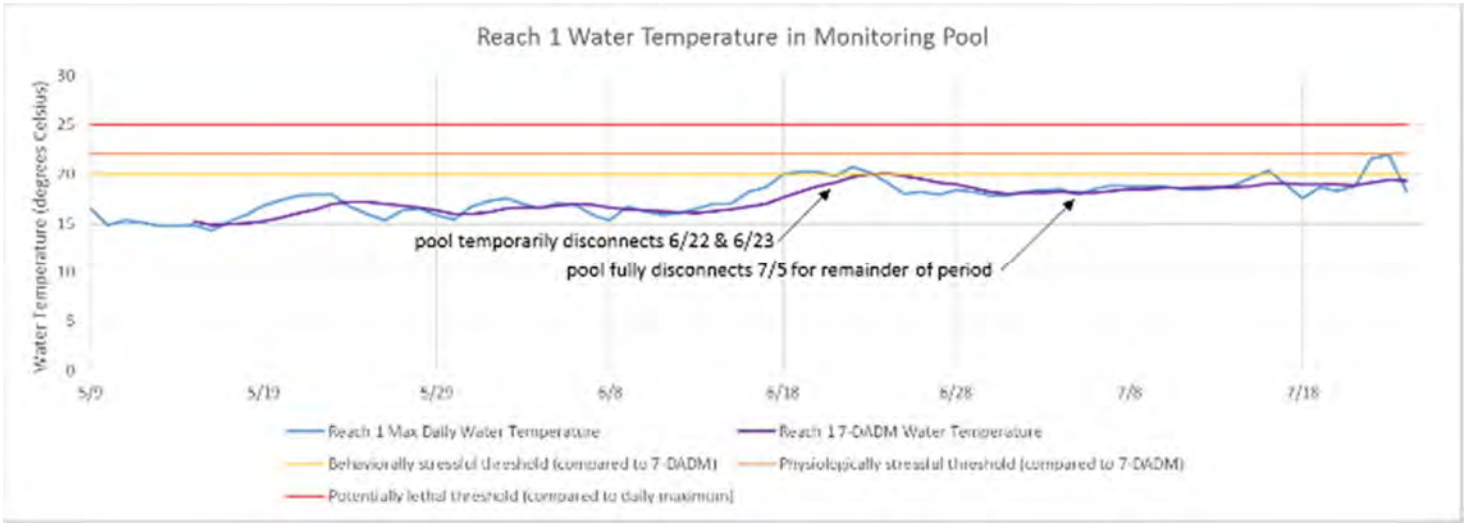


Figure 14 Reach 4 Water Surface Elevation Monitoring Pool: Pool Depth Data

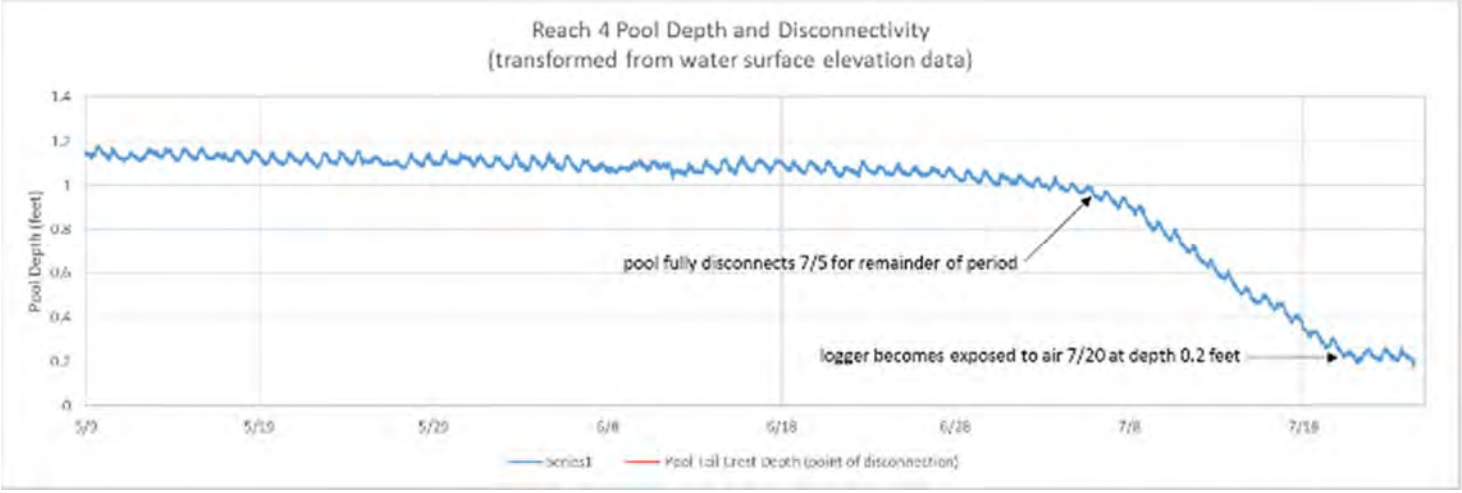
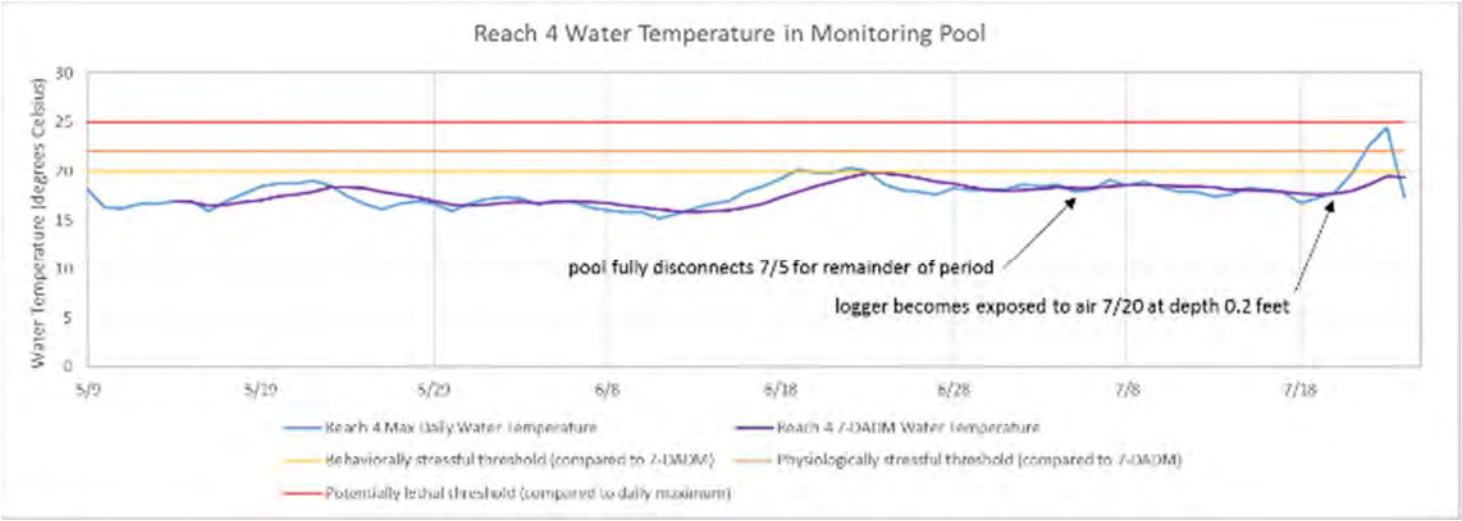


Figure 15 Reach 4 Water Surface Elevation Monitoring Pool: Water Temperature Data



Attachment 1
Selected Photographs from Upper Novato Creek

Preliminary Habitat Assessment (November 4, 2016) and Habitat Mapping Survey (May 8–9, 2017)

Reach 1 Photos

Photo date: 5/8/2017

Photo: 2017-01

Photo point: 08

Reach: 1

Description:
Habitat in Reach 1 between Waypoints 826 and 827, looking upstream.

Photo date: 11/4/2016

Photo: 2016-01

Waypoint: 826

Reach: 1

Description:
Isolated pool habitat. Stickleback observed.

Photo date: 5/8/2017 Photo: 2017-02 Photo point: 09 Reach: 1 Description: habitat in Reach 1 between Waypoints 826 and 827, just downstream of Bridge 1, looking downstream.	
Photo date: 11/4/2016 Photo: 2016-02 Waypoint: 827 Reach: 1 Description: Dry channel in Reach 1. Gravel surface substrate with sandy subsurface substrate.	

Photo date: 5/8/2017 Photo: 2017-03 Photo point: 10 Reach: 1 Description: **Reach 1 data logger pool, at deployment** Pool habitat upstream of Bridge 1 with small and large woody debris jam, looking downstream.	
Photo date: 7/24/2017 Photo:2017-04 Photo point: 10 Reach: 1 Description: **Reach 1 data logger pool, at retrieval** Pool habitat upstream of Bridge 1 with small and large woody debris jam, looking upstream.	

Photo date: 11/4/2016 Photo: 2016-04 Waypoint: 828 Reach: 1 Description: Dry, with evidence of being wet. Woody debris.	
Photo date: 5/8/2017 Photo: 2017-05 Photo point: 11 Reach: 1 Description: Shallow water flatwater and riffle habitats just upstream of Waypoint 828 location, looking downstream.	

Photo date: 5/8/2017 Photo: 2016-06 Photo point: 12 Reach: 1 Description: Shallow water flatwater habitat between Waypoint 828 and 829 locations, end of Reach 1 habitat mapping study area.	
Photo date: 11/4/2016 Photo: 2016-05 Waypoint: 829 Reach: 1 Description: Dry channel with debris and thick vegetation.	

Photo date: 5/8/2017 Photo: 2017-07 Reach: 1 and 2 break point Location: Bridge 2 Description: Looking downstream under Bridge 2. Potentially a complete passage barrier at downstream edge of bridge: approximately 3-foot jump height and 1.7-foot plunge pool depth.	
Photo date: 11/4/2016 Photo: 2016-06 Reach: 1 and 2 break point Waypoint: 830, Bridge 2 Description: Ponded water at Bridge 2, looking downstream.	

Reach 2 Photos

Photo date: 11/4/2016

Photo: 2016-07

Reach: 2

Waypoint: 831

Description:
Minor flow, small gravel and sand substrates.

Photo date: 11/4/2016

Photo: 2016-08

Reach: 2

Waypoint: 833

Description:
Dry section upstream of Bridge 2.

Photo date: 5/9/2017 Photo: 2017-08 Reach: 2 Location: Bridge 3 Description: Potentially a complete barrier to upstream fish movement at upstream end of Bridge 3. Impounded shallow pool upstream of drop structure.	
Photo date: 5/9/2017 Photo: 2017-09 Reach: 2 Location: Bridge 3 Description: Potentially a complete barrier to upstream fish movement at upstream end of Bridge 3: approximately 3.5-foot jump height and 3-foot plunge pool depth.	

Photo date: 11/4/2016 Photo: 2016-09 Reach: 2 Waypoint: 836, Bridge 3 Description: Turbid water held back by Bridge 3 drop structure, looking upstream.	
Photo date: 5/9/2017 Photo: 2017-10 Reach: 2 Photo point: 13 Description: Pool and riffle habitats upstream of Bridge 3 in Reach 2.	

Photo date: 11/4/2016 Photo: 2016-10 Reach: 2 Waypoint: 838 Description: Upstream end of inundation created by Bridge 3 drop structure.	
Photo date: 11/4/2016 Photo: 2016-11 Reach: 2 Waypoint: 839 Description: Fine and coarse sediments in dry gap upstream of Bridge 3 backwater area.	

Photo date: 5/9/2017 Photo: 2017-11 Reach: 2 Photo point: 17 Description: Pool habitats in Reach 2, between Waypoints 839 and 842. Bank erosion can be seen in left of frame.	
Photo date: 5/9/2017 Photo: 2017-12 Reach: 2 Photo point: 16 Description: Flatwater habitat with large woody debris in Reach 2. Upstream end of Reach 2 habitat mapping study area.	

Photo date: 5/9/2017 Photo: 2017-13 Reach: 2 Photo point: 16 Description: Flatwater habitat and upper riffle with large woody debris in Reach 2. Upstream end of Reach 2 habitat mapping study area.	
Photo date: 11/4/2016 Photo: 2016-12 Reach: 2 Waypoint: 842 Description: Representative section in middle of Reach 2; example location for habitat mapping.	

Photo date: 11/4/2016 Photo: 2016-13 Reach: 2 Waypoint: 842 (second photo at this waypoint) Description: Example of steep banks.	
Photo date: 11/4/2016 Photo: 2016-14 Reach: 2 Waypoint: 844 Description: Recent bank failure.	

Photo date: 11/4/2016 Photo: 2016-15 Reach: 2 Waypoint: 844 (second photo at this waypoint) Description: Upper portion of Reach 2, downstream of potential in-channel spring. Coarser substrates and stickleback observed.	
Photo date: 11/4/2016 Photo: 2016-16 Reach: 2 Waypoint: 846 Description: Large scour and severe erosion.	

Photo date: 11/4/2016 Photo: 2016-17 Reach: 2 Waypoint: 846 (second photo taken at this waypoint) Description: Coarser substrate in upper portion of Reach 2.	
Photo date: 11/4/2016 Photo: 2016-18 Reach: 2 Waypoint: 847 Description: Boulder section.	

Photo date: 11/4/2016 Photo: 2016-19 Reach: 2 Waypoint: 848 Description: 100 feet upstream gets thicker vegetation, horsetail present. Flow may be from in-stream spring.	
Photo date: 11/4/2016 Photo: 2016-20 Reach: 2 Waypoint: 849 Description: Bedrock chute section.	

Reach 4 Photos

Photo date: 5/8/2017

Photo: 2017-14

Reach: 4

Description:
Reach 4 data logger pool, at deployment

Facing downstream.

Photo date: 7/24/2017

Photo: 2017-15

Reach: 4

Description:
Reach 4 data logger pool, at retrieval

Facing downstream.

Photo date: 11/4/2016 Photo: 2016-21 Reach: 4 Waypoint: 854 Description: Dry, gravel mixture.	
Photo date: 5/8/2017 Photo: 2017-16 Reach: 4 Photo point: 01 Description: Start of habitat mapping study area in Reach 4, between Waypoints 853 and 854. Looking downstream at riffle habitat. Severe erosion on bank seen at stream bend.	

Photo date: 5/8/2017 Photo: 2017-17 Reach: 4 Photo point: 01 Description: Start of habitat mapping study area in Reach 4, between Waypoints 854 and 855. Looking upstream toward Waypoint 853.	
Photo date: 11/4/2016 Photo: 2016-22 Reach: 4 Waypoint: 853 Description: Dry, fine sediment to small gravel and some cobble substrate.	

Photo date: 5/8/2017 Photo: 2017-18 Reach: 4 Photo point: 02 Description: Flatwater habitat in Reach 4, looking upstream.	
Photo date: 5/8/2017 Photo: 2017-19 Reach: 4 Photo point: 03 Description: Shallow riffle and flatwater complex in Reach 4, looking upstream.	

Photo date: 5/8/2017 Photo: 2017-20 Reach: 4 Photo point: 04 Description: Shallow pool habitat formed at large root wad in Reach 4, looking downstream.	
Photo date: 5/8/2017 Photo: 2017-21 Reach: 4 Photo point: 05 Description: Upstream end of habitat mapping study area in Reach 4, looking downstream at riffle habitat with a large amount of substrate exposed to air.	

Reach 4 – Gradient Barrier Photos

Photo date: 11/4/2016

Photo: 2016-23

Reach: 4

Waypoint: 850

Description:
First high gradient barrier in Reach 4. Some very limited ponding, no running pool depth.

Photo date: 5/8/2017

Photo: 2017-22

Reach: 4

Location: high gradient barrier, same location as waypoint: 850

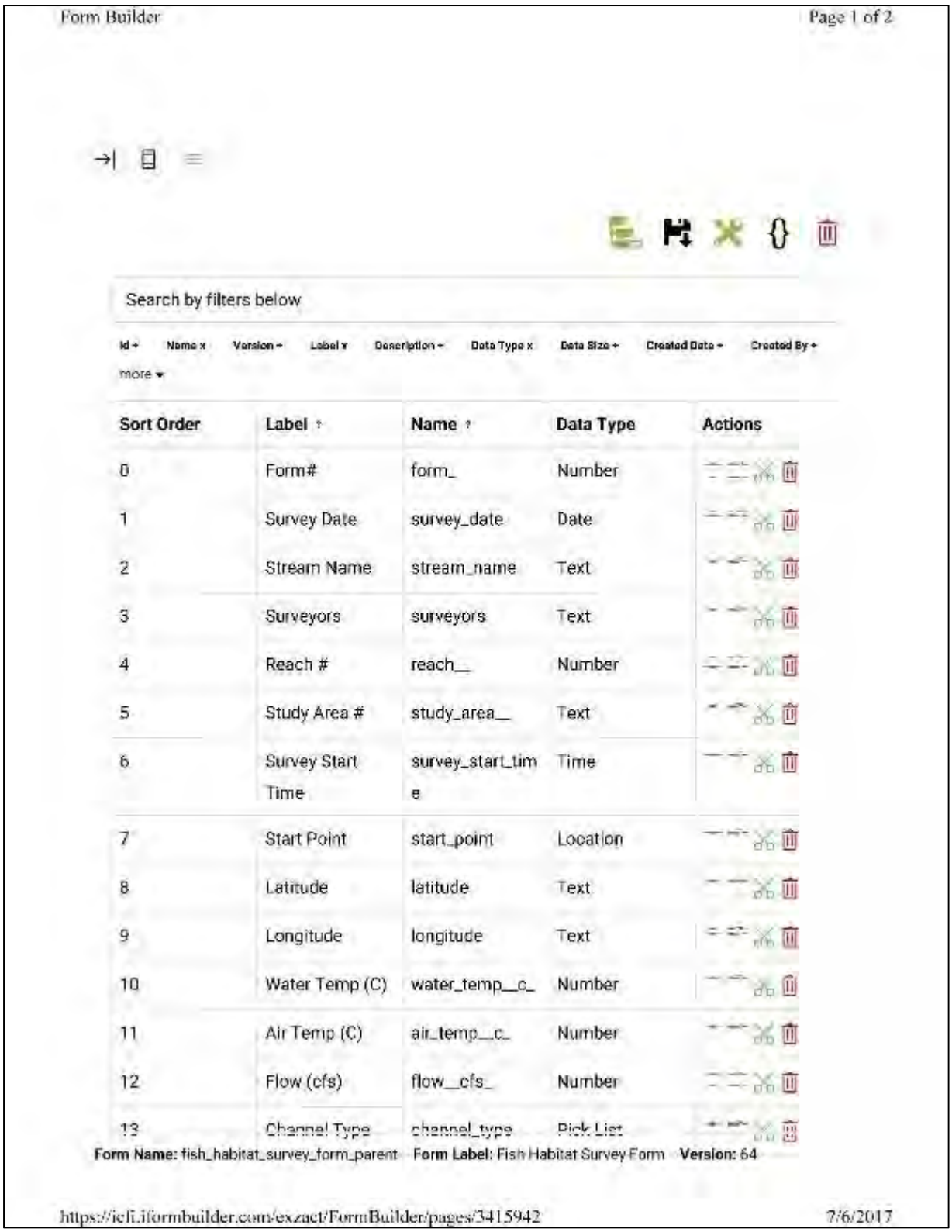
Description:
High gradient barrier at Waypoint 850 in Reach 4. Image was taken near the downstream end of the approximately 127-foot long boulder cascade.

Photo date: 5/8/2017 Photo: 2017-23 Reach: 4 Location: high gradient barrier, same location as waypoint: 850 Description: High gradient barrier at Waypoint 850 in Reach 4. Observed flow was falling over boulders onto areas mostly lacking plunge pools. This image was taken in the middle portion of the cascade; it shows a very small plunge pool at the lower drop, and the upper drop lacks a plunge pool.	
Photo date: 5/8/2017 Photo: 2017-24 Reach: 4 Location: high gradient barrier, same location as waypoint: 850 Description: Area of high gradient barrier where flow was observed filtering through boulder crevices.	

Photo date: 5/8/2017 Photo: 2017-25 Reach: 4 Location: high gradient barrier, same location as waypoint: 850 Description: Small woody debris jam at top of high gradient barrier.	
Photo date: 11/4/2016 Photo: 2016-24 Reach: 4 Waypoint: 852 Description: Second high gradient barrier in upper portion of Reach 4.	

Attachment 2
Data Types Collected, as Managed in iForm Application

Data Types Collected for Each Study Reach



Form Builder

Page 1 of 2

Search by filters below

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Sort Order	Label ▿	Name ▿	Data Type	Actions
0	Form#	form_	Number	
1	Survey Date	survey_date	Date	
2	Stream Name	stream_name	Text	
3	Surveyors	surveyors	Text	
4	Reach #	reach__	Number	
5	Study Area #	study_area__	Text	
6	Survey Start Time	survey_start_time	Time	
7	Start Point	start_point	Location	
8	Latitude	latitude	Text	
9	Longitude	longitude	Text	
10	Water Temp (C)	water_temp__c_	Number	
11	Air Temp (C)	air_temp__c_	Number	
12	Flow (cfs)	flow__cfs_	Number	
13	Channel Type	channel_type	Pick List	

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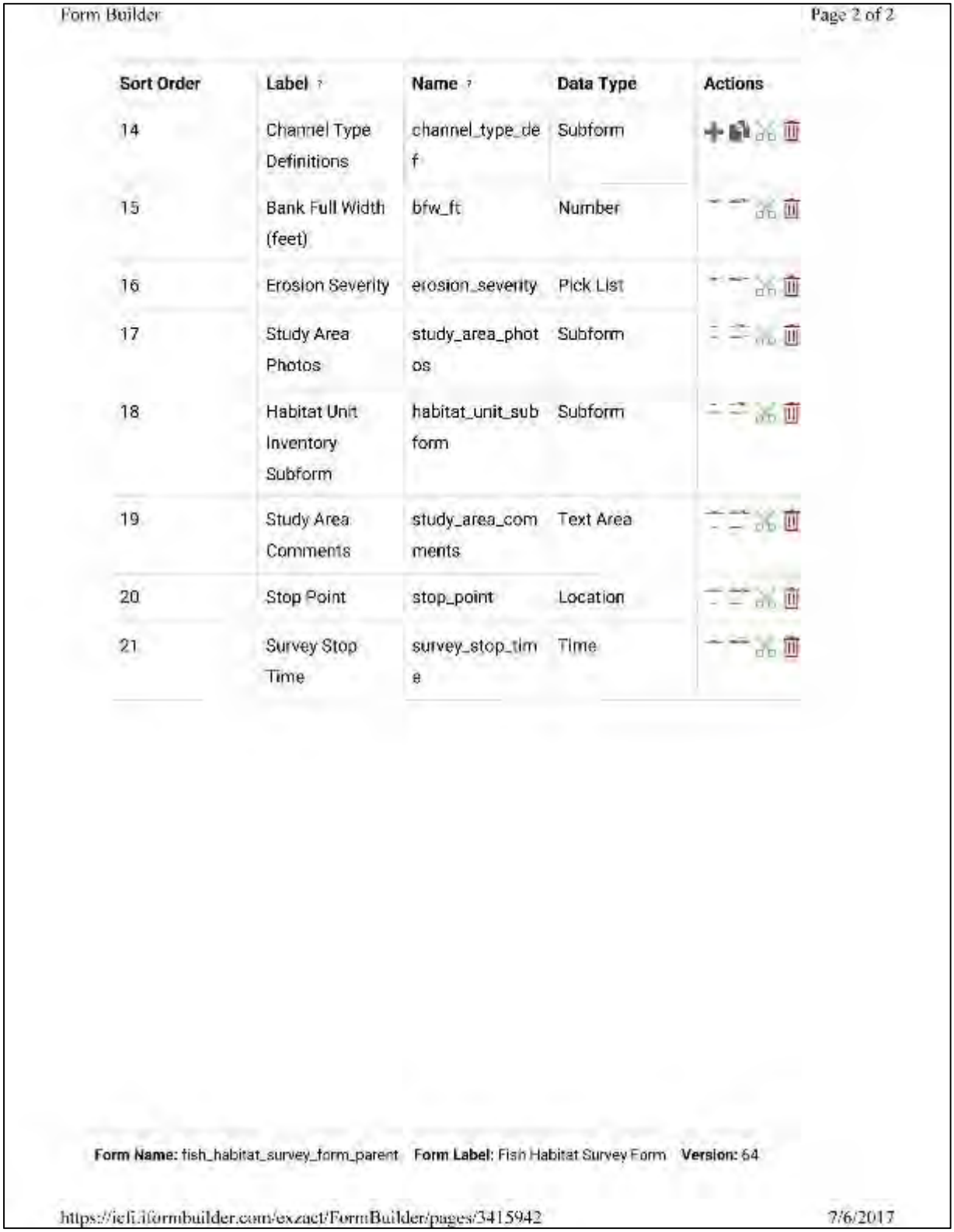
https://icli.iformbuilder.com/exzact/FormBuilder/pages/3415942

7/6/2017



Form Builder

Page 2 of 2

Sort Order	Label	Name	Data Type	Actions
14	Channel Type Definitions	channel_type_def	Subform	
15	Bank Full Width (feet)	bfw_ft	Number	
16	Erosion Severity	erosion_severity	Pick List	
17	Study Area Photos	study_area_photos	Subform	
18	Habitat Unit Inventory Subform	habitat_unit_subform	Subform	
19	Study Area Comments	study_area_comments	Text Area	
20	Stop Point	stop_point	Location	
21	Survey Stop Time	survey_stop_time	Time	

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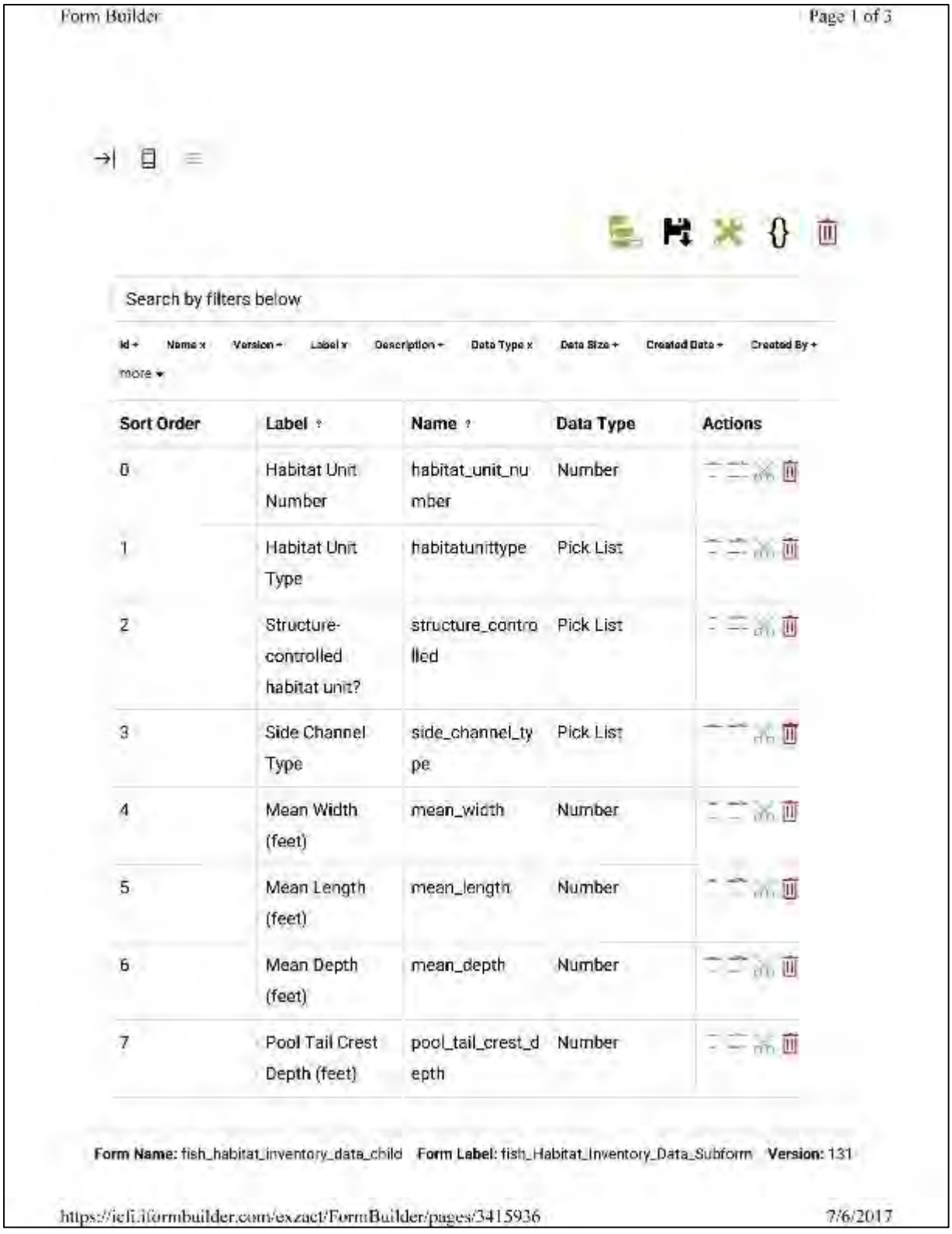
https://ielf.iformbuilder.com/exzact/FormBuilder/pages/3415942

7/6/2017

Data Types Collected for Each Habitat Unit



Form Builder Page 1 of 3

Search by filters below

Id ÷ Name ÷ Version ÷ Label ÷ Description ÷ Data Type ÷ Data Size ÷ Created Date ÷ Created By ÷ more ▾

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0	Habitat Unit Number	habitat_unit_number	Number	
1	Habitat Unit Type	habitatunittype	Pick List	
2	Structure-controlled habitat unit?	structure_controlled	Pick List	
3	Side Channel Type	side_channel_type	Pick List	
4	Mean Width (feet)	mean_width	Number	
5	Mean Length (feet)	mean_length	Number	
6	Mean Depth (feet)	mean_depth	Number	
7	Pool Tail Crest Depth (feet)	pool_tail_crest_depth	Number	

Form Name: fish_habitat_inventory_data_child **Form Label:** fish_Habitat_Inventory_Data_Subform **Version:** 131

https://ieli.iformbuilder.com/exzact/FormBuilder/pages/3415936 7/6/2017

Sort Order	Label	Name	Data Type	Actions
8	Pool Tail Substrate	pool_tail_substrate	Pick List	
9	Pool Tail Embeddedness	pool_tail_embeddedness	Pick List	
10	Max Depth (feet)	max_depth	Number	
11	LWD Count Diameter >1' & Length 6-20'	lwd_count_d1l6to20	Number	
12	LWD Count Diameter >1' & Length >20'	lwd_count_d1l20	Number	
13	Dominant Cover Type 1	dominant_cover_type_1	Pick List	
14	% Cover 1	_cover_1	Range	
15	Dominant Cover Type 2	dominant_cover_type_2	Pick List	
16	% Cover 2	_cover_2	Range	
17	Primary Substrate	primary_substrate	Pick List	
18	% primary substrate	_primary_substrate	Range	
19	Secondary Substrate	secondary_substrate	Pick List	
20	% secondary substrate	_secondary_substrate	Range	

Form Name: fish_habitat_inventory_data_child **Form Label:** fish_Habitat_Inventory_Data_Subform **Version:** 131

Sort Order	Label	Name	Data Type	Actions
21	% Exposed Substrate (exposed to air)	__exposed_substrate	Range	
22	% Total Canopy	_total_canopy	Range	
23	Right Bank Composition	rt_bk_composition	Pick List	
24	Right Bank Dominant Vegetation	rt_bk_dominant_vg	Pick List	
25	% Right Bank Vegetated	__rt_bk_vegetated	Range	
26	Left Bank Composition	lft_bk_composition	Pick List	
27	Left Bank Dominant Vegetation	lft_bk_dominant_vg	Pick List	
28	% Left Bank Vegetated	__lft_bk_vegetated	Range	
29	Habitat Unit Comments	habitat_unit_comments	Text Area	

Form Name: fish_habitat_inventory_data_child **Form Label:** fish_Habitat_Inventory_Data_Subform **Version:** 131

9

MEMORANDUM

To: Board of Directors July 13, 2018

From: Drew McIntyre, General Manager

Subj: New Water-Use Efficiency Legislation (SB 606 and AB 1668) Update
t:\gm\bod misc 2018\memo to bod re new water use efficiency legislation 071718.docx

RECOMMENDED ACTION: Information Only

FINANCIAL IMPACT: None at this Time

At the December 20, 2016 meeting, the Board was apprised of the State's proposed framework for implementing the Governor's Executive Order B37-16 "Making Water Conservation a California Way of Life." At that time, similar comment letters were submitted by the District and Sonoma Marin Saving Water Partnership (SMSWP). At the August 15, 2017 meeting, the Board was advised of a new Sonoma Marin Saving Water Partnership comment letter on the updated legislation that was being proposed to "help make water conservation a way of life" (Attachment 1).

Finally, after many months of discussion within the legislature, Governor Brown signed long-term water-use efficiency bills SB 606 (Hertzberg) and AB 1668 (Friedman) into law on May 21, 2018. The Association of California Water Agencies (ACWA) and many member agencies, including NMWD, advocated for key amendments to these bills and, although not all of them were accepted, the final legislation is much improved compared to the initial drafts. AB 1668 and SB 606 require the State Water Resources Control Board and the California Department of Water Resources to adopt water-use efficiency regulations, outline reporting requirements for urban water suppliers, and specify penalties for violations. SB 606 also contains distinct provisions on water shortage planning and water loss reporting for urban wholesale water suppliers.

There are no immediate impacts to NMWD customers at this time. Water agencies including NMWD will be working with the State Water Board over the next several years to define how the new laws will be implemented. By the year 2022, NMWD must set new water conservation targets and begin implementation the following year. The overall framework includes: (1) a standard for indoor residential water use of 55 gallons per day per person, (2) a standard for outdoor residential water use (based on climate and amount of landscape area) and (3) a standard for water loss in the distribution system.

A more detailed summary of the new water use efficiency legislation is provided in Attachment 2.

August 11, 2017

The Honorable Robert M. Hertzberg
Chairman, Senate Committee on Natural Resources and Water
State Capitol, Room 5046
Sacramento, CA 95814
Via email: senator.hertzberg@senate.ca.gov

Re: Comments on Legislation Necessary to Help with "Making Water Conservation a California Way of Life"

Dear Chairman Hertzberg:

On behalf of the Sonoma-Marin Saving Water Partnership (SMSWP), I am responding to your request for written comments on the Committee's stated intent to "enact legislation necessary to help make water conservation a California way of life." Our Partnership had previously commented on this topic in our April 13, 2017 letter supporting AB 1654 and AB 968 authored by Assembly Member Blanca Rubio. AB 1654 and AB 968 would enhance existing urban water management planning requirements, strengthen water suppliers' abilities to plan and prepare for future droughts, and ensure a balanced approach to providing a drought resilient water supply including use of recycled water and enhanced long term water use efficiency. These two bills preserved local authority which, when combined with legislative oversight, must be paramount as the state develops and implements new policies intended to enhance water use efficiency and water shortage planning requirements.

SMSWP members include the Cities of Cotati, Petaluma, Rohnert Park, Santa Rosa, Sonoma, Town of Windsor, and the Marin Municipal, North Marin and Valley of the Moon Water Districts, California American Water (Larkfield, Wikiup, Fulton and Geyserville) and Sonoma County Water Agency. The SMSWP members recognize that establishing common water conservation programs on a regional basis and applicable across the political and jurisdictional boundaries of each party is a means of cost effectively conserving more water than would otherwise be conserved on an individual agency-by-agency basis.

Our Partnership supports the goal of making water conservation a California way of life and we recommend that improvements in urban water use efficiency be measured at the local level based on water use that is considered reasonable and efficient. Any legislation should have a goal of reducing the wasteful use of water rather than seeking to reduce the total volume of water served for uses that are reasonable and efficient. Additional comments related to this issue are summarized as follows:

- Before the Legislature establishes water use efficiency targets based on any single method, including water budgets, that method must be proven reliable, broadly applicable, and adaptable to varying conditions throughout the state. AB 968 would have accomplished this by providing three clearly defined options for calculating water use efficiency targets. Any revision to the legislation should include multiple options.

- Drought-resilient supplies, such as recycled water, are key components of the state's water supply portfolio. In many regions, including Marin-Sonoma, recycled water supplies far exceed demand, and incentives are needed to attract more customers. Targets and standards should include a recycled water credit that protects existing use and promotes expansion. A variance of the proposed 1.0 evapotranspiration factor should be included to allow higher level use when needed due to other relevant factors.

- Legislation should focus on the goal of eliminating water waste through appropriate and progressive enforcement authority that accounts for a retail water agency's authorities and responsibilities related to their customers. The focus should be on corrective action instead of cease-and-desist orders.

- Legislation should preserve local decision-making powers to determine actions to avoid or mitigate shortages. As stated in DWR's Guidebook for 2015 Urban Water Management Plans, "*There is no substitute for water planning at the local water supplier level. Only a local supplier has the knowledge, ability to consider the unique circumstances of the individual agency, can provide for participation by the community, and tailor the planning to local conditions*".

- Legislation should expressly provide that during a drought or water shortage, an urban water supplier shall not be required to reduce its use or reliance on drought resilient supplies such as recycled water nor take any additional actions beyond those specified in its water shortage contingency plan for the level of shortage that is anticipated.

In closing, we recognize that additional proposed legislation changes are underway. A review of the recent Skinner/Hertzberg draft proposal is concerning because the proposal: (1) delegates the Legislature's authority over long-term water use efficiency standards/targets to State agencies, (2) has enforcement provisions that do not account for urban retail water suppliers authorities and responsibilities relative to their customers and (3) does not adequately protect or create incentives for future development of recycled water. The proposal also introduces new concepts not previously considered in this year's legislative discussions. Given the importance of this legislation and the varying complexity of the proposed changes, the Partnership requests that continued legislation refinement occurs in the policy committees as a two-year bill to provide the time necessary to ensure quality legislation.

If you or your staff have any questions, please contact me at 415-897-4133 or dmcintyre@nmwd.com.

Sincerely,

Drew McIntyre
General Manager
North Marin Water District

cc: The Honorable Mike McGuire, Member, California State Senate
The Honorable Bill Dodd, Member, California State Senate
The Honorable Jim Wood, Member California State Assembly
The Honorable Cecilia Aguiar-Curry, Member, California State Assembly
The Honorable Marc Levine, Member, California State Assembly
The Honorable Eduardo Garcia, Chairman, Assembly Committee on Water, Parks and Wildlife
The Honorable Members, Senate Committee on Natural Resources and Water
The Honorable Members, Assembly Committee on Water, Parks, and Wildlife
The Honorable Nancy Skinner, Member, California State Senate
The Honorable Members, Assembly Water Conservation Working Group
Mr. Kip Lipper, Chief Policy Advisor, Office of the Senate President Pro Tem
Mr. Alf Brandt, Senior Counsel, Office of the Assembly Speaker
Mr. Dennis O'Connor, Principal Consultant, Senate Environmental Quality Committee
Ms. Catherine Freeman, Chief Consultant, Assembly Committee on Water, Parks, and Wildlife
Mr. Ryan Ojakian, Senior Consultant, Assembly Committee on Water, Parks, and Wildlife
Mr. Michael Bedard, Chief of Staff, Office of Senator Robert Hertzberg
Mr. Todd Moffitt, Consultant, Senate Republican Caucus
Mr. Robert Spiegel, Consultant, Assembly Republican Caucus
Ms. Kim Craig, Deputy Cabinet Secretary, Office of the Governor
Mr. Gordon Burns, Undersecretary, CalEPA

Summary of AB 1668 and SB 606 Legislation

(Provided by Bay Area Clean Water Agencies- BACWA)

Background

- AB 1668 and SB 606 are companion bills that require the SWRCB, in coordination with DWR, to adopt long-term standards for the efficient use of water and would establish specified standards for per capita daily indoor residential use.
- The bills require each urban retail water supplier to calculate and report an urban water use objective no later than November 1, 2023, and by November 1 every year thereafter, and compare its actual urban water use to the objective by those same dates. The bill would authorize the board to issue information orders, written notices, and conservation orders to an urban retail water supplier that does not meet its urban water use objective, as specified.
- The bills revise urban water management plan requirements, in particular requiring a drought risk assessment for a five-year drought and increasing water shortage contingency plan requirements. The bills also require each urban water supplier to conduct an annual water supply and demand assessment and report annually by June 1st to DWR on anticipated shortage, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with the supplier's water shortage contingency plan.

Urban Water Use Objective

Each urban water supplier will calculate its urban water use objective (e.g. water use target) annually for the prior calendar or fiscal year, with the first reporting due November 1, 2023, and compare the target to its actual water use. Target will be calculated as:

- Efficient indoor residential water use, plus
- Efficient outdoor residential water use, plus
- Efficient outdoor water use through dedicated irrigation meters at CII customers, plus
- Efficient water loss

Actual water use will be calculated as:

- Aggregate residential water use, plus
- Aggregate outdoor water use through dedicated irrigation meters at CII customers, plus
- Aggregate water loss

DWR will provide each urban retail water supplier with data regarding irrigable lands, at level of detail sufficient to verify accuracy at the parcel level.

Enforcement

Enforcement actions are phased over the early years of implementation.

- 2023: SWRCB may issue information order to an urban water supplier that does not meet its urban water use objective
- 2024: SWRCB may issue written notice to urban water supplier that does not meet its urban water use objective
- 2025: SWRCB may issue conservation order to urban water supplier that does not meet its urban water use objective. Issuance of a conservation order does not require the imposition of a civil liability.

Timeline

Date	Requirement
1/1/2020	1. DWR to recommend to legislature standards for indoor residential water use. Defaults are: • 55 gpcd until 2025 • 52.5 gpcd 2025 until 2030 • 50 gpcd after 2030 2. DWR to provide each urban retail water supplier with data regarding irrigable lands, at level of detail sufficient to verify accuracy at the parcel level
10/1/2021	1. DWR to recommend standards for outdoor residential use for adoption by SWRCB • Incorporate MWELO principles • Applies to *irrigable lands* • Include provisions for swimming pools, spas, etc. 2. DWR to recommend performance measures for CII water use, including: • CII classification system • Minimum size thresholds for converting mixed CII meters to dedicated irrigation meters • Recommendations for CII BMPs 3. DWR to recommend variance provisions for: • Evaporative coolers • Horses and livestock • Seasonal populations • Soil compaction/dust control • Water to sustain wildlife • Water for fire protection 4. DWR to recommend standards for outdoor irrigation of landscape areas with dedicated irrigation meters • Incorporate MWELO principles 5. DWR to recommend standards for outdoor irrigation of landscape areas with dedicated irrigation meters • Incorporate MWELO principles 6. DWR to recommend performance measures for CII water use, including: • CII classification system • Minimum size thresholds for converting mixed CII meters to dedicated irrigation meters • Recommendations for CII BMPs 7. DWR to recommend standards for: • Determining irrigable lands

	• Methodologies for calculating population • Utilizing precipitation and climate data to determine irrigation budgets • Estimating changes in landscape area and population when updated data is not available from DWR
6/30/2022	1. SWRCB to adopt long-term standards for efficient water use: • Outdoor residential • Outdoor irrigation of landscape with dedicated irrigation meters at CII customers • Water loss (consistent with SB 555) 2. SWRCB to adopt performance measures for CII water use
11/1/2023	1. Urban Water Supplier shall calculate its urban water use objective and its actual water use for previous calendar or fiscal year • Efficient indoor residential water use, plus • Efficient outdoor residential water use, plus • Efficient outdoor water use through dedicated irrigation meters at CII customers, plus • Efficient water loss, plus • Variances as appropriate

Water Shortage Contingency Planning Requirements

- New Water Shortage Contingency Plan Requirements
  - ANNUAL water supply and demand assessment and report by June 1st to DWR on anticipated shortage, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with the supplier's water shortage contingency plan.
  - Standardized shortage levels, range from 10% to >50%
  - Shortage response actions
  - Customer communication plan
  - Enforcement plan
  - Financial plan
- Urban Water Management Plans to include risk assessment for a five-year drought.

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NORTH BAY WATERSHED ASSOCIATION

North Bay Watershed Association

Board Meeting Notice

July 13th, 2018

9:30 a.m. – 11:30 a.m.
Marin Municipal Water District
Board Room
220 Nellen Avenue
Corte Madera, CA 94925

Next Meeting

September 7th, 2018
9:30 a.m. – 11:30 a.m.
Novato Sanitary District
500 Davidson Street
Novato, CA

Board Meeting Agenda

1. Call to Order 9:30
Jack Gibson, Chair

2. Public Comment

3. Approval of Agenda 1 min.
Approve

4. Approval of Minutes 1 min.
Approve

5. Treasurer's Report 1 min.
Accept

6. Director's Report 5 min.
Judy Kelly, NBWA Executive Director

7. North Bay IRWMP Project Updates 9:45
Nahal Ghoghaie, Bay Area Program Coordinator, Environmental Coalition for Water
Nahal will brief the Board on the work now underway in the North Bay areas under the latest round of funding from the Integrated Resource Water Management Plan efforts.

8. Delta Decisions: How they will affect San Francisco Bay and the North Bay 10:35
Michael Patrick George, Delta Watermaster
Overview and perspectives on some of California's thorniest water policy issues and how they may impact the North Bay and regional waters.

Appointed in 2015, Delta Watermaster Michael Patrick George acts as an independent officer of the State reporting jointly to the State Water Resources Control Board and the Delta Stewardship Council. The Watermaster administers water rights within the Sacramento/San Joaquin River Delta and the Suisun Marsh and advises the Board and the Council on related water rights, water quality and water operations in and affecting the Delta.

9. Items of Interest 11:25

10. Items for the Next Agenda 11:28
Description

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DISBURSEMENTS - DATED JUNE 28, 2018

Date Prepared 6/26/18

The following demands made against the District are listed for approval and authorization for payment in accordance with Section 31302 of the California Water Code, being a part of the California Water District Law:

Seq	Payable To	For	Amount
EFT*	CalPERs	June Health Insurance Premium (Employees $46,661, Retirees $11,232 & Employee Contribution $9,200)	$67,092.52
54818*	Marin County Clerk	Environmental Fee to be Paid to the Dept of Fish & Wildlife to File a Notice of Determination for the PRE Tank 4A Replacement Project	2,330.75
EFT*	US Bank	May Bank Analysis Charge (Lockbox $912 & Other $398, Less Interest of $199)	$1,110.52
EFT*	Fidelity National Title	Employer Assisted Housing Loan	275,000.00
1	Aarsheim, Einar	Refund Overpayment on Closed Account	21.41
2	Able Tire & Brake	Adjustment to Previous Invoice	41.58
3	Allquip Universal	Pressure Washer Pump & Clutch ('13 Vac Excavator & Trailer)	1,034.53
4	Alpha Analytical Labs	Lab Testing	30.00
5	Alphagraphics Marin	Printing (825) ($1,326) & Mailing Services for W.M. Spring Waterline & Meter AMI Letters (13,394) & Mailing Services ($3,515)	5,086.09
6	American Family Life Insurance	June Employee Accident, Disability & Cancer Insurance	2,776.45
7	Arrow Benefits Group	June Dental Admin Fee	310.75
8	AT&T	Leased Lines	66.24
9	Bahia Novato Hoa RR C/O	Refund Overpayment on Closed Account	101.77
10	Bender, Matthew	Water Codes, Volumes 4, 5 & 6	569.21
11	BlackPoint Tree Service	Remove 1 Birch Tree & Haul Wood (2075 Laguna Vista)	235.00
12	Bold & Polisner	May Legal Services ($777), Cherry Hill Pipeline ($105), Gallagher Well #2 ($63), Misc ($966), Prop 218 Letter ($441), Rate Increase ($231) & RW Central Private Onsite Retrofit ($42)	2,625.00

Seq	Payable To	For	Amount
13	Breit, Adam	Exp Reimb: Safety Boots	200.00
14	Brelje & Race	Prog Pymt #3: Engineering Services for STP Clearwell Concrete Coating Service (Balance Remaining on Contract $1,471)	1,785.00
15	Brilliant Corners	Refund of Deposit/New Development/Water Conservation Restriction- Novato	1,000.00
16	Calif Dept of Wtr Resources	FY19 Annual Dam Fee	13,296.00
17	Caltest Analytical Laboratory	Lab Testing	70.30
18		Vision Reimbursement	360.70
19	Comcast	June Internet Connection	151.12
20	Core Utilities	Consulting Services: May IT Support ($5,000), SCADA ($800), Website Maintenance ($450) & AMI & Asset Management Software Session ($1,850)	8,100.00
21	Corner Office	Ergonomic ($480) & Visitor Chairs (2) (Blue)	934.34
22	Covello Group	Prog Pymt #20: April RW Exp Project Central Service Area	708.75
23	Cresco Equipment Rentals & Affiliates	Asphalt Cutters (5) ($382), Wacker Compactor Foot & Air Filter	714.82
24	Dell Computers	New PC for Instrument in the Lab	763.58
25	Environmental Resource Assoc	Reference Sample (Lab)	132.10
26	Ferguson Waterworks	Economic Flow & Pressure Kit, Box Lids (36) ($873)	1,163.85
27	Ferguson Waterworks	AMI Meter Registers (2,541) Meters (890) ($181,738), Handheld Communication Cradles (3), Retrofit Meters (572) ($85,335) Meter Lids (413), Meter Lids w/Probe (318), Concrete Lids (33), Cellular AMI Meters (2) (Used North of Novato) Meter Installations (2,806)	746,767.59
28	Fonseca, Luisa	Exp Reimb: Mileage for Bank of Marin Outlook 2018 Training	17.99
29	GHD	Prog Pymt#3: Water Tank 4A Replacement (Balance Remaining on Contract $30,512)	2,038.00
30	Ghilotti Construction	Refund RW Load Security Deposit Less RW Water Loads and 3 Magnets	10.00

Seq	Payable To	For	Amount
31	Golden Gate Petroleum	Diesel ($3.49/gal), Gas (2) ($3.32/gal & $3.30/gal)	4,348.84
32	Grainger	Socket Extensions (2), Membrane Filter (STP) ($54), Paint Brushes (12) ($165), Wheel Chocks, Pins for Truck/Trailers, Pipe Wrench & Pliers	524.64
33	Hach	Turbidimeters (2)	4,222.36
34	HERC Rentals	Mower Rental (3 weeks)	597.44
35	Idexx Laboratories	Colilert Media for RW (Lab)	2,254.84
36	Lincoln Life	Deferred Compensation PPE 6/15/18	11,933.10
37	Madruga Iron Works	Vault Lid	5,931.24
38	Marin Color Service	Paint for Controller's Office	41.38
39	Martrano Enterprises	Control Board for Middle Gate Operator	384.87
40	McLellan, WK	Misc Paving	5,262.29
41	National Meter	Meter Registers (4)	108.11
42	Nationwide Retirement Solution	Deferred Compensation PPE 6/15/18	1,750.00
43	Pace Supply	Angle Meter Stops (8) ($1,488), Steel Covers (3) ($456), Clamp, Couplings (4) ($804), Valves (3) ($829), Bolts (600) ($1,053), Nuts (523), Ball Valves (4), Copper Pipe (120'), Meter Pit Pump & Corp Stops (14) ($417)	5,720.62
44	PDM Steel Service Centers	Steel to Replenish Welding Shop Inventory	2,247.11
45	Peterson Trucks	Exhaust Brake Valve ('12 Int'l 5 yd Dump Truck) ($686) & Drive Belts	880.21
46	PG&E	Power: Bldgs/Yard ($3,732), Rectifier/Controls ($2,895), Pumping ($31,183), Treatment ($239) & Other ($103)	38,153.45
47	Recology Sonoma Marin	June Trash Removal	465.08
48	Redwoods Townehome HOA	Refund Meeting Room Deposit	100.00
49		Vision Reimbursement	262.49
50	RH & Sons Water Services	Annual Backflow Testing Services for Customer Owned RP Devices	7,182.55

Seq	Payable To	For	Amount
51	SoftResources	Prog Pymt#8: Consulting Enterprise Asset Management Software (Balance Remaining on Contract $2,891)	9,891.90
52	Soiland	Asphalt Recycling (19 tons)	95.00
53	Sonoma County Water Agency	May Contract Water	368,972.95
54	SPG Solar Facility	May Energy Delivered Under Solar Services Agreement	13,947.39
55	Streakwave Wireless	Radios for Crest Tank, Eagle P/S, San Mateo East & 2 Spares	422.36
56	Thatcher of California	Chlorine (2,000 lbs) & Ferric Chloride (10 dry tons) (STP)	7,411.90
57	Thomas Scientific	Phosphate Buffer for Micro Analysis (Lab)	54.91
58	Township Building Services	May Janitorial Services ($1,878) & Cleaning Supplies	2,104.13
59	United Parcel Service	Delivery Services: Sent PreTank 4A CEQA Documents, RW Central Disbursement 4 Request, Backflow Device Sent in for Credit & GAC Sample Sent in for Testing	204.29
60	VWR International	Lab Wipes, Incubator ($3,721), Macro Tips (250) & Colormeter Kit ($463) (Lab)	4,417.62
61	Watkins, Jeff	Exp Reimb: Safety Boots	178.87
62	Winzer	Cut off Wheels (100) ($374), Grinding Wheels (10), Zip Ties, Screws & Grease Fittings for Auto Shop	623.24
		TOTAL DISBURSEMENTS	**$1,637,341.14**

The foregoing payroll and accounts payable vouchers totaling $1,637,341.14 are hereby approved and authorized for payment.

Seq	Payable To	For	Amount

Julie Blue 6/26/18

Auditor-Controller Date

6/26/18

General Manager Date

DISBURSEMENTS - DATED JULY 5, 2018

Date Prepared 7/3/18

The following demands made against the District are listed for approval and authorization for payment in accordance with Section 31302 of the California Water Code, being a part of the California Water District Law:

Seq	Payable To	For	Amount
54819*	State Water Resources Control	D1 Re-Exam Fee (Pearce)	$30.00
EFT*	Employment Development	Unemployment Claim	2,847.00
EFT*	US Bank Card	ACWA Registration for Russian River Watershed Event on 6/15/18 (Stompe) ($60), Asset Management Lunches for 5/15-5/17 ($349), Facebook Promotions ($15), New Certifications Lab Standard ($195), Engineering Bond Paper ($71) & Office Supplies ($37)	726.45
P/R*	Employees	Net Payroll PPE 6/15/18	$137,997.57
EFT*	Internal Revenue Service	Federal & FICA Taxes PPE 6/15/18 & Final Payout	57,834.25
EFT*	State of California	State Taxes & SDI PPE 6/15/18 & Final Payout	11,867.97
EFT*	CalPERS	Pension Contribution PPE 6/15/18	33,961.11
EFT*	CalPERs	July Health Insurance Premium (Employees $48,075 Retirees $11,882 & Employee Contribution $8,411)	$68,368.74
1	All Star Rents	Propane (18 gals)	64.25
2	Alphagraphics Marin	Printing ($3,779) & Mailing ($1,462) of Novato Spring Waterline	4,713.77
3	Amazon/Genuine-Hardware	PC Monitor ($433), Video Card ($54), Ram for Engineering PC's ($495), Ethernet Switch ($35), Ergonomic Mouse, Laptop Desk Cart & Ergonomic Keyboard ($151), Keyboard Platform w/Wrist Rest ($284), Monitor Arm ($87), Ram for Lab ($469), Caddy Organizer ($47) & Drill ($130)	1,838.14
4	Armstrong, Linda	Refund Overpayment on Closed Account	48.29
5	Athens Administrators	June Replenishment for Checks Written	1471.32
6	AT&T	June Internet Connection for PRTP	94.25

Seq	Payable To	For	Amount
7	AT&T	Telephone ($59), Fax ($72), Data ($269) & Leased Lines ($143)	543.80
8	Automation Direct	PLC Parts for Radio Upgrades	1,276.00
9		Cafeteria Plan Reimbursement	416.66
10	Bay Area Barricade Service	6X24 Construction Sign For Ridge Road Pipeline Project	75.34
11	Bay Alarm	Quarterly STP Fire Alarm Monitoring Fee (7/1-10/1/18)	338.19
12	Black Box	Category Cable Connectors for Radio/PLC Cables	81.61
13	Boland, Ryan and Rachel	Novato "Toilet Rebate Ultra High Efficiency" Program ($150) & Novato "Cash for Grass" Rebate Program ($165)	315.00
14	Bretz, Dena	Novato "Washer Rebate" Program	50.00
15	Ronald & Patricia Eastman	Refund of Deposit/New Development/WC Restriction West Marin	1,000.00
16		Cafeteria Plan: Uninsured Medical Reimbursement	300.00
17	Grainger	Tape Measure, Calibration Gas for Air Monitors ($626), 2-Point Utility Blade & Orthotic Insole	705.44
18	Hanless of Davis	New 2018 Ram 2500 Truck	26,826.41
19	Hermsmeyer, Nancy	Novato "Hot Water Recirculation System" Rebate Program	75.00
20	Hints, Ralph	Refund of Deposit/New Development/WC Restriction Dillon Beach	500.00
21		Vision Reimbursement	368.00
22	Home Depot	Rapid Set Concrete (50-60lb Sacks)	541.50
23	InfoSend	May Processing Fee for Water Bills ($1,364) & Postage ($3,783), May Monthly Support Fee & Bill Insert Printing Fee (Water Quality Report) ($689)	6,573.48
24	International Dioxide	Assembly of Parts to Fix Generator Leak (STP)	100.00

Seq	Payable To	For	Amount
25	ISU Insurance Services	Cyber Liability Insurance FY19	4,079.00
26	Kehoe, Theresa	Exp Reimb: Mileage to W.M. Board Meeting ($32) & Dance Palace Rental ($40)	72.21
27	Lombardi's Deli & BBQ	Deposit for Catering Services for NMWD Holidav Partv on 12/1/18	1,082.00
28	MacDonald, Douglas	Novato "Washer Rebate" Program	50.00
29	Marin IJ Processing Center	Display Ad: Water Rate Hearing 5/15/18	137.20
30	Mettler-Toledo Rainin	Annual Pipet Calibration (Lab)	249.27
31		Vision Reimbursement	184.00
32	MRC Global	Labor to Install Relay Board & Start Up on 12" Aquaduct Valves	799.50
33	Neopost USA	July Postal Meter Rental	108.20
34	Northbay Auto Wraps	Vinyl Wraps for Truck Tail Gates (2)	350.00
35	NMWD Employee Association	Association Dues (4/30/18-6/15/18)	990.00
36	Novato Sanitary District	April 2018 RW Operating Expense	10,100.79
37	NSI Solutions	QC Sample (Lab)	51.25
38	NTT Training	Reg Fee; Industrial Electricity & Troubleshooting Electrical Control Circuits Seminar (Davenport & Lemos)	3,848.00
39	Office Depot	Desk Sign	23.86
40	Olivo, Laura	Novato "Smart Irrigation Controller" Program	99.00
41	Origin Micro	Cisco Firewalls for Radio Telemetry Project	2,675.00
42	Pace Supply	Connection Rings (150) ($439), Brass Caps (3), Corp Stops (10), Meter Spuds (8) & Brass Valves (10)	996.85
43	Pacelli, Thomas	Novato "Toilet Rebate Ulta High Efficiency" Problem	450.00
44	Pape Machinery	Radiator Guard ('15 John Deere Skip Loader)	186.41
45	NMWD Petty Cash	Safety Snacks ($101), 4th of July Decorations & Safety Bucks	129.40

Seq	Payable To	For	Amount
46	Point Reyes Light	Legal Notice: Oceana Marin Sewer Rate Notice on 6/7/18	84.90
47	Pollard Water	Economic Flow & Pressure Kits (3) ($843), Adaptors (2), Nipples (2), Fittings for New Press Regulator/Reliefs ($715) & Pressure Kit Pressure Gauges (4)	1,894.71
48		Cafeteria Plan Reimbursement & Uninsured Medical Reimbursement	300.00
49	Sequoia Safety Supply	Nitrile Gloves (300), Poison Oak Lotion/Cleanser & Anti Fog Safety Glasses (12)	325.48
50	Skezas, Amy	Novato "Washer Rebate" Program	50.00
51	Soiland	Asphalt Recycling (5 tons)	24.45
52	Syar Industries	Asphalt (6 tons)	924.75
53	Tamagno Green Products	Sludge Removal at STP (66 yds)	1,650.00
54	Thatcher of California	Ferric Chloride (9 tons) (STP)	5,215.62
55	VWR International	Standard (Lab)	38.47
56	Williamson, Nancy	Exp Reimb: Snacks for Annual Physical Inventory	41.46
		TOTAL DISBURSEMENTS	**$399,161.32**

The foregoing payroll and accounts payable vouchers totaling $399,161.32 are hereby approved and authorized for payment.

Julie Blue 7/3/18

Auditor-Controller Date

7/3/18

General Manager Date

DISBURSEMENTS - DATED JULY 12, 2018

Date Prepared 7/10/18

The following demands made against the District are listed for approval and authorization for payment in accordance with Section 31302 of the California Water Code, being a part of the California Water District Law:

Seq	Payable To	For	Amount
P/R*	Employees	Net Payroll PPE 6/30/18	$144,465.22
EFT*	US Bank	Federal & FICA Taxes PPE 6/30/18	59,198.98
EFT*	State of California	State Taxes & SDI PPE 6/30/18	12,074.84
EFT*	CalPERS	Pension Contribution PPE 6/30/18	33,756.34
1	Allied Fluid Products	Temporary Hose for Highline to Connect Water Service During Outages Over 12 Hours	4,360.35
2	Alpha Analytical Labs	Lab Testing	1,670.00
3	Asbury Environmental Services	Used Oil Filter Disposal	120.00
4	Athens Administrators	July Workers Comp Admin Fee	1,000.00
5	Beck Communications	Installation & Materials for Fiber Optic Cable (Fiber Link from Solar Field to STP)	7,404.23
6	CalPERS	Annual Lump Sum Prepayment Option (Classic - $683,639 & Pepra - $252)	682,891.00
7	CDW-Government	Tp Link 8 Port Smart Switch	187.53
8		Cafeteria Plan: Uninsured Medical Reimbursement	260.00
9	DataTree	June Subscription to Parcel Data Information	100.00
10	Direct Line	July Telephone Answering Service	370.32
11	Fedak & Brown	Prog Pymt #1: FY 18 Audit (Balance Remaining on Contract $15,838)	1,800.00
12	Golden Gate Petroleum	Gas ($3.20/gal) & Diesel ($3.38/gal)	3,951.08
13	Grainger	Cartridge Filter Paper (4), Sealant, Beverage Cooler (5 gal), 24" Traffic Sign ($92), Handheld LED Light & Yard Lights (5) ($434)	656.58
14	Hach	Sodium Thiosulfate (STP)	34.82

*Prepaid

Seq	Payable To	For	Amount
15	Ben Ielmorini	Exp Reimb: D3 Water Treatment Plant Operation Course & Materials	156.53
16	Kehoe, Theresa	Exp Reimb: Patio Umbrella	54.05
17	Lincoln Life	Deferred Compensation PPE 6/30/18	11,945.59
18	Marinscope	Notice of Public Hearing for FY19 Novato Budget on 6/13/18	40.00
19	McLellan, WK	Misc Paving	20,943.05
20	Mutual of Omaha	July Group Life Insurance Premium	860.64
21	Nationwide Retirement Solution	Deferred Compensation PPE 6/30/18	1,750.00
22	Pace Supply	Service Saddles (15) ($741), Cap, Ells (3), Bushings (2), Couplings (9), Hydrants (2), Nipples (20), Copper Pipe (660') ($2,440), Corp Stops (3), Meter Stops (40) & Flanges (22)	11,120.01
23	Point Reyes Light	Legal Notice: West Marin Water Rate Increase Notice	505.49
24	Pollard Water	Economic Flow & Pressure Kits (2) ($572), Adaptors (2), Nipples (2), Fittings for New Press Regulator/Reliefs ($345) & Pressure Gauges (4)	1,524.54
25	Ramudo, Pablo	Exp Reimb: Mileage for BAWWA Tour & Meeting ($45), Registration ($55) & Membership & Registration ($80) (Duston)	179.69
26	Recology Sonoma Marin	Misc Debris (20 yds)	482.10
27	Sage Software	Accounting Software Fixed Assets (Budget $900) (7/18-7/19)	884.00
28	Simkins, Robert	Refund Excess Advance for Construction Over Actual Job Cost-1182 Simmons-Upsize to 1" Meter	412.69
29	Thatcher of California	Ferric Chloride (9 tons) (STP)	4,483.68
30	Torres, Yasmin Gomez	Refund Excess Advance for Construction Over Actual Job Cost-626 Olive Ave-Upsize to 1" Meter	412.32
31	USA BlueBook	Nitrile Gloves (2,200) (STP)	462.34

Seq	Payable To	For	Amount
32	Volvo Construction Equipment	Service Parts (Compressor Ingersoll - Rand & '12 Compressor Ingersoll Rand)	679.32
33	Wiley Price & Radulovich	May Legal Services	293.00
		TOTAL DISBURSEMENTS	**$1,011,490.33**

The foregoing payroll and accounts payable vouchers totaling $1,011,490.33 are hereby approved and authorized for payment.

Julie Blue 7-10-18

Auditor-Controller Date

7.10.18

General Manager Date

NORTH MARIN WATER DISTRICT

Director's Compensation Request for Attendance at Meetings Other than District Board Meetings

BOARD MEMBER: RICK FRAITES

50 Forrest Road

Novato, CA 94947

DATE 6/19/2018
(TODAY'S DATE)

I attended the North Bay Watershed Association **on** 6/8/18
(NAME OF MEETING OR WORKSHOP) (DATE OF MEETING)

and wish to be compensated as provided under the Board Compensation Policy.

Richard Fraites
DIRECTOR SIGNATURE

FOR ACCOUNTING USE ONLY

Julie

Julie Blue 6/20
APPROVED TO PAY BY **DATE**

CHARGE TO: 56001-01-11 **AMOUNT:$** 225.00
(filled in by Accounting)

PAID PAY PERIOD ENDING 6/30/18

t:\forms\check request completed\check request for fraites.doc
Rev. 0716

MEMORANDUM

To: Board of Directors July 13, 2018

From: Ryan Grisso, Water Conservation Coordinator RG

Subject: Public Outreach Update – 4th of July Parade
V:\Memos to Board\4th of July Parade Recap.doc

RECOMMENDED ACTION: Information Only

FINANCIAL IMPACT: None

On July 4th, 2018, the District participated in the Novato 4th of July Parade to commemorate the District's 70 year anniversary. One of the large crew trucks (Truck 508) was decorated with two large "70 Year Anniversary" banners on each side and festive 4th of July adornments (see Attachment 1 for photos). Staff who participated in the parade, included Jeff Watkins, Jessica Swenson, Monica Juarez and Ryan Grisso. This year the District gave out 500 rubber duckies on the parade route along with some candy.

There were strategically located announcement booths along the parade route that reminded attendees about the District's 70th anniversary as our entry passed by. This parade has a huge attendance from the Novato and surrounding community and was excellent exposure for the District to our customers. It was so well attended, that 500 rubber ducks were not enough and if the District is to do the parade again in future years, it is recommended to have 100 giveaway items per block (1,000 total giveaway items).

RECOMMENDATION

None

ATTACHMENT 1

MEMORANDUM

To: Board of Directors July 13, 2018

From: Nancy Williamson, Senior Accountant NW

Subj: Information – FY18 4th Quarter Labor Cost Report
I:\ac\word\memo\18\4th qtr labor cost rpt.doc

RECOMMENDED ACTION: Information Only

FINANCIAL IMPACT: None

Total labor cost increased $37,496 (0.5%) from the prior fiscal year. Attached in graphical format is a five-year comparative summary of total labor cost (Attachment A), overtime cost (Attachment B) and temporary employee cost (Attachment C) expended during each fiscal year. Also attached is a summary of total labor cost vs. budget (Attachment D), which shows that labor was 5.3% under budget through the end of the fiscal year.

Department	Increase / (Decrease) in Labor Cost vs prior FY	% Change
Administration	($72,996)	(3.3%)
Engineering	$82,706	6.6%
Operations/Maint	($66,703)	(2.3%)
Construction/Maint	$94,489	6.7%
Net Increase/(Decrease)	$37,496	0.5%

Comment on Change from Prior Year

Administration: Labor Cost decreased $72,996, or 3.3%. The decrease is due to an overlap in the Administration Department in FY17 from January 16, 2017 through May 2, 2017 while Drew McIntyre transitioned from Assistant General Manager to General Manager upon the retirement of the previous General Manager on May 2, 2017. The decrease is also due to an empolyee, who had been out on medical leave since January, exhausted his Paid Leave Bank and went unpaid from September 12, 2017 until his return to work on October 20, 2017. The General Manager, Accounting/HR Supervisor and District Secretary positions were all filled with lower salaries than their predecessors. The decrease was offset by an overlap in the Accounting/HR Supervisor position beginning on October 10, 2017 due to a retirement on November 30, 2017 and an overlap in the Auditor Controller position beginning March 19, 2018 to replace David Bentley retired on May 2, 2018. There were also three 5% step increases, and the 2.7% labor cost increase effective October 1 of 2017.

Engineering: Labor Cost increased $82,706, or 6.6%. The increase is primarily due to overlapping salaries arising from the addition of Susan Dove on August 16, 2017 to the Engineering Tech IV position to replace an employee who retired on September 30, 2017, two 5% step increases, one 3% spot adjustment, more Water Conservation temporary hours worked and the aforesaid 2.7% labor cost increase.

Operations/Maintenance: Labor Cost decreased $66,703, or 2.3%. The decrease was primarily due

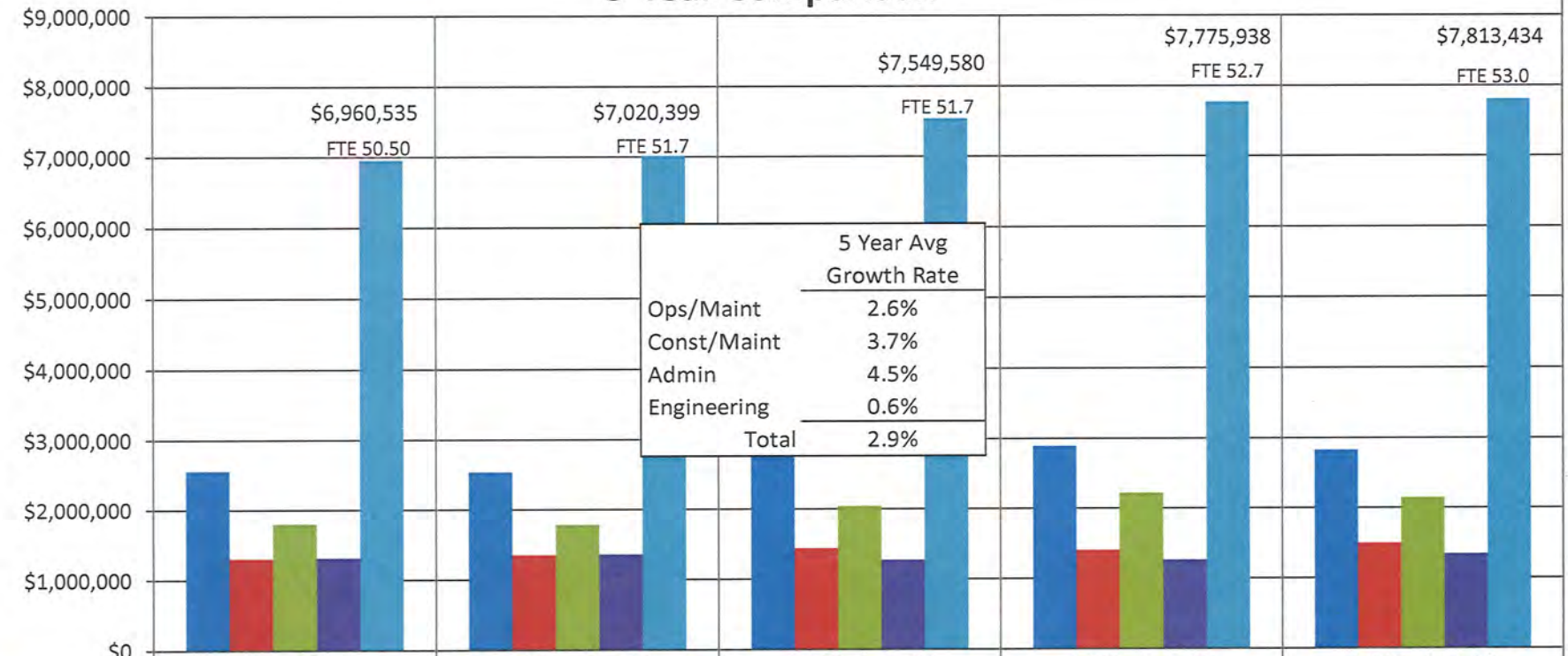
to the resignation of a Senior TP Operator on October 6, 2017, the resignation of an Assistant Distribution/TP Operator on December 8, 2017, the retirement of a Sr. Elec/Mech Tech on 12/30/17 and to an employee's unpaid family leave from September 11, 2017 through September 30, 2017. This was offset by the promotion of Roy Foster to Distribution/TP Operator on December 1, 2017, the addition of Assistant Distribution/TP Operators Silas Miranda (December 4, 2017) and David Dustin (February 26, 2018), the addition of Collin Davenport (October 16, 2017) and James Lemos (November 16, 2017) from the Construction department to Apprentice E/M Techs, two 3% spot adjustments, fifteen 5% step increases, and the 2.7% labor cost increase.

***Construction/Maintenance**:* Labor Cost increased $94,489, or 6.7%. The increase was due to more temporary and overtime hours worked and thirteen 5% step-increases and the 2.7% labor cost increase.

7/13/18

t:\finance\hrsrpt\fy18 4th qtr labor cost report\all hrs $ chart.xls

Total Labor Cost
NMWD Fiscal Year through June
5-Year Comparison



	Jul 13 - June 14	Jul 14 - June 15	Jul 15 - June 16	Jul 16 - June 17	Jul 17 - June 18
Ops/Maint	$2,554,436	$2,534,072	$2,804,984	$2,895,724	$2,829,021
Const/Maint	$1,296,106	$1,344,737	$1,437,713	$1,403,082	$1,497,571
Admin	$1,800,594	$1,784,116	$2,038,085	$2,216,433	$2,143,437
Eng	$1,309,399	$1,357,474	$1,268,798	$1,260,699	$1,343,405
Total	$6,960,535	$7,020,399	$7,549,580	$7,775,938	$7,813,434

Ops/Maint Const/Maint Admin Eng Total

ATTACHMENT A

7/13/18

t:\finance\hrsrpt\fy18 4th qtr labor cost report\ot $ chart

Overtime Cost
NMWD Fiscal Year through June
5-Year Comparison

	Jul 13 - June 14	Jul 14 - June 15	Jul 15 - June 16	Jul 16 - June 17	Jul 17 - June 18
Ops/Maint	$96,619	$102,235	$95,680	$100,565	$106,400
Const/Maint	$49,928	$67,286	$82,085	$54,698	$62,232
Admin	$19,549	$12,857	$14,870	$14,880	$28,124
Eng	$910	$4,353	$84		
Total	$167,006	$186,731	$192,718	$170,143	$196,755

ATTACHMENT B

7/13/18

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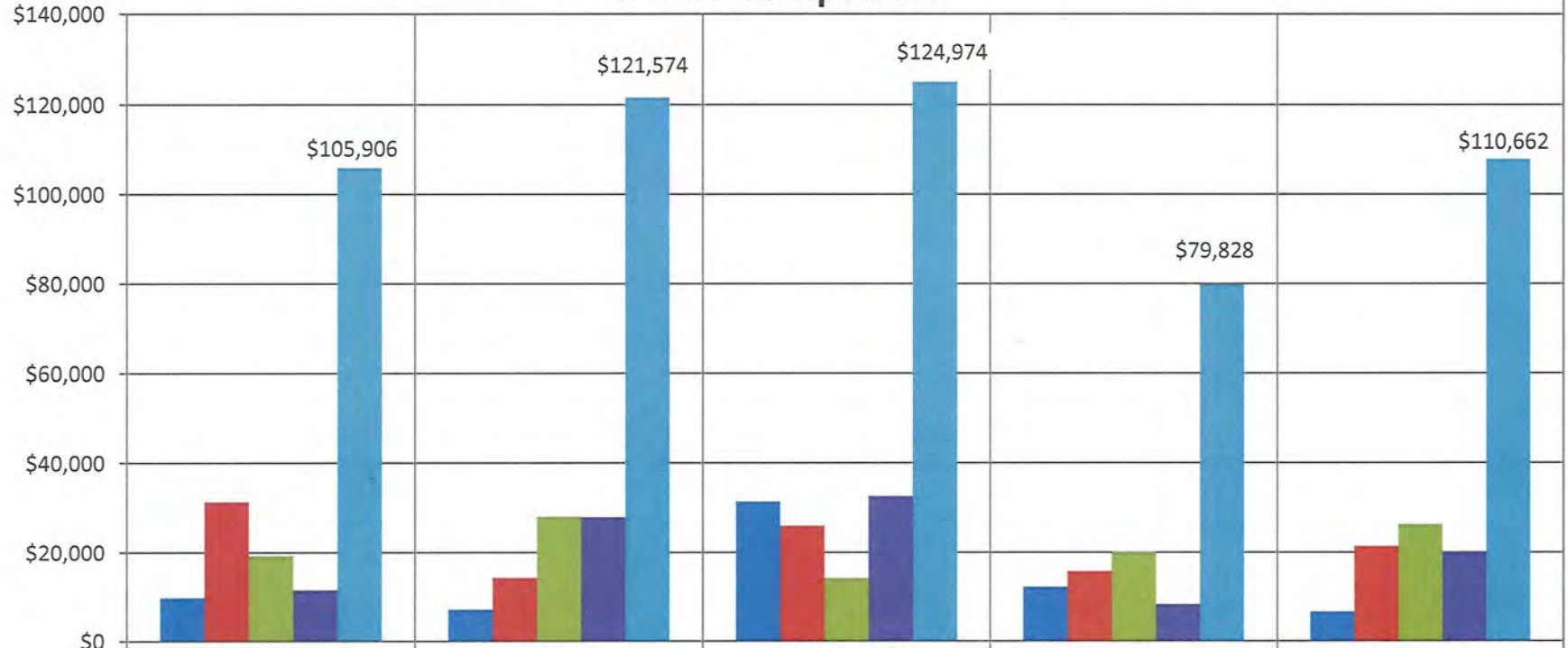
Temporary Employee Cost
NMWD Fiscal Year through June
5-Year Comparison



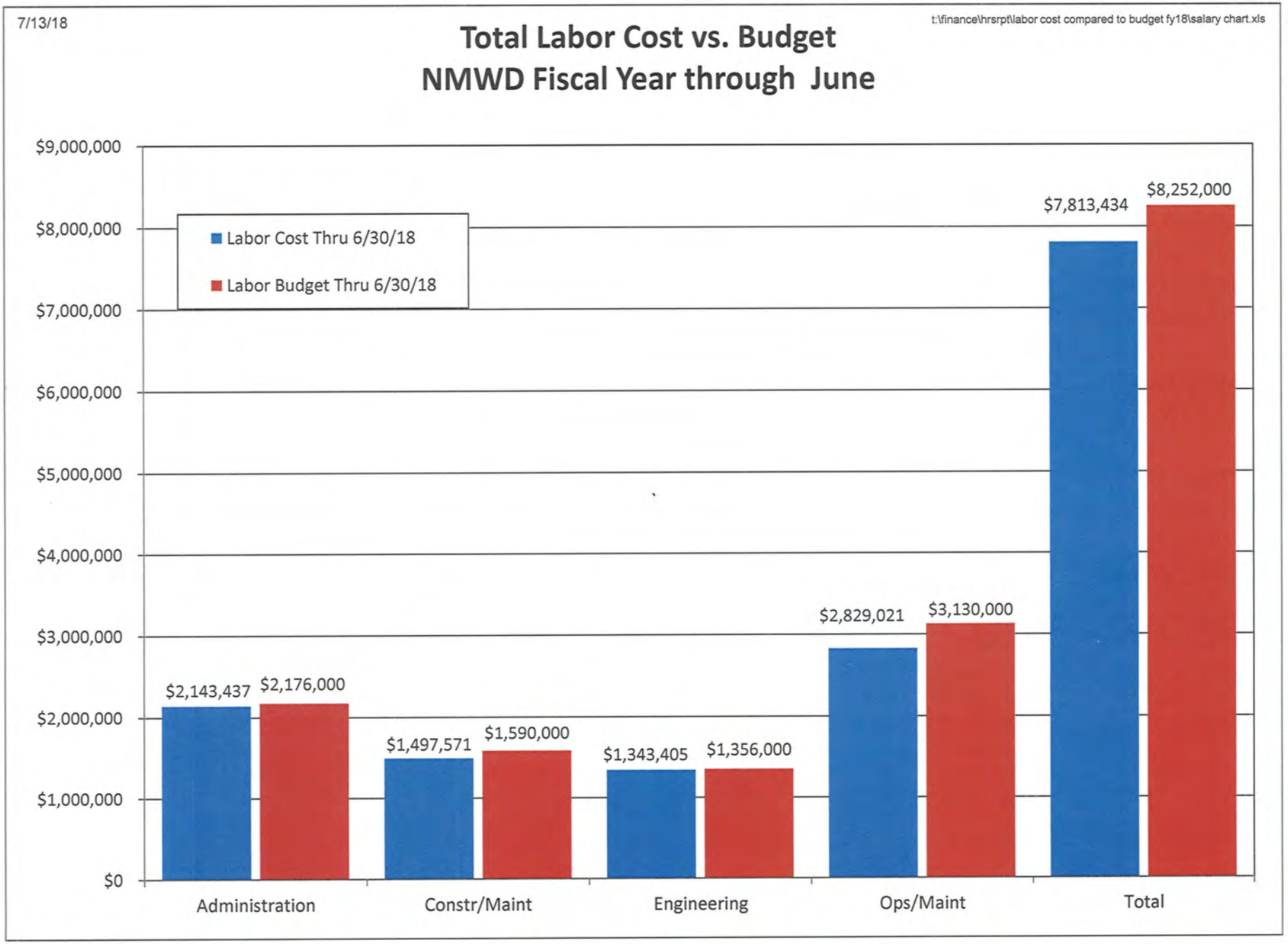
	Jul 13 - June 14	Jul 14 - June 15	Jul 15 - June 16	Jul 16 - June 17	Jul 17 - June 18
Ops/Maint	$9,822	$7,136	$31,416	$12,298	$6,644
Const/Maint	$31,381	$14,311	$25,982	$15,714	$21,450
Admin	$19,312	$28,021	$14,252	$20,153	$26,224
Eng	$11,564	$27,902	$32,659	$8,341	$20,110
Total	$105,906	$121,574	$124,974	$79,828	$110,662

ATTACHMENT C

7/13/18

t:\finance\hrsrpt\labor cost compared to budget fy18\salary chart.xls

Total Labor Cost vs. Budget
NMWD Fiscal Year through June



ATTACHMENT D

MEMORANDUM

To: Board of Directors July 13, 2018

From: Nancy Williamson, Sr. Accountant

Subj: Self-Insured Workers' Comp – 4th Quarter Status Report
t:\ac\word\personnel\wc\self ins status 0418.docx

RECOMMENDED ACTION: None

FINANCIAL IMPACT: Cumulative Savings of $578,500

The District returned to self-insuring its workers compensation liability effective July 1, 2011, after the low-cost proposal for first-dollar workers' compensation coverage increased 20% over the prior year, to $159,331. The avoided-cost since returning to self-insurance is calculated at $413,454. When the Reserve for Future Medical (which is the estimated cost to fully resolve open claims) is added, the total cash outlay avoided to date, including interest earned on the cost avoided, is $541,322. This cash is set-aside in a reserve for future claims.

In FY18, the District incurred six claims. The savings for FY18 is significantly less due to the reduction in cost of policy premiums. Due to this decreased savings margin the benefits of self-insuring will be evaluated and reconsidered for FY20. Attached are charts showing a 10-year history of annual claims cost (average $71,000 per year) and 10-year history of claims frequency (average 7 claims per year).

	FY12 through FY15	FY16	FY17	FY18	Cumulative
Premium Avoided	$845,391[1]	$212,135[2]	$191,000[3]	$109,260[4]	$1,357,786
Self-Insurance Cost					
Medical/Indemnity	(174,705)	(8,162)	(261,735)	(14,509)	(459,111)
Third-Party Administration	(48,000)	(12,000)	(12,000)	(12,000)	(84,000)
Excess Insurance Premium[5]	(193,292)	(54,462)	(58,638)	(62,358)	(368,750)
Legal/Miscellaneous	(21,646)	(2,946)	(1,102)	(6,777)	(32,471)
Net Cost Avoided	$407,749	$134,565	($142,476)	$13,616	$413,454
Reserve for Future Medical	0	0	85,670	11,911	97,581
Total Cash Outlay Avoided	$407,749	$134,565	($56,806)	$25,527	$511,035
Interest Earned on Cash Outlay Avoided	5,431	6,022	9,124	9,710	30,287
Cash Savings	$413,180	$140,587	($47,682)	$35,237	$541,322

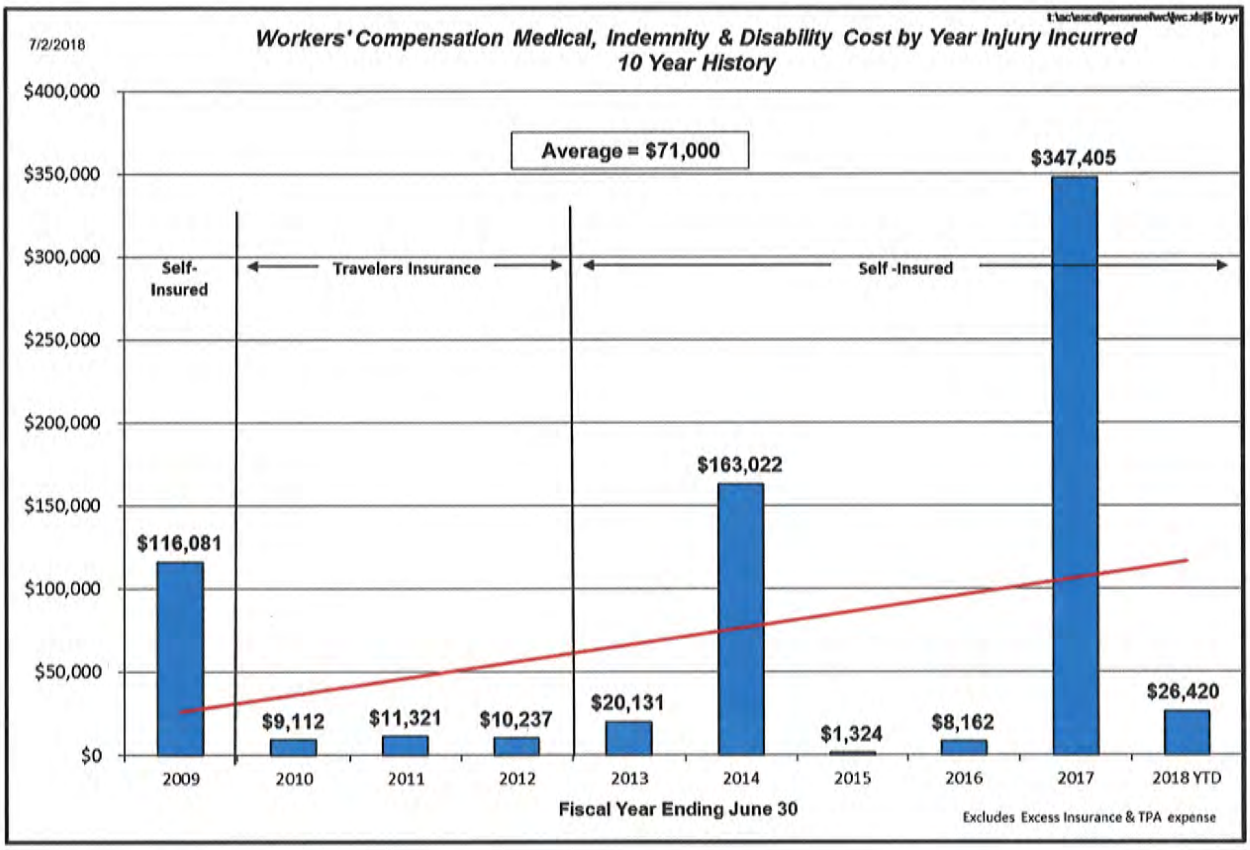
[1] Proposed annual premium of $159,331 (FY12), $170,574 (FY13), $311,764 (FY14) and $203,722 (FY15)

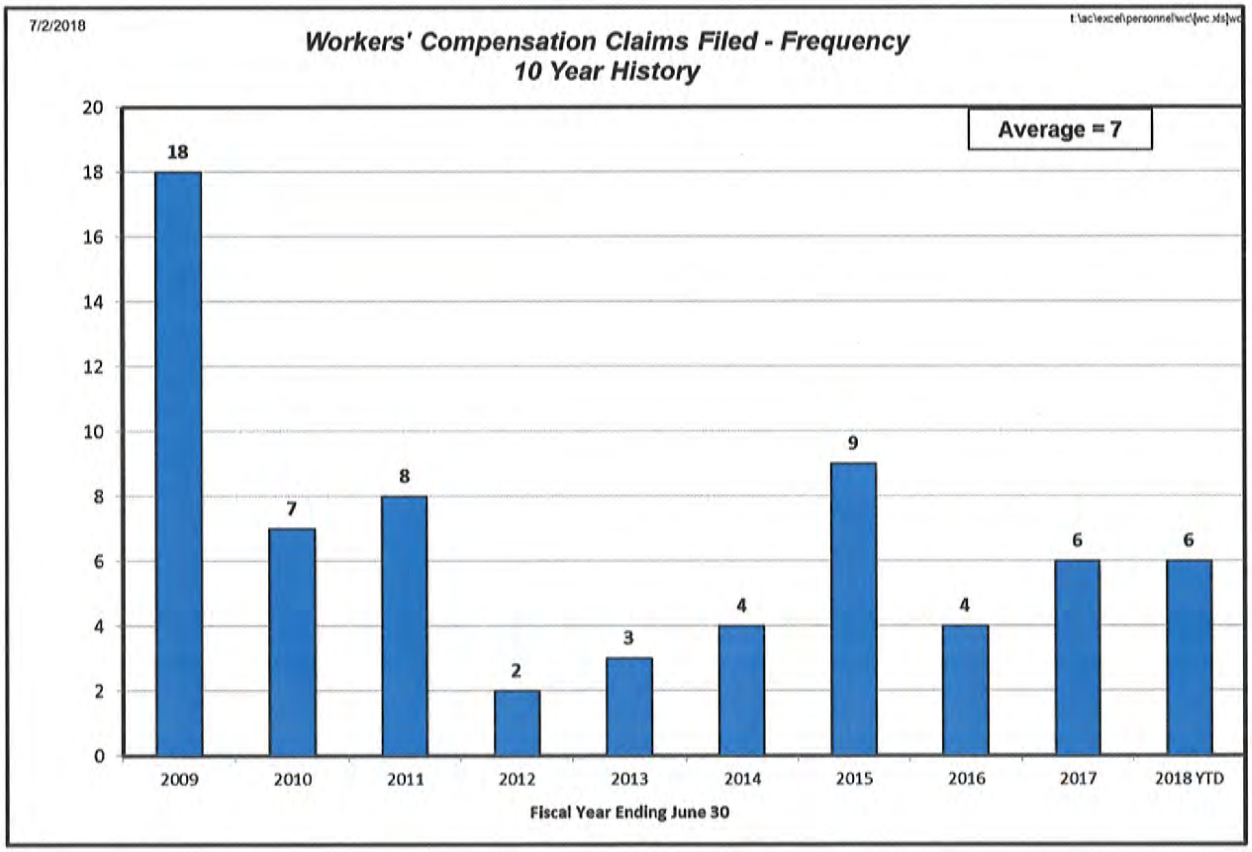
[2] New York Marine and General Insurance Company was the low cost proposal with an annual premium of $212,135.

[3] Allied World Assurance was the low cost proposal with an annual premium of $191,000.

[4] Zenith Insurance Company was the low cost proposal with an annual premium of $109,260.

[5] Excess Insurance Protects the District against Catastrophic Loss Exceeding $1,000,000 per claim.


7/2/2018
Workers' Compensation Medical, Indemnity & Disability Cost by Year Injury Incurred
10 Year History
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$0
Average = $71,000
Self-Insured
Travelers Insurance
Self -Insured
$116,081
$9,112
$11,321
$10,237
$20,131
$163,022
$1,324
$8,162
$347,405
$26,420
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018 YTD
Fiscal Year Ending June 30
Excludes Excess Insurance & TPA expense


7/2/2018
Workers' Compensation Claims Filed - Frequency
10 Year History
20
18
16
14
12
10
8
6
4
2
0
Average = 7
18
7
8
2
3
4
9
4
6
6
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018 YTD
Fiscal Year Ending June 30

PROOF OF PUBLICATION (2015.5 CCP)

This space is for the County Clerk's Filing Stamp

STATE OF CALIFORNIA
County of Marin

I am a citizen of the United States and a resident of the county aforesaid. I am over the age of eighteen years, and not a party to or interest in the above-entitled matter. I am the publisher of the Point Reyes Light, a newspaper of general circulation, printed and published in the town of Point Reye s Station, County of Marin and which newspaper has been adjudged a newspaper for general circulation by the Superior Court of the County of Marin, State of California, under the date April 26, 1949, Case Number 183007; that the notice of which annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement therof on the following dates to wit:

7/12/18

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date at Inverness, California, this

7/12/18

Signature

Proof of Publication

Notice:

Salinity intrusion into the Point Reyes well supply serving the West Marin communities of Point Reyes, Olema, Inverness Park, and Paradise Ranch Estates has occurred and has caused sodium levels to increase from background levels of 15-30 milligrams per Liter (mg/L). The table below lists the most recent concentrations for sodium in the West Marin water supply:

Date	Chloride	Sodium	Units
7/10/18	54	88	mg/L

*milligrams per liter

Drew McIntyre, General Manager
North Marin Water District

New Groundwater Woes, and Regulations, in California Wine Country

Four groundwater basins in Napa and Sonoma counties may be in worse shape than previously thought. The state of California recently signaled they should be subject to new groundwater sustainability rules.

WRITTEN BY
Matt Weiser

PUBLISHED ON
July 2, 2018

Vineyards likes this one near Healdsburg, California, rely heavily on groundwater to irrigate grapevines. George Rose/Getty Images

CALIFORNIA'S PREMIER WINE-GROWING region has been targeted for more regulation under the state's new groundwater law, likely resulting in new fees and limits on water extraction for the industry.

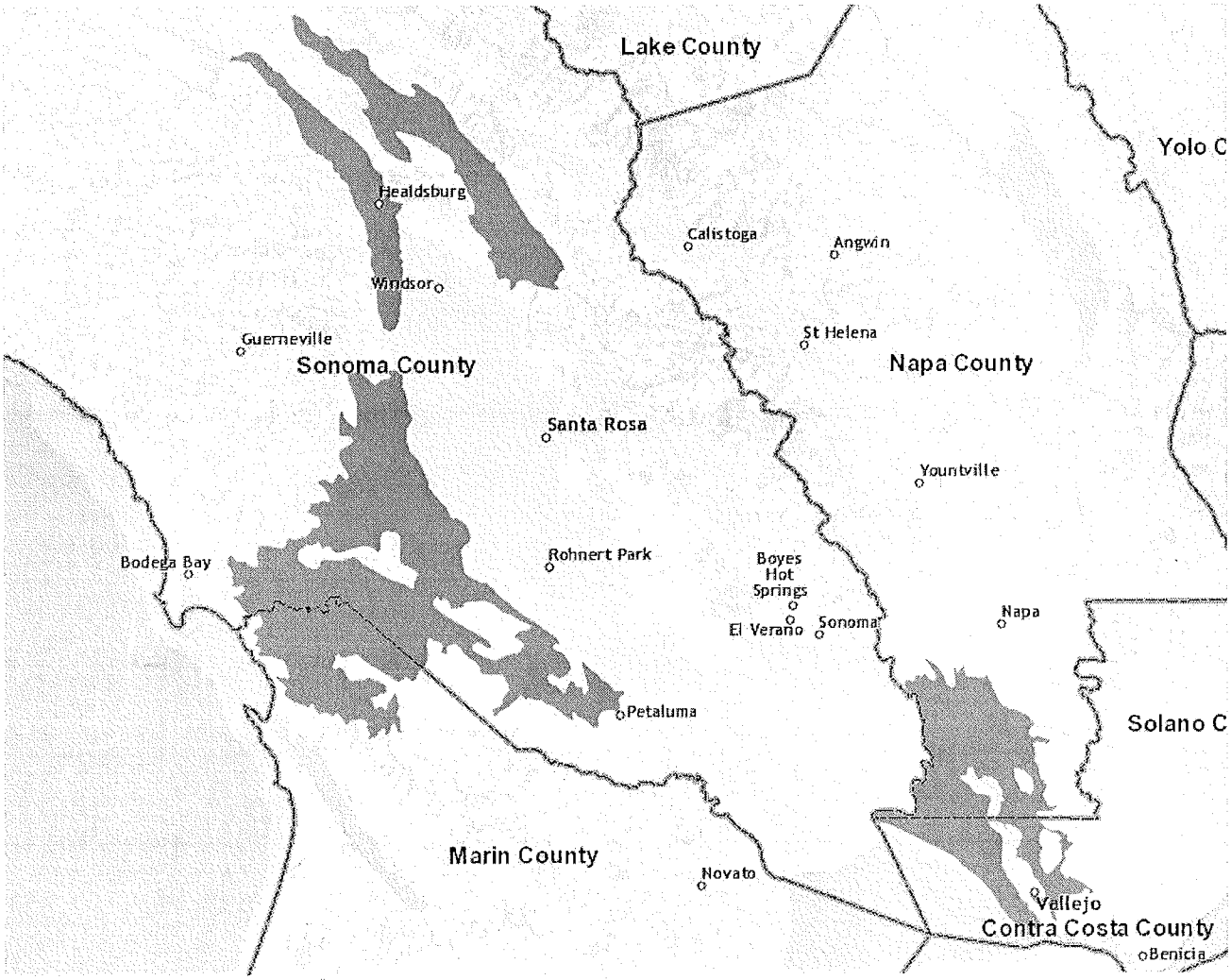
The state Department of Water Resources declared in May that 14 groundwater basins across the state are at risk of overdraft, and thus should be reprioritized under the Sustainable Groundwater Management Act (SGMA). Four of these are in Napa and Sonoma county wine-growing valleys.

The aquifers in question are the Sonoma Lowlands subbasin in Napa and Solano counties, the Alexander Valley basin and Healdsburg area subbasin in Sonoma County and the Wilson Grove Highlands basin in Sonoma and Marin Counties. Each is a vital source of irrigation water for grape growing.

The department proposes to change these basins from "low" to "medium" priority under the law after reviewing new data on the severity of overdraft and land use in each region. Previously,

their low ranking meant these basins got a pass from complying with SGMA. If finalized in November, medium priority will require each basin to form a groundwater sustainability agency within two years, and complete a sustainability plan within five years.

Other groundwater basins in Napa and Sonoma counties are already subject to these requirements. The new additions mean virtually all of California's top wine region now confronts costly groundwater regulations for the first time. Grape growing is the primary consumer of groundwater in each basin.



The state of California proposes to change the wine-country groundwater basins shown in orange to "medium" priority, meaning they will be required to comply with the Sustainable Groundwater Management Act. The basins shown in gray on the map are already subject to law. (Image courtesy California Department of Water Resources)

"Nobody likes to be regulated, particularly when we are already doing our best to economize the use of irrigation water," said Tito Sasaki, a board member of the Sonoma County Farm Bureauand a farmer who grows champagne grapes.

Trevor Joseph, a supervising engineering geologist with the state Department of Water Resources, said the water demands of wine

growing were definitely a factor in raising the priority status of the Napa and Sonoma basins.

"We had more recent and refined estimates of groundwater use in these areas," Joseph said. "There is some relevance here to the wine-growing areas. These ones in particular are heavily dependent on groundwater to meet their water demands."

The new groundwater sustainability plans require each basin to reverse groundwater overdraft. This could result in new water conservation rules imposed on farmers. The basins could also be required to develop plans to recharge aquifers, which could mean buying surface water or recycled water. Groundwater users in each basin will probably be required to pay fees to support all these efforts.

In Sonoma County, three groundwater basins were already ranked as "high" priority under the SGMA requirements. The Sonoma County Water Agency has been working under contract with groundwater users in those basins to organize new sustainability agencies and begin drafting sustainability plans.

Jay Jasperse, director of groundwater management for the county water agency, said doubling the number of groundwater basins subject to the law in Sonoma County will add significant workload and cost.

The expenses are numerous. At its core, the process involves creating a new government agency to regulate groundwater. The costs include selecting and seating a board, organizing meetings, complying with the state's open-meetings law, hiring a part-time attorney and administrator for each basin, and developing all the usual policies and procedures required of any government agency.

In addition, consultants must be hired to study the hydrology of the basin and, in many cases, to conduct a rate study to figure out how much each groundwater user should pay into the program. Other tasks are likely to include installing new groundwater monitoring devices on private wells throughout each basin and possibly even drilling new monitoring wells.

Jasperse said Sonoma County has budgeted $2.7 million to fund the startup process for each of the three groundwater agencies it is already working on. Each of the three new basins will require a similar investment.

"You're talking about over $8 million or so in costs, on top of what we're already hit with," he said. "So that is something we're

very concerned about. How do you pay for these extra costs? We're already struggling with that with our first three basins."

The county obtained a $1 million state grant for each of the first three basins. Jasperse hopes the same will be possible for the additional three.

He suspects the change in priority is a result of connections between groundwater and surface water. The Healdsburg groundwater basin, for instance, is connected to surface flow in the Russian River. The Dry Creek basin is connected to Dry Creek.

The Sonoma County Water Agency manages surface flow in both of those streams via its control of upstream reservoirs. This gives it a direct role in the fate of groundwater in those basins.

"Having surface water flows, and how those are managed – that's very critical to the health of the groundwater aquifer," Jasperse said.

Two big questions loom over the future of groundwater in these wine-producing basins.

First, what is the right path to sustainability? Is it through water conservation efforts, groundwater recharge, or some combination? Sasaki prefers to focus on recharge, he said, because wine growers have already done a lot to reduce groundwater pumping, including widespread conversion to drip irrigation.

But that requires finding water to use for recharge, which won't be easy in this already water-scarce region.

Second, who should pay for groundwater management? Besides startup costs, there will be additional costs in perpetuity to monitor groundwater, prepare status reports, fund conservation efforts and plan aquifer recharge programs.

Sasaki said the entire population benefits from sustainable aquifers and their connection to surface-water flows. Therefore, he said, the growers who extract most of the groundwater should not be solely responsible for groundwater management costs.

He acknowledges this is not a popular position, especially since most cities in the region depend on surface water, not groundwater.

"I'm more of the opinion that the groundwater issues are part of the entire water resources optimization challenge," Sasaki said. "Therefore, the costs should be borne by everybody in the entire

region – in this case, the entire county. But many people don't agree with that."

Study of workforce housing planned by city, schools

NOVATO

By Adrian Rodriguez

arodriguez@marinij.com @adrianrrodri on Twitter

Novato wants to do better to attract and retain quality employees.

To that end, officials with the city and the Novato Unified School District are considering using city- and districtowned land to develop workforce housing.

The Novato City Council this week authorized City Manager Regan Candelario to enter into a memorandum of understanding with the school district to study the feasibility of a joint housing project for public employees. This would include housing for staff of the city, police department, school district and fire district.

"If people can't afford to live in Novato or anywhere near here, it's hard to retain employees," Superintendent Jim Hogeboom said. "If we could do anything to increase the availability of great staff, that's why we want to look at housing for the city."

There are two undeveloped sites in the San Marin neighborhood that have been identified as potentially suitable for development, officials said. That includes a school districtowned 21-acre swath of land on San Andreas Drive near the San Marin Drive intersection. To the east of that is a 4-acre site that the city owns.

The school district board of directors approved the memorandum in this form with a 7-0 vote on June 19. Because the district owns a majority of the land, it would be the lead agency in the project. But this particular strategy had its critics on the City Council: the move was passed on a 3-2 vote Tuesday, with council members Pam Drew and Pat Eklund opposing.

"I do not believe that we have the expertise for this, and I do not believe that the school district has the expertise for this," Drew said. She said she would prefer that the city set up "a funding program to make a down payment to create favorable loan terms or to help people get into the housing that they desire."

Eklund said she thinks there should be more public outreach and a city-hosted workshop before any memorandum of understanding is authorized.

"The steps from June 2018 to April of 2019, none of those steps includes a public outreach program," she said. "I think that is totally unacceptable."

In the same mindset, resident Robin Diedrich said she lives next door to the land and wanted to make sure that the city and the school district would engage the residents in the decision making.

"I recommend that you have sufficient community input," Diedrich said. "It will be in everyone's best interest whether the project goes forward or not; it's something that we really want to make sure that we do."

Councilman Eric Lucan said he was "confident that there would be extensive outreach."

"There would be so many meetings to even get to the next stage of this that there will be tremendous opportunity for people to weigh in," he said. "I think starting with this process with a feasibility study makes sense given that now a family of four in Novato making $117,000 a year is consider low-income."

The school district performed a survey to gauge the interest from its employees. The survey netted 465 respondents from 842 employees. More than 50 percent of employees travel 20 to 90 minutes one-way to get to work, and more than 90 percent drive alone, according to the survey. Employees are not living closer because rent and home prices are too high, the survey says.

Of those who participated, about 56 percent, or 259 respondents, are interested in subsidized housing. Eighty-five percent of that 259, or 175 respondents, said they would be interested in affordable housing offered through the school district. The city also conducted a survey that received similar results.

There are about $66,000 in available funds for the study. That includes donations from the Marin Community Foundation and the Ginny & Peter Haas Jr. Fund. The city of Novato also has budgeted $20,000 in affordable housing funds.

The feasibility and technical studies are expected to be completed by November, at which time officials will determine whether more study is needed. From January through April of 2019, officials are expected to begin exploring options for financing, development and planning.

Wildfire-watch camera network being planned

SONOMA COUNTY

By J.D. Morris

The Press Democrat

Starting this fall, a new network of high-tech web cameras could help first responders and government officials in Sonoma County respond more quickly to wildfires and decide how best to deploy their resources when major blazes ignite.

As proposed by the county Water Agency, the project would start as an eight-camera system, mostly located in the north county and aimed at the Lake Sonoma watershed, which could suffer catastrophic damage from a major fire in the area. One of the pan-tilt-zoom cameras would be located on Sonoma Mountain and two would be installed at the Pepperwood Preserve, where they would have eyes on some of the October burn scars.

"It provides a level of situational awareness that is absolutely needed going forward to address the new normal, which are these extreme weather events that drive fires to a different degree," said Board of Supervisors chairman James Gore. "I'm very excited about this." County supervisors are expected to consider approval of the plan, currently estimated to cost as much as $475,000, at their Aug. 7 meeting.

The cameras would in most cases be installed on communication towers and other existing structures, officials said. They're primarily intended to help emergency responders, dispatchers and government leaders more quickly understand the severity of a fire, where it is spreading and how quickly it is advancing.

If the county moves forward with the initiative, it would become part of a larger network of cameras in other fire-prone areas such as Lake Tahoe and San Diego, which already use the system developed out of the University of Nevada, Reno. The camera system's creators hope technological advances will one day enable the devices to often detect the start of wildfires before anyone else does. Already, they do a good job detecting fires caused by lighting strikes, according to Graham Kent, director of the Nevada Seismological Laboratory at UNR.

Kent, who told supervisors about the cameras at a February board meeting, said the technology would have been a big help during the start of October's fast-moving and devastating firestorm, particularly since the system works best at nighttime.

"A camera system that night would have easily been able to identify the six or seven starts or however many it was," Kent said. "At least everyone would have been on a common understanding of what it was."

If supervisors, who are directors of the Water Agency, sign off on the project next month, officials would aim to have them installed through the month of September so they are in place by Oct. 1 — ahead of the one-year anniversary of last year's fires.

The initial group of cameras would be focused on protecting Lake Sonoma, the reservoir that serves as the largest source of drinking water for more than 600,000 North Bay residents. Located in the forested coast mountains west of Healdsburg, the lake is part of a 130-square-mile watershed that's particularly vulnerable to wildfires, which could threaten the water supply due to sedimentation, runoff and other potential impacts, officials said. But the proposed configuration of the eightcamera network would end up covering close to 40 percent of the county, said Jay Jasperse, the Water Agency's chief engineer. The cameras can see 40 to 60 miles during the day and 100 miles or more at night, weather depending, and they're typically spaced about 20 miles apart, Kent said. *Distributed by Tribune News Service.*

Employee contracts: $20M over 3 years

MARIN COUNTY

Tentative agreement prevented 3-day strike

By Richard Halstead

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The three-year contract agreement negotiated between Marin County and its largest bargaining unit will cost the county more than $14 million in estimated pay and pension benefits.

The Marin Association of Public Employees (MAPE), which represents more than 1,300 employees, will receive raises of 2.5 percent in 2018, 3 percent in 2019 and 2.5 percent in 2020 if the contract is ratified by MAPE employees on Monday and approved by county supervisors on Tuesday. Salaries and benefits are 61 percent of the county budget.

The county initially offered MAPE 7 percent in wage increases over three years; the union asked for 11 percent.

"There is a combination of being pleased and relieved," said MAPE executive director Rollie Katz. "It was a compromise of course. We don't think it had to be this hard but it was."

The tentative agreement was reached at 11:20 p.m. on June 29, the day before MAPE members were scheduled to hold an informational demonstration during the first day of the Marin County Fair. A three-day strike was to begin on July 1.

The deal also includes a one-time payment of 1,000 to full-time MAPE employees earning less than $90,000 per year and a one-time payment of $500 to similar employees earning $90,000 or more. It is estimated that 1,070 MAPE employees will receive one of the payments resulting in a one-time $1.4 million cost to the county. That cost is included in the $14 million total.

"The ratification bonus is a one-time, non-pensionable payment that provides more to our lower-income employees," said County Administrator Matthew Hymel. "This is in response to what we heard about how they are struggling to make ends meet given the strength of the Bay Area economy."

Katz said, "I think it is fair to characterize the 'lump sum payment' as a compromise to get us more money this year without it going on the salary schedule. Not only is the lump sum payment not 'pensionable' it doesn't go into base pay and thus isn't included in overtime, differentials, etc."

The Marin County Employees' Retirement Association includes a 3 percent per year wage increase as one of the assumptions on which it calculates required pension contributions by the county and employees.

The increased costs to the county also reflect a commitment from the county to pay more to help cover MAPE members' health care costs. In each of the three years of the contract, the county will boost its contribution to up to 5 percent of the cost for Kaiser members who claim one or more dependents.

In the end, the county gave up on several takeback proposals that it initially sought. It dropped a proposal to slow down the pace at which some employees earn vacation time and also backed off a proposed change in the way that shift differentials are calculated that would have resulted in a pay cut for some low-wage shift workers.

Another proposal, to first freeze and then reduce a bonus payment to employees who opt for Kaiser Permanente as their medical provider and have no spouse or other dependents on their health plan, was dropped for current employees. The new contract eliminates the bonus for new employees.

On another take-back proposal — to pay overtime only to employees who work more than 40 hours in a week — a compromise was reached. The change was included in the contract; but exceptions were carved out for a number of employee classifications. It can affect employees, such as communications dispatchers, who take a vacation day or sick day and then are required to work an overtime shift later that same week.

"We thought we protected the group most adversely affected by the takeaway," Katz said. "That still means some people are going to be hurt by it; but that's the compromise."

Katz said the union was also disappointed that the county declined to contribute anything to the retirement costs of the county's part-time employees.

The county has also negotiated agreements with the Marin County Management Employees' Association (MCMEA), which represents about 405 employees, and two other smaller bargaining units: the Marin County Sheriff's Staff Officers Association and the Marin County Probation Managers' Association.

The agreement with the MCMEA will cost the county more than an additional $6 million in pay and pension benefits. MCMEA members will receive the same yearly wage increases as the MAPE employees, the same one-time payments of $1,000 and $500, and the same increases in the health care fringe benefit. It is estimated that 405 MCMEA members will receive the one-time payment.

The probation managers will get the same pay raises as the MAPE and MCMEA members and all members will receive a one-time payment of $500. Their contract will cost the county about $213,800 over three years. Members of the sher-iff's State Officers' Association will get a 2.5 percent wage increase in fiscal 201819. That contract will cost the county $128,728 in pay and pension benefits.

Novato officials work to solve housing woes

Editorial

Novato City Hall and the school district are joining forces to study possible solutions to a workforce housing crisis they share.

Despite obvious political hazards, the two agencies, the largest Novato employers, are moving forward to study opportunities to build housing for teachers, police officers, firefighters and other city and district workers in hopes that it will help them retain and recruit employees.

The cost of housing — and the expense, time and stress of commuting — loom as important factors as recruits consider whether to seek jobs in Novato or current workers opt to take job offers closer to home.

"If people can't afford to live in Novato or anywhere near here, it's hard to retain employees," Novato Unified School District Superintendent Jim Hogeboom said.

Many employers across Marin can relate to that frustration.

Working together and taking a look at possible opportunities and options makes sense for the city and the district.

The district owns two properties in the San Marin neighborhood and both agencies will look at their potential for workforce housing.

It would be wise for both agencies to involve neighborhood residents in every step of this initiative.

It wasn't that long ago that neighborhood opposition derailed the city's housing planning, setting the stage for antihousing sentiments and distrust of City Hall that still lingers today.

In fact, two council members who have won support from those sharing those sentiments, Pat Eklund and Pam Drew, voted against proceeding with this initiative, even getting it started.

The idea won the unanimous approval of the school board.

It deserves a supportive start.

From January through April of 2019, officials from the two agencies plan to explore possibilities for financing, development and planning — including looking for sites that make sense and that are complementary in size and design.

Eklund and Drew reflect the political challenge facing this effort.

The opportunity, at this point, is to grow public awareness, involvement, trust and support by having an inclusive agenda that is willing to explore numerous opportunities.

At the very least, two employers are trying to do something constructive in solving a growing business, traffic and environmental problem. That's wiser than standing by and watching the problem — and its financial and environmental ramifications — grow worse.

COAST IN CRISIS

ENVIRONMENT

California sea-level report sounds alarm on erosion

By Darryl Fears

The Washington Post

Like an ax slowly chopping at the trunk of a massive tree, waves driven by sea-level rise will hack away the base of cliffs on the Southern California coast at an accelerated pace, a recent study says, increasing land erosion that could topple some bluffs and thousands of homes sitting atop them.

California officials from Santa Barbara to San Diego will face an awful choice as the sea rises, the U.S. Geological Survey study says: save public beaches enjoyed by millions, or close them off with boulders and concrete walls to armor the shore and stop the waves in a bid to save homes.

The study predicts coastal land loss on an unimaginable scale over the remaining century, up to 135 feet beyond the existing shoreline.

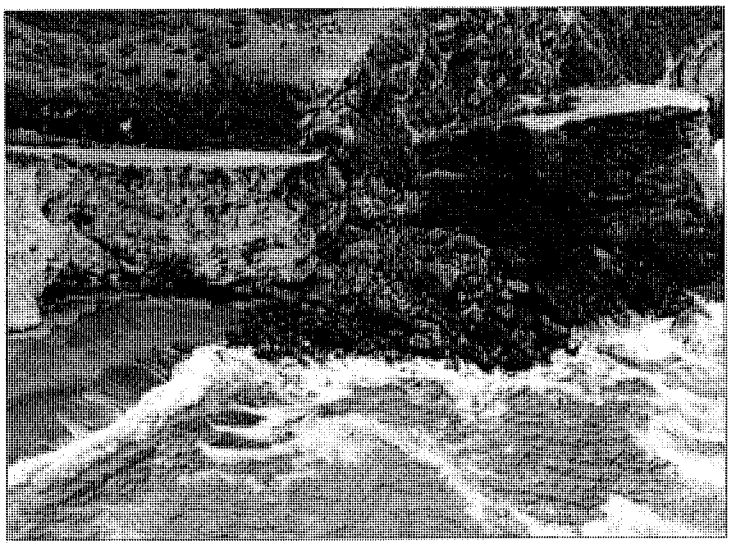
The USGS undertook the study to inform the state's public planners and policymakers of possible effects of climate change, which is causing the seas to rise. The analysis focuses on Southern California, but future studies will examine possible effects on the state's central and northern coasts as well.

While coastal Marin is not built up with homes the way Southern California is, there are still erosion dangers to areas that attract thousands each year to take in wilderness and ocean views.

In 2015, Arch Rock collapsed in the Point Reyes National Seashore, killing a 58-year-old San Fran-

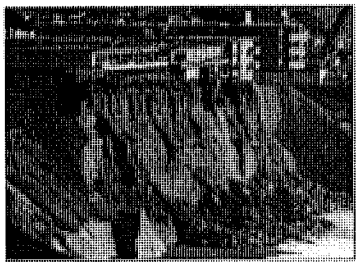
"Beaches are perhaps the most iconic feature of California, and the potential for losing this identity is real."

— Sean Vitousek, US Geological Survey study author



A slide at Arch Rock in the Point Reyes National Seashore in 2015killed one hiker and injured another.

POINT REYES NATIONAL SEASHORE



Cliff erosion in Pacifica forced the evacuation of an apartment complex in 2016.

JEFF CHIU — ASSOCIATED PRESS FILE

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cisco woman and injuring her companion as the roughly 70-foot high overlook crumbled in the sea. In 2013, the arch at Tennessee Beach at Tennessee Cove crashed to the ground in mere seconds. No one was injured.

In other parts of the Bay Area, officials have already retreated from some parts of the coast, removing homes from cliffs that have eroded and areas that have flooded. San Francisco is taking steps to move the Great Highway away from Ocean Beach because erosion is eating away sand from eroding cliffs, beaches in Southern California may not survive rising sea levels — and bluff-top development may not withstand the forecast 62 to 135 feet cliff recession." As a result, the authors wrote, "managers could be faced with the difficult decision between prioritizing private cliff-top property or public beaches" when they allow or ban hard shore protections.

"Beaches are perhaps the most iconic feature of California, and the potential for losing this identity is real," Sean Vitousek, the study's lead

the earth beneath it. Houses and apartments in Pacifica, south of the city, were declared uninhabitable as cliffs that supported them gave way to erosion.

The new study mirrors a report produced last year by the Scripps Institution of Oceanography at the University of California San Diego. It provided erosion rates for 680 miles of the California coast — 69 of those in Marin — from the United States border with Mexico to Bodega Head in Sonoma County.

The research found Marin has the second highest percentage of "cliff steepening" locations in the study area at 54 percent. Only San Luis Obispo County was high at 62 percent.

Among the areas where the highest cliff erosion rates occurred were Double Point — south of Alamere Falls — and Point Reyes, both in the Point Reyes National Seashore. Researchers used historical maps and LiDAR — Light Detection and Ranging — aerial mapping, which was used to create detailed 3-D elevation maps. The newer study was published last month in the Journal of Geophysical Research. It predicts that by the end of the century, erosion in Southern California will double from the rates observed between 1930 and 2010, depending on how high the seas rise, as waves pound cliffs more frequently.

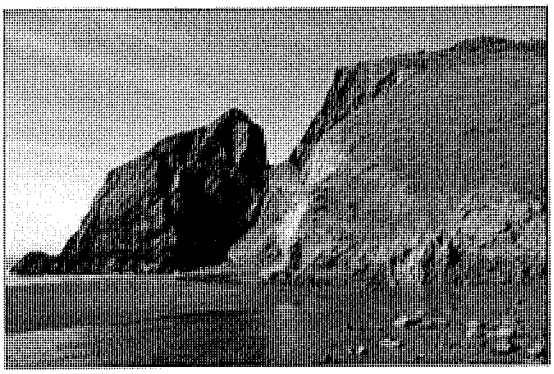
According to the statement's synopsis of the study, "Without the supply of

author, said in the statement. "The effect of California losing its beaches is not just a matter of affecting the tourism economy. Losing the protecting swath of beach sand between us and the pounding surf exposes critical infrastructure, businesses and homes to damage."

The report says: "For the highest sea-level rise scenario, taking an average cliff height of more than 25 meters (82 feet), the total cliff volume loss would be more than 300 million meters (186,000 miles) by 2100."

One of the study's authors, Patrick Barnard, a USGS research geologist, explained the issue in a way that laypeople can understand: "It's a huge volume of material. We place this in a context of dump truck loads. It would be 30 million dump trucks full of material that will be eroded from the cliffs."

The trucks would stretch around the globe multiple times, he said. *IJ reporter Mark Prado contributed to this report.*



A rock arch collapsed at Tennessee Valley Beach on the Marin coast in 2013, leaving a cleft on the cliff edge. No one was injured.

FRANKIE FROST — IJ PHOTO

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