



NORTH MARIN WATER DISTRICT
AGENDA - REGULAR MEETING
 January 5, 2016 – 7:00 p.m.
 District Headquarters
 999 Rush Creek Place
 Novato, California

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| Est. Time | Item | Subject |
|--------------|--|---|
| 7:00 p.m. | CALL TO ORDER | |
| | 1. | APPROVE MINUTES FROM REGULAR MEETING , December 15, 2015 |
| | 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. | PUBLIC HEARING – Revisions to Water Conservation Regulations 15 & 17 Resolutions |
| | 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. | |
| | 6. | Consent – Approve – Outside District Boundary Water Service Agreements Yee and Fontes Resolutions |
| | 7. | Consent – Approve – Rising Sun Energy Center Water Use Survey Agreement |
| | ACTION CALENDAR | |
| | 8. | Approve: Date and Time of Special Meeting – Planning Workshop |
| | 9. | Approve: Date and Time of Special Meeting – Ethics Training |
| | 10. | Approve: NMWD Comments on the Central California Coast Steelhead Recovery Plan |
| | INFORMATION ITEMS | |
| | 11. | Dominican University Institute for Leadership Studies – The Making of Leaders |
| | 12. | Marin LAFCo Countywide Water Service Study |
| | 13. | NBWRA BOD Update – December 14, 2015 |
| | 14. | TAC Meeting – January 4, 2016 |

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 |
|--------------|------|--|
| | 15. | NBWA Meeting – January 8, 2016 |
| | 16. | MISCELLANEOUS Disbursements Meter Reading Accuracy Letter from City of Novato Local Government Coalition Files Constitutional Amendment <u>News Articles:</u> Flood tax measures loom for Novato, San Rafael House of Reps tightens Coast Guard bill |
| 8:30 p.m. | 17. | ADJOURNMENT |

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DRAFT
NORTH MARIN WATER DISTRICT
MINUTES OF REGULAR MEETING
OF THE BOARD OF DIRECTORS
December 15, 2015

CALL TO ORDER

President Schoonover called the regular meeting of the Board of Directors of North Marin Water District to order at 7:00 p.m. at the District headquarters and the agenda was accepted as presented. Present were Directors Jack Baker, Rick Fraites, Stephen Petterle and Dennis Rodoni. Also present were General Manager Chris DeGabriele, Engineering Secretary Eileen Blue, Auditor-Controller David Bentley and Chief Engineer Drew McIntyre. District Secretary Katie Young was absent.

Novato resident Mike Jolly was in the audience. District employees Robert Clark (Operations/Maintenance Superintendent), Tony Arendell (Construction/Maintenance Superintendent), Kerry Lemos (Employee Association Chairman) and Ryan Grisso (Water Conservation Coordinator) were in the audience.

MINUTES

On motion of Director Baker, seconded by Director Petterle, the Board approved the minutes from the previous meeting as presented by the following vote:

AYES: Directors Baker, Fraites, Petterle, Rodoni, Schoonover

NOES: None

GENERAL MANAGER'S REPORT

The General Manager informed the Board that he attended a State Water Resources Control Board (SWRCB) workshop for proposed increased Division of Drinking Water Fees. He stated that the Water Board is interested in moving away from a fee-for-service model to a fee-per-connection and that they are interested in providing more service at less cost to smaller water systems. He advised the Board that the District would see a slight decrease in drinking water fees for West Marin water but much more cost for Novato. He noted that he and Pablo Ramudo have volunteered to be part of an ACWA working group on the issue.

OPEN TIME

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

1 **STAFF / DIRECTORS' REPORTS**

2 President Schoonover asked if staff or Directors wished to bring up an item not on the
3 agenda and there was no response.

4 **MONTHLY PROGRESS REPORT**

5 Mr. DeGabriele handed out the SWRCB Small Water Supplier Conservation Report for the
6 West Marin Water System to the Board.

7 Mr. DeGabriele reviewed the November Monthly Progress Report. He stated that water
8 production in Novato during November was down 22 % from last year and down 41% compared to
9 November 2013. He stated that in West Marin, water production was also down and referred to the
10 Small Water Supplier Conservation Report. He informed the Board that Stafford Lake storage is up
11 slightly as well as both Lake Mendocino and Lake Sonoma. Mr. DeGabriele stated that in Oceana
12 Marin the treatment and storage ponds are in good shape and that the Summary of Complaints and
13 Service Orders show consumer system problems are about the same as it has been in the previous
14 November and year to date.

15 Mr. Bentley provided the Board with the Monthly Report of Investments for November. He
16 stated that at the end of November the District had a cash balance of approximately \$12M. He
17 stated that is down \$1.1M since July due to a Caltrans' lag in paying invoices but once invoices are
18 all paid the balance will be back up.

19 **CONSENT CALENDAR**

20 On the motion of Director Petterle, seconded by Director Fraites, the following items were
21 approved on the consent calendar by the following vote:

22 AYES: Directors Baker, Fraites, Petterle, Rodoni, Schoonover

23 NOES: None

24 **RENEW AGREEMENT FOR BILL PRINT SERVICES**

25 InfoSend has been providing bill printing and mailing services for the District since 2004.

26 The Board authorized the Auditor-Controller to renew the agreement with InfoSend to
27 provide document processing services for a three-year period commencing January 1, 2016.

28 **FINAL ANNUAL REPORT FISCAL YEAR 2014-15**

29 The Board approved the Fiscal Year 2014-2015 Annual Report.

30

1 **REQUEST CONFLICT WAVIER**

2 Director Baker requested that this item be removed from the consent calendar to obtain
3 further information. Mr. DeGabriele provided the Board a historical overview of Olompali Spring
4 water supply to the Silveira Ranch. Mr. DeGabriele stated that the District's legal counsel, Robert
5 Maddow, was asked by the Silveira's attorney to provide an opinion regarding the reliability of that
6 supply for irrigation on the Silveira ranch. He noted that the Silveira's did not accept the easement
7 compensation that Caltrans offered and that the appraisal that was performed identified that the best
8 use for the property was for a vineyard, which increased the value of the property. Mr. DeGabriele
9 advised that there is a slight potential for conflict of interest, should the District be interested in the
10 water right and that if Silveira wants District water supply for irrigation in the future, Mr. Maddow will
11 cease representation to the Silveiras and will represent the District.

12 On motion of Director Petterle, seconded by Director Rodoni, the Request for Conflict
13 Waiver was approved by the following vote:

14 AYES: Directors Fraites, Petterle, Rodoni, Schoonover

15 NOES: None

16 ABSTAIN: Director Baker

17 **ACTION CALENDAR**

18 **PUBLIC RECORDS ACT REQUEST**

19 Mr. DeGabriele advised the Board that District legal counsel has prepared a letter response
20 to the San Jose Mercury News/Bay Area Newsgroup regarding information requested for the top 20
21 residential customers for the period of June through September. He informed the Board that the
22 information is not available as requested and that the District cannot accurately calculate the
23 information because the billing dates do not coincide with the requested dates. He noted that
24 Government Code does not require the District to release the information unless customers use
25 water inconsistent with District policies. Me. DeGabriele stated that staff proposes the District
26 comply with the request by providing consumption information as measured by two water bills
27 between June 1 through September 30 for the Board of Directors, but the District is not required to
28 provide address information.

29 On motion of Director Petterle, seconded by Director Rodoni, the response to the Public
30 Records Act Request was approved by the following vote:

31 AYES: Directors Baker, Fraites, Petterle, Rodoni, Schoonover

32 NOES: None

1 **SET PUBLIC HEARING FOR REVISION OF WATER CONSERVATION REGULATION 15 & 17**

2 Ryan Grisso, Water Conservation Coordinator, provided the Board with a brief summary of
3 the revisions to Water Conservation Regulations 15 & 17. He stated that it has been six years since
4 the last update and State Model Water Efficient Landscape Ordinance (MWELo) requires the
5 District to revise the regulations. Mr. Grisso has met with the City of Novato and the County of Marin
6 to insure these requirements are enforced through their planning and building permit process.

7 Mr. Grisso asked that the Board set a Public Hearing for January 5, 2016 at 7 p.m. to adopt
8 the resolution to comply with the current State Water Resources Control Board Water Conservation
9 Regulations.

10 On motion of Director Baker, seconded by Director Petterle, the Public Hearing for revision
11 to the Water Conservation Regulation 15 & 17 was set for January 5, 2016 and approved by the
12 following vote:

13 AYES: Directors Baker, Fraites, Petterle, Rodoni, Schoonover

14 NOES: None

15 **CSW/STUBER-STROEH CONTRACT AMENDMENT**

16 Mr. McIntyre reminded the Board that CSW/Stuber-Stroeh has been performing the design
17 services for the Aqueduct Energy Efficiency Project and that there has been various amendments
18 throughout the project. He noted that the last amendment for \$209,433 was approved at the April
19 15th meeting. He stated that the new amendment requests \$47,662 for additional out of scope
20 services for the redesign work for the Aqueduct alignment near the Silveira Ranch and of the road
21 side ditch just north of the County line. Mr. McIntyre advised the Board that Caltrans has already
22 authorized the change orders for this work. He informed the Board that staff recommends approval
23 of the contract amendment for both of the out of scope tasks.

24 On motion of Director Fraites, seconded by Director Baker, the Contract Amendment for
25 CSW/Stuber-Stroeh was approved by the following vote:

26 AYES: Directors Baker, Fraites, Petterle, Rodoni, Schoonover

27 NOES: None

28 **CONDITIONS OF EMPLOYMENT – GENERAL MANAGER (REVISED RESOLUTION 95-12)**

29 Kerry Lemos, the District's Employee Association Chairman, addressed the Board and
30 presented the general consensus of the Employee Association regarding the proposed salary
31 increase for the General Manager. Mr. Lemos noted that raises had been approved for the Chief

1 Engineer and the Sr. Accountant/HR Supervisor within the last year. Mr. Lemos asked the Board to
2 reconsider median placement for the GM salary.

3 On motion of Director Baker, seconded by Director Fraites, a revised employment resolution
4 95-12 entitled "Conditions of Employment – General Manger" for the General Manager was
5 approved by the following vote:

6 AYES: Directors Baker, Fraites, Schoonover

7 NOES: Directors Petterle, Rodoni

8 **INFORMATION ITEMS**

9 **MARIN LAFCO COUNTYWIDE WATER SERVICE STUDY UPDATE**

10 Mr. DeGabriele provided the Board with information on the Marin LAFCo comprehensive
11 update of the Countywide Water Municipal Service Review (MSR). He stated that Marin LAFCo
12 staff will present the final report at their January 14, 2016 meeting.

13 **TAC MEETING – DECEMBER 7, 2015**

14 Mr. DeGabriele provided a summary of the December 7, 2015 Technical Advisory Committee
15 Meeting. He informed the Board that the Sonoma Marin Saving Water Partnership's request to the
16 State Board for a regional compliance option to the Emergency Water Conservation Regulations did
17 not go as well as hoped. He noted that a draft of any revised regulation will likely be available in
18 January with a workshop and vote by the State Board in February to extend the Urban Water
19 Conservation Regulations into next fiscal year. He also informed the Board that at the TAC Ad Hoc
20 meeting, Sonoma County Water Agency disclosed that water sales are so low there may not be
21 sufficient revenue to hold rate increases below 6%, which is the high end of the target range for
22 annual rate increases. Mr. DeGabriele noted that a budget subcommittee of the TAC will begin
23 discussion with SCWA to work on a strategy going forward to approve a needed rate increase for
24 the upcoming fiscal year.

25 **MISCELLANEOUS**

26 The Board received the following miscellaneous information: Disbursements, Annual Sick
27 Leave Buy-Back, Water Research Foundation, Certificate of Excellence (ERA), The Making of
28 Leaders – Dominican University Leadership Graduation, and CalPERS Adopts Plan to Lower Risk,
29 Increase Rates.

30 The Board received the following news articles: California misses October target for saving
31 water, Marin Voice: MMWD should look at the costs of fluoridation, Marin Supervisor Kinsey says he
32 won't seek another term, PG&E wants Marin Clean Energy customers to pay more for exit ticket,

1 Marin Voice: MMWD must do more to bolster local supply, Methoprene denied at mosquito district,
2 but agreement uncertain, and Marin Water users will see rates climb in January.

3 **ADJOURNMENT**

4 President Schoonover adjourned the meeting at 8:03 p.m.

5 Submitted by

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Eileen Blue
Acting District Secretary

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MEMORANDUM

To: Board of Directors

December 31, 2015

From: Ryan Grisso, Water Conservation Coordinator *Rb*

Subject: Public Hearing for Revisions to Water Conservation Regulations 15 and 17

V:\Memos to Board\Regulation 15 and 17 Public Hearing 010516.doc

RECOMMENDED ACTION: Public Hearing: Approve Revisions to Regulation 15 and 17**FINANCIAL IMPACT:** None at this time

In 2015, by order of the Governor, the State Water Resources Control Board updated the State's Model Water Efficient Landscape Ordinance (MWELO) with more restrictive requirements for applicable new and rehabilitated landscapes. The new 2015 MWELO takes effect on January 1, 2016; however local agencies can adopt their own version that meets or exceeds State MWELO requirements, and must do so by December 1, 2015 or March 1, 2016 for regional ordinances, and report to the State by December 31, 2015. Since the District is working on a regional approach with the multiple local agencies (City of Novato and Marin County) and two different service areas (Novato and West Marin), the reporting deadline will be March 1, 2016.

The State's updated MWELO remains lengthy and not in a format readily adaptable by the District, so staff has taken the pertinent additions/modifications and incorporated them into Regulations 15 (Novato) and 17 (West Marin), as shown respectively in Attachments 1 and 2 in underline/strikeout format. Although the District does not have direct building permit or land use authority, the District will continue to work closely with the City of Novato (City) and Marin County (County) to enforce these requirements through their planning and building permit process. Staff expects the City and County to continue to rely on the District's enforcement of the 2015 MWELO provisions through their land use approval process. In any event, adoption of the proposed Regulation changes will exceed the requirements of the updated State MWELO and provisions will allow the District to refer project requirements to the State MWELO if needed. If approved, staff will prepare a letter to the State Department of Water Resources explaining the District's landscape requirements and documenting its compliance with State requirements for both the City and County.

In addition, staff proposes changes to other parts of Regulations 15 and 17 as noted in Attachments 1 and 2, in underline/strikeout format, to provide clarification on rebate eligibility and participation requirements including indoor fixture/appliance requirements for new development.

At the December 15, 2015 Board meeting, staff presented draft proposed revisions and requested that the Board set a public hearing on January 5, 2016. A Public Hearing notice with

brief summary of changes was published in the Marin Independent Journal and the Point Reyes Light on December 23rd and December 30th (Attachment 5 and 6). A summary of the revisions to the Regulations will be published within 10 days in both newspapers if approved.

RECOMMENDATION

Hold Public Hearing at 7:00 PM on January 5, 2016, and approve Resolutions 16-01 and 16-02 (Attachment 3 and 4), amending Regulations 15 and 17 (as shown in Attachments 1 and 2).

NORTH MARIN WATER DISTRICT
REGULATION 15
WATER CONSERVATION - NOVATO SERVICE AREA

A. Purpose

The purpose of this regulation is to assure that water resources available to the District are put to reasonable beneficial use, that the instream values of Novato Creek and the Russian River are preserved to the maximum possible extent and that the benefits of the District's water service extend to the largest number of persons.

B. Waste of Water Prohibited

- (1) Customers shall not permit any water furnished by the District for the following nonessential uses:
 - (a) The washing of sidewalks, walkways, driveways, parking lots and other hard surfaced areas by direct hosing when runoff water directly flows to a gutter or storm drain, except as may be necessary to properly dispose of flammable or other dangerous liquids or substances, wash away spills that present a trip and fall hazard, or to prevent or eliminate materials dangerous to the public health and safety;
 - (b) The escape of water through breaks or leaks within the customers' plumbing or private distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of seventy-two (72) hours after the customer discovers such a break or leak or receives notice from the District, is a reasonable time within which to correct such break or leak, or, as a minimum, to stop the flow of water from such break or leak;
 - (c) Irrigation in a manner or to an extent which allows excessive run-off of water or unreasonable over-spray of the areas being watered. Every customer is deemed to have his/her water system under control at all times, to know the manner and extent of his/her water use and any run-off, and to employ available alternatives to apply irrigation water in a reasonably efficient manner;
 - (d) Washing cars, boats, trailers or other vehicles and machinery directly with a hose not equipped with a shutoff nozzle;
 - (e) Water for non-recycling decorative water fountains;
 - (f) Water for new non-recirculating conveyor car wash systems;
 - (g) Water for new non-recirculating industrial clothes wash systems;
 - (h) Water for single pass coolant systems.
- (2) Exempt Water Uses. All water use associated with the operation and maintenance of fire suppression equipment or employed by the District for water quality flushing and sanitation purposes shall be exempt from the provisions of this section. Use of water supplied by a private well or from a reclaimed wastewater recycled water, gray water or rainwater utilization system is also exempt.
- (3) Variances. Any customer of the District may make written application for a variance. Said application shall describe in detail why Applicant believes a variance is justified.

- (a) The General Manager of the District may grant variances for use of water otherwise prohibited by this section upon finding and determining that failure to do so would cause an emergency condition affecting the health, sanitation, fire protection or safety of the Applicant or public; or, cause an unnecessary and undue hardship on Applicant or public, including but not limited to, adverse economic impacts, such as loss of production or jobs.
 - (b) The decision of the General Manager of the District may be appealed to the Board of Directors by submitting a written appeal to the District within fifteen (15) calendar days of the day of the General Manager's decision. Upon granting any appeal, the Board of Directors may impose any conditions it determines to be just and proper. Variances granted by the Board of Directors shall be prepared in writing and the Board of Directors may require the variance be recorded at Applicant's expense.
- (4) Enforcement. Depending on the extent of the water waste, the District may, after written or verbal notification to customer and after a reasonable time to correct the violation as solely determined by the District, take some or all of the following actions:
- (a) Telephone the customer to inform of the water waste violation including a specified period of time to correct the violation;
 - (b) Personal contact with the customer at the address of the water service. If personal contact is unsuccessful, written notice of the violation including a date that the violation is to be corrected may be left on the premises with a copy of the notice sent by certified mail to the customer;
 - (c) The District may install a flow-restricting device on the service line;
 - (d) The District may cause termination of water service and the charge for same shall be billed to the customer. Except in cases of extreme emergency as solely determined by the General Manager of the District, service shall not be reinstated until verified by the District that the violation has been corrected and all outstanding charges have been paid.
 - (e) The District may impose a penalty, in an amount approved by the Board from time to time, to be assessed on the customer water bill.

C. Use of Water Saving Devices

Each customer of the District is urged to install water efficient devices that meet or exceed EPA WaterSense standards, including but not limited to showerheads, sink aerators and toilets. ~~to reduce the quantity of water to flush toilets and to reduce the flow rates of showers and interior faucets.~~

D. Water-Saving Fixtures/Devices/Equipment Kits

The District will make available from time to time, ~~without cost to program participants for use in each residence receiving water service from the District and constructed prior to January 1, 1992,~~ a water-saving kit containing to customers the following devices and incentives:

- (1) A device or devices for reducing shower and sink flow rates;
- (2) A dye tablet or tablets for determining if a toilet tank leaks;
- (3) Other devices from time to time approved by the District;

- (4) ~~Installation and other instructions and information pertinent to conservation of water.~~ Rebates from time to time for District qualified hot water recirculation systems, greywater systems, and rainwater catchment systems.

E. Water-Saving Devices and Restrictions for New Development

- (1) Water service will not be furnished to any Applicant unless the water-saving devices hereinafter described are installed. Applicants for single service installations serving one dwelling unit (d.u.) or one d.u. and an accessory d.u. or Applicants for projects for which the District does not have final building permit sign off authority, shall pay a \$1,000 deposit per d.u. to be refunded upon post inspection of the installation of the water-saving devices and restrictions and compliant water efficient landscape (section F) herein. All other projects may be subject to a water conservation deposit with amount and applicability determined by the General Manager on a case-by-case basis. Applicant shall have two years to complete the project, obtain District inspection approval and request a refund of the deposit. If after two years the project is not completed, the deposit will be forfeited to the District to be used for other Water Conservation Programs. If requested by the Applicant, the District may extend the time period for the project completion up to one additional year.
- (2) All interior plumbing and appliances in new development shall meet the following requirements:
- (a) Toilets and associated flush valves shall be High Efficiency Toilets (HETs), rated at not more than 1.28 gallons per flush on average, and shall be listed on the approved District HET list;
 - (b) Urinals and associated flush valves shall be rated at not more than 0.125 gallons per flush or be a District approved non-water using urinal;
 - (c) Shower heads shall have a rated flow of 2.0 gallons per minute or less, and only one shower head will be allowed per bathroom;
 - (d) Lavatory faucets and hand-washing sinks shall have aerators or laminar flow devices together with flow control inserts, valves, devices or orifices that restrict flow to a maximum of 1.5 gallons per minute in residential construction and 0.5 gallons per minute in commercial construction. Kitchen faucets shall have a maximum flow of 2.02 gallons per minute in all construction;
 - e) Laundry facility washing machines shall be ~~front-loading horizontal-axis models~~ District approved high-efficiency models with an Energy Star rating ~~and integrated a modified water factor of 4.55-5 or less;~~
 - (f) Dishwashers shall be high efficiency models with an Energy Star rating that use no more than 5 gallons per cycle;

F. Water Efficient Landscape Requirement

- (1) Purpose. Section 2 of Article X of the California Constitution specifies that the right to use water is limited to the amount reasonably required for the beneficial use to be served and the right does not and shall not extend to waste or unreasonable method of use. This Regulation protects water supplies through the implementation of a whole systems approach to design, construction, installation and maintenance of the landscape resulting in water conserving climate-appropriate landscapes, improved water quality and the minimization of natural resource inputs.

(2) Applicability

- a. Requirements stated herein shall apply to all of the following new and rehabilitated landscape projects associated with construction that requires a Building or Grading Permit, Plan Check, Design Review or water service upgrade for:
Commercial, industrial and institutional landscaping, park and greenbelt landscaping, multiple-family residential and single-family residential landscaping.
 - i. At District discretion, landscape requirements for applicable projects may be deferred to the State Model Water Efficient Landscape Ordinance (California Code of Regulations Title 23, Waters, Division 2, Department of Water Resources, Chapter 2.7, Model Water Efficient Landscape Ordinance).
 - ii. For projects with irrigated landscape area less than 2,500 square feet, the District may choose to select any or all of the requirements to the State Model Water Efficient Landscape Ordinance (Referenced above), Appendix D – Prescriptive Compliance Option.
- b. Requirements stated herein shall not apply to:
 - i. Registered local, state or federal historical landscape area;
 - ii. Ecological restoration or mined-land reclamation projects that do not require a permanent irrigation system.

(3) Landscape Design Plan. For each landscape project subject to this Regulation, applicants shall submit a landscape design plan and install a landscape in accordance with the following:

- a. Amendments, Mulching and Soil Conditioning
 - i. A minimum of 8" of non-mechanically compacted soil shall be available for water absorption and root growth in planted areas.
 - ii. Prior to incorporating compost or fertilizer and planting of any materials, compacted soils shall be transformed into a friable condition.
 - iii. Incorporate compost or natural fertilizer into the soil to a minimum depth of 8" at a minimum rate of 86 cubic yards per 1000 square feet ~~or and~~ per specific amendment recommendations from a soils-laboratory management report.
 - iv. A minimum 3" layer of District approved mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers or direct seeding applications. Mulch shall be made from recycled or post-consumer materials when possible.
- b. Plants
 - i. Selected plants, other than the allowable turf areas in residential projects, shall be Water Use Classification of Landscape Species (WUCOLS) categorized "Very Low" or "Low" water use for the North-Central Coastal Region and not cause the Estimated Water Use (ETWU) to exceed the Maximum Applied Water Allowance (MAWA) using an evapotranspiration factor of 0.6-55 of evapotranspiration for residential and 0.45 for non-residential sites and a WUCOLS corresponding plant factor of 0.3 or less for Very Low or Low water use plants. (Special Landscape Areas including areas dedicated to edible plants, recreational areas, or areas irrigated solely with recycled water shall not

be subjected to the plant selection requirements and shall use an evapotranspiration factor of 1.0 for the purposes of calculating ETWU and MAWA.)

- ii. Plants with similar water use needs shall be grouped together in distinct hydrozones and where irrigation is required the each distinct hydrozones shall be irrigated with a separate valve(s) and noted on the plans.
- iii. ~~Low and moderate water use plants can be mixed, but the entire hydrozone will be classified as moderate water use for MAWA or ETWU calculations.~~
- iv.iii Moderate and High water use plants as classified by WUCOLS shall not be mixed with low or moderate water use plants.
- iv. All non-turf plants shall be selected, spaced and planted appropriately based upon their adaptability to the climatic, soils, and topographical conditions of the project site.
- vi Turf shall not be planted in the following conditions:
 - 1. Slopes exceeding 10%.
 - 2. Planting areas 8-10 feet wide (in any direction) or less unless irrigated by District approved subsurface irrigation or with recycled water.
 - 3. Street medians, traffic islands, planter strips or bulb-outs of any size.
 - 4. Front yard landscaping of single family residential homes where the backyard landscape is not developer installed.
- vii. Total turf areas shall not exceed the following
 - 1. Single Family: 25% of the total landscape area not to exceed 600800 square feet.
 - 2. Townhouse/Condominium (THC): 400300 square feet.
 - 3. Apartment (APT): 130 square feet.
 - 4. Commercial and/or non-residential: 0 square feet.
 - 5. Recycled Water Sites: The preceding turf limitations shall not apply to sites irrigated with recycled water.
 - 5. Special Landscape Areas: The preceding turf limitations shall not apply to sites irrigated with recycled water or areas dedicated to District approved recreational uses.
- viii. Invasive plants as listed by the California Invasive Plant Council are prohibited.

c. Water Features

- i. Recirculating water systems shall be used for water features.
- ii. Recycled water shall be used in water features when available onsite.

- (4) Irrigation Design Plan. For each landscape project subject to this Regulation, applicants shall submit an irrigation design plan that is designed and installed to meet the MAWA irrigation efficiency criteria and in accordance with the following:

- a. Dedicated irrigation meter or private landscape water or submeter for residential must be specified for all non-residential irrigated landscapes and residential

irrigated landscapes of 5,000 sq. ft. or greater.

- b. Irrigation systems with meters 1 ½" or greater, or non-residential projects with irrigated landscapes over 5,000 square feet, require a high-flow sensor that can detect high-flow conditions and have the capabilities to shut off the system.
- c. Isolation valves shall be installed at the point of connection and before each valve or valve manifold.
- d. Weather-based or other sensor based self-adjusting irrigation controllers with non-volatile memory shall be required.
- e. Rain sensors shall be installed for each irrigation controller.
- f. Pressure regulation and/or booster pumps shall be installed so that all components of the irrigation system operate at the manufacturer's recommended optimal pressure.
- g. Irrigation system shall be designed to prevent runoff or overspray onto non-targeted areas.
- h. Point source irrigation is required where plant height at maturity will affect the uniformity of an overhead system.
- i. Minimum 24" setback of overhead irrigation is required where turf is directly adjacent to a continuous hardscape that flows or could runoff into the curb and gutter.
- j. Slopes greater than ~~45~~10% shall be irrigated with point source or other low-volume irrigation technology.
- k. A single valve shall not irrigate hydrozones that mix high water use plants with moderate or low water use plants.
- l. Trees shall be placed on separate valves ~~except when planted in turf areas.~~
- m. All non-turf landscape areas shall be irrigated with District approved drip irrigation systems or other alternative District approved point source irrigation.
- n. Sprinkler heads, rotors and other emission devices on a valve shall have matched precipitation rates. All spray irrigation systems shall be a brake rotary type ~~and or~~ be multi-stream, multi-trajectory, adjustable arc, rotating stream sprinkler with matched precipitation rates. All rotating stream sprinkler units shall be installed in a 40 psi pressure regulated spray head body and provide the highest potential distribution uniformity. All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher.
- o. Head-to-head coverage is required unless otherwise directed by the manufacturer's specifications
- p. Swing joints or other riser protection components are required on all risers.
- q. Check valves shall be installed to prevent low-head drainage.
- r. Master shut-off valves are required on all projects with irrigated landscapes over 5,000 square feet.
- s. Irrigation efficiency factors of 0.75 for overhead spray devices and 0.81 for drip system devices shall be used for ETWU and MAWA calculations.

- t. A diagram of the irrigation plan, including hydrozones and equipment locations, shall be provided and kept with the irrigation controller for subsequent management purposes.
- (5) Irrigation Audit: Project applicants shall submit an irrigation audit report for all applicable projects.
 - a. The project applicant shall submit an irrigation audit report that includes inspection, system tune-up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factors, slope, exposure and any other factors necessary for accurate programming.
 - b. All landscape irrigation audits shall be conducted by a local agency landscape irrigation auditor or a third party certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who designed or installed the landscape.
 - c. In production home developments, audits of 15% of the landscapes shall be sufficient.

G. Rebate for Energy Star High-Efficiency Washing Machines in Residences

District customers in the Novato Service area are eligible for rebate as available from time to time for front loading / horizontal axis, Energy Star washing machines in existing residences. New residential construction in the District's Novato service area are required to be equipped with high-efficiency washing machines in accordance with Section E. (2) (e) of this regulation. District rebates are not available for Energy Star Washing Machines high-efficiency washing machines required in new residential construction.

H. Rebate for Removing Irrigated Turf from Residential Properties

- (1) The owner of property containing a formal lawn area or areas shall be eligible for a cash rebate from the District if said owner removes all or part of the formal lawn area(s) and replaces same with eligible plant materials and meets the qualification requirements. "Formal lawn area" means an existing lawn in good condition which is irrigated regularly, by an automatic inground irrigation system, with water furnished by the District and mowed regularly.
- (2) Qualification requirements:
 - (a) Application for rebate must be made on District's form prior to removing the formal lawn area(s). All applicable information requested must be supplied;
 - (b) Application for rebate must include a landscape plan or sketch showing the size, in square feet, and location of all formal lawn area(s) on the Applicant's parcel and the location of formal lawn area(s) that will be removed and replaced;
 - (c) The Applicant must utilize only eligible replacement materials for the formal lawn area(s) removed which are to be considered in calculating the rebate. Eligible replacement materials are District approved water-conserving and/or low water use California native plants or District approved synthetic turf;

- (d) If the automatic in-ground irrigation system will continue to serve some remaining formal lawn area(s), Applicant must modify the system so that water is not served to the proposed replacement area;
 - (e) Formal lawn area(s) removed and replanted with eligible replacement materials shall be mulched with material suitably thick to prevent weed growth (minimum three inches) and reduce water loss. Areas shall not be irrigated except for limited supplemental hand-watering or temporary drip irrigation to establish the plant material;
 - (f) The owner of the property must sign a statement promising not to reinstall lawn in formal lawn area(s) where lawn has been removed as long as the owner holds property. The owner may be relieved of this promise at any time by returning the full amount of the District's rebate;
 - (g) The General Manager may at any time halt or suspend acceptance of applications for rebate if the District's funds appropriated for this purpose become exhausted.
- (3) After reviewing the information supplied by the Applicant and making at least one site inspection to assure that qualification conditions have been met, District shall mail a rebate check.
 - (4) The amount of the rebate shall be determined by the Board from time-to-time.
 - (5) Rebates may be available for non-residential property or for hotels, motels, hospitals, government housing or a senior citizen complex on a parcel which is separately owned and assessed. Maximum rebate amount for a non-residential property shall be determined by General Manager on a case-by-case basis.
 - (5) ~~Synthetic turf replacements of formal lawn area may be eligible for a higher rebate level to be determined by the General Manager on a case-by-case basis.~~

I. Landscape Rebate Alternatives

- (1) The District will consider, and may approve, requests to substitute for any of the requirements in section HF, well-designed alternatives or innovations that will effect similar significant and continuing reductions of water requirements. Determination of eligibility shall be at the sole discretion of the General Manager or designated staff.
- (2) ~~The District will rebate \$50 for landscape installation in existing dwellings meeting the standards listed in Section H and over 500 square feet in area if the customer has:~~
 - (a) ~~Removed or killed the lawn area prior to making application for rebate;~~
 - (b) ~~Replaced the lawn with landscape no more than one month before alerting the District;~~
 - (c) ~~Re-landscaping a lawn area that was not regularly mowed and irrigated turf.~~

Determination of eligibility shall be at the sole discretion of the General Manager or Designee.

J. High Efficiency Toilet Replacement Program(s)

- (1) A High Efficiency Toilet (HET) is defined as any toilet that is with an average rated at 20% or less water use on average than a standard 1.6 gallon per flush toilet flush volume of 1.28 gallons per flush or less. This includes District approved 1.0 gallons per flush pressure assist toilets or dual flush models. Ultra High Efficiency Toilet

(UHET) is defined as any toilet with an average flush volume of 1.1 gallons per flush or less.

- (2) Any qualifying customer of the District who removes and recycles all toilets rated to use more than 1.6 gallons per flush and replaces same with a District approved HET or UHET may request ~~and receive a cash rebate or bill credit~~ in an amount established by the Board of Directors from time to time for each such toilet removed, recycled and replaced.
- (3) To qualify for a rebate(s) hereunder, application shall be made on a form available from the District and person signing application shall:
 - (a) Request District make a brief inspection of customer's structure at a time and date approved in advance by customer to identify water conservation measures appropriate and effective for the customer to implement or be pre-qualified by District staff via other communication means. Should customer refuse access for an inspection or not receive pre-qualification, District shall not be under any obligation to make a rebate. Inspection requirements are subject to available staff time;
 - (b) Be a customer of the District and the customer's structure in which the replaced toilet(s) is located shall be served water in the District's Novato Service Area and replacing a toilet installed prior to January 1, 1992, and manufactured to flush more than 1.6 gallons per flush;
 - (c) Provide District with bill of sale or original receipt of sale within the current fiscal year and made out to said customer by person or vendor selling customer the HET or UHET or, in lieu thereof, provide District with letter addressed to said customer signed by a licensed plumber or contractor stating that a HET(s) or UHET(s) has been installed by said plumber or contractor at the customer's address;
 - (d) ~~Recycle toilets at a predetermined District site with all internal mechanisms, toilet seat and all other wood, metal and plastic removed, if recycling outlet is available.~~
- (4) If the customer is renting the structure, a rebate will be made provided customer includes with the application a letter from the owner of the property consenting to District making rebate payment to customer for the replacement of a non-water conserving toilet(s).
- (5) Rebates are not available for toilets installed in buildings constructed after January 1, 1992 or for replacement of toilets rated to use 1.6 gallons per flush or less.
- (6) Free or subsidized UHET giveaways may be available to customers from time to time. Eligibility requirements listed in J (3) (a) to (d) apply to this program should it become available.

K. Landscape Water Efficiency Rebate

- (1) Landscape water efficient rebates are available to customers who install District qualified water efficient landscape equipment including:
 - (a) Drip irrigation systems

- (b) Water pressure-regulating devices
 - (c) Check valves
 - (d) Multi-stream rotating sprinkler nozzles (lawn areas only)
 - (e) Rain shut-off devices
 - (f) Mulch
 - (g) Soil conditioner/amendment
- (2) Rebate amounts will be established by the Board of Directors from time to time depending on customer classification and water savings potential. Customers are allowed only up to the maximum rebate level for the life of the program.
 - (3) Applicant shall request and agree to a brief District pre-inspection of customer's property to identify water efficient landscape actions to be taken. District will pre-approve and post inspect to confirm the retrofit installations. Inspections are subject to available staff time.
 - (4) Applicant shall provide District with a complete bill of sale or original receipt of sale within the current fiscal year, clearly showing the purchase of the landscape water efficiency installed items noted in the pre-inspection.
 - (5) Free or subsidized water efficient landscape items such as rain sensors, and mulch may be available to customers. Eligibility requirements listed in K (1) through (3) apply should items become available.

L. Rebates for District Approved Swimming Pool Covers

District customers are eligible for rebates as available from time to time for purchasing District approved swimming pool covers. Eligible pool covers must be a solar or safety cover with non-netted type material, at least 12 mil in thickness, and at least 450 square feet area.

M. Requirement for Installation of Water Conserving Plumbing Fixtures Upon Change of Property Ownership

(1) Definitions.

- (a) "Water Conserving Plumbing Fixtures" means any toilet rated at 1.6 gallons of water per flush or less, urinals that are rated at 1.0 gallons of water per flush, showerheads with a flow rated at 2.0 gallons of water per minute or lavatory faucets that can emit no more than 1.5 gallons of water per minute;
- (b) "Change in Property Ownership" means a transfer of present interest of real property, or a transfer of the right to beneficial use thereof, the value of which is substantially equal to the proportion of ownership interest transferred.
- (c) "Retrofit" means replacing "Existing Plumbing Fixtures" with "Water-Conserving Plumbing Fixtures;"
- (d) "Existing Plumbing Fixtures" means any toilet using more than 1.6 gallons of water per flush, urinals using more than 1.0 gallons of water or more per flush, showerheads with a flow rated more than 2.0 gallons of water per minute or lavatory faucets that emit more than 1.5 gallons of water per minute.

- (e) "Existing Structure" means any structure built and available for use or occupancy on or before January 1, 1992, which is equipped with a toilet using more than 1.6 gallons of water per flush or a urinal using more than 1.0 gallons of water per flush.

(2) Retrofit Upon Change of Property Ownership.

All existing plumbing fixtures in existing structures receiving water from the District's water system shall, at the time of change of ownership, be retrofitted, if not already done, exclusively with water conserving plumbing fixtures as defined in Section ~~Mm~~(1) of this regulation.

(3) Compliance and Penalties

Compliance shall be by the honor system. It shall be the Seller's responsibility to obtain from the District, in addition to any normal permits required by agencies other than the District, ~~from the District~~ a Certificate of Compliance acknowledging that the Seller or title holder has stated that the retrofit installation required by this Regulation has been completed. If the District later determines or finds that the work was not done or was not completed or that water conserving plumbing fixtures are no longer present, the District may assess an annual fee of 20% of the estimated annual water bill as determined by the District until the owner of the property demonstrates that the required retrofit work has in fact been done. A site inspection shall be required in such cases and the owner shall be charged \$35 for each such site inspection as an added fee on the owner's water bill.

(4) Alternative Compliance Procedure for Transfers of Residential Property

At Seller's option, Seller shall pay the District \$315 per bathroom that does not fully comply with Regulation 15 M. Half bathrooms shall count as one bathroom. The District shall thereupon immediately provide a Certificate of Compliance to Seller. Buyer shall then be responsible for installation of the water conserving plumbing fixtures and Seller shall provide Buyer with a copy of District Regulation 15 M. and shall notify Buyer of this requirement in writing before close of escrow. Buyer shall have one year from the date of close of escrow to install such fixtures. Upon being notified that said fixtures have been installed and making a brief inspection confirming installation, the District shall pay the Buyer an amount equal to the payment made to District by Seller. If after one year, the water conserving plumbing fixtures have not been installed, the District shall use this money for any other Board approved water conservation program and shall be under no obligation to pay said money to Buyer.

(5) Responsibility for Compliance Negotiable

The Seller is responsible for compliance with Regulation 15 M, however responsibility for payment of the deposit specified in Section M(4) may be assumed by the Buyer so long as the agreement is not otherwise inconsistent with the terms of Regulation 15 M. Any such agreement shall be evidenced in a writing signed by both the Buyer and Seller.

N. Weather Based Irrigation Controller Installation Program

- (1) A weather based irrigation controller is defined as any irrigation controller using weather data to create the actual irrigation schedule and which schedule is automatically adjusted by the controller to meet the applied water demand based on actual weather data. Weather based irrigation controllers may either receive "real time" weather data or generate their weather data using an integrated solar radiation sensor.
- (2) District customers using more than an average of 600 gallons per day are eligible for rebates or vouchers as available from time to time for purchasing District approved weather based irrigation controllers. Directly installed weather based irrigation controllers may be available from time to time. Customers receiving weather based irrigation controller rebates or vouchers may be subject to a pre and post installation inspection.

O. Exemptions from Provisions Set Forth in Regulation 15 (A. through N.)

(1) Retrofit Exemptions

The District's General Manager may grant an exemption from Section M in the following instances:

- (a) Unavailability of Water Conserving Plumbing Fixtures to either match a well-defined historic architectural style fitted with authentic plumbing fixtures or accommodate existing house plumbing without bathroom alteration;
- (b) Special health circumstances upon submittal of reasonable evidence that demonstrates that specific plumbing fixtures are required by the user that may not meet the Water Conserving Plumbing Fixture criteria defined by this regulation.
- (c) Faucets at kitchen sinks or antique faucets which do not have standard threaded openings for aerators.

(2) Other Exemptions

The District's General Manager may grant exemptions from Section A. through N. for purposes of health, safety and sanitation or if Applicant demonstrates an "at least as effective as" water efficiency alternative. The District's General Manager shall have the sole decision of determining whether Applicant has demonstrated an "at least as effective as" water efficiency alternative.

**NORTH MARIN WATER DISTRICT
REGULATION 17
WATER CONSERVATION - WEST MARIN SERVICE AREA**

A. Purpose

The purpose of this regulation is to assure that water resources available to the District are put to reasonable beneficial use, that the in-stream values of Lagunitas Creek are preserved to the maximum possible extent and that the benefits of the District's water service extend to the largest number of persons.

B. Waste of Water Prohibited

- (1) Customers shall not permit any water furnished by the District for the following nonessential uses:

- (a) The washing of sidewalks, walkways, driveways, parking lots and other hard surfaced areas by direct hosing when runoff water directly flows to a gutter or storm drain, except as may be necessary to properly dispose of flammable or other dangerous liquids or substances, wash away spills that present a trip and fall hazard, or to prevent or eliminate materials dangerous to the public health and safety;
- (b) The escape of water through breaks or leaks within the customers plumbing or private distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of seventy-two (72) hours after the customer discovers such a break or leak or receives notice from the District, is a reasonable time within which to correct such break or leak, or, as a minimum, to stop the flow of water from such break or leak;
- (c) Irrigation in a manner or to an extent which allows excessive run off of water or unreasonable over spray of the areas being watered. Every customer is deemed to have his water system under control at all times, to know the manner and extent of his water use and any run off, and to employ available alternatives to apply irrigation water in a reasonably efficient manner;
- (d) Washing cars, boats, trailers or other vehicles and machinery directly with a hose not equipped with a shutoff nozzle; and
- (e) Water for non-recycling decorative water fountains.
- (f) Water for new non-recirculating conveyor car wash systems; and
- (g) Water for new non-recirculating industrial clothes wash systems.
- (h) Water for single pass coolant systems.

- (2) Exempt Water Uses. All water use associated with the operation and maintenance of fire suppression equipment or employed by the District for water quality flushing and sanitation purposes shall be exempt from the provisions of this section. Use of water supplied by a private well or from a ~~reclaimed wastewater~~ recycled water, gray water or rainwater utilization system is also exempt.

- (3) Variances. Any customer of the District may make written application for a variance. Said application shall describe in detail why applicant believes a variance is justified.
- (a) The General Manager of the District may grant variances for use of water otherwise prohibited by this section upon finding and determining that failure to do so would cause an emergency condition affecting the health, sanitation, fire protection or safety of the applicant or public; or, cause an unnecessary and undue hardship on applicant or public, including but not limited to, adverse economic impacts, such as loss of production or jobs.
 - (b) The decision of the General Manager of the District may be appealed to the Board of Directors by submitting a written appeal to the District within fifteen (15) calendar days of the day of the General Manager's decision. Upon granting any appeal, the Board of Directors may impose any conditions it determines to be just and proper. Variances granted by the Board of Directors shall be prepared in writing and the Board of Directors may require the variance be recorded at applicant's expense.
- (4) Enforcement. Depending on the extent of the water waste the District may take some or all of the following actions:
- (a) Telephone the customer to inform of the water waste violation including a specified period of time to correct the violation;
 - (b) Personally contact the customer at the address of the water service. If personal contact is unsuccessful, written notice of the violation including a date that the violation is to be corrected will be sent by certified mail to the customer;
 - (c) Install a flow-restricting device on the service line;
 - (d) Cause termination of water service and the charge for same shall be billed to the customer. Except in cases of extreme emergency as solely determined by the General Manager of the District, service shall not be reinstated until verified by the District that the violation has been corrected and all outstanding charges have been paid.
 - (e) Any customer who fails to repair a significant leak or otherwise eliminate waste of water within twenty days after becoming aware of it or receiving written notice from the District shall pay a penalty charge equal to ten times the commodity charge for the amount of water estimated by the District to have been wasted or \$50 whichever is greater.
 - (f) The District may impose penalty, in an amount approved by the Board from time to time, to be assessed on the customer water bill.

C Use of Water Saving Devices

Each customer of the District is urged to install water efficient devices that meet or exceed EPA WaterSense standards, including but not limited to showerheads, sink aerators, and toilets. ~~to reduce the quantity of water to flush toilets and to reduce the flow rates of showers and faucets.~~

D. Water-Saving Kits

~~The District will periodically make available from time to time to customers the following devices and incentives; without cost and for use in residences receiving water service from the District, a water-saving kit containing the following devices for use with non-water conserving fixtures:~~

- (1) A device or devices for reducing shower and sink flow rate;
- (2) Dye tablets for determining if a toilet tank leaks;
- (3) Other devices from time to time approved by the District;
- (4) ~~Device installation and other instructions and information pertinent to conservation of water.~~ Rebates from time to time for District qualified hot water recirculation systems, greywater systems, and rainwater catchment systems.

E. Water-Saving Devices and Restrictions for New Development

- (1) Water service will not be furnished to any Applicant for new or expanded service unless the water-saving devices hereinafter described are installed. Applicants for single service installations serving one dwelling unit (d.u.) or one d.u. and an accessory d.u. or applicants for projects for which the District does not have a building permit final sign off, shall pay a \$1,000 deposit per d.u. to be refunded upon post inspection of the installation of the water-saving devices and restrictions and compliant water efficient landscape (section F) herein. All other projects may be subject to a water conservation deposit with amount and applicability determined by the General Manager on a case-by-case basis. Applicant shall have two years to complete the project, obtain District inspection approval and request a refund of the deposit. If after two years the project is not completed, the deposit will be forfeited to the District to be used for other Water Conservation programs. If requested by the Applicant, the District may extend the time period for project completion up to one additional year.
- (2) All interior plumbing in new development shall meet the following requirements:
 - (a) Toilets and associated flush valves shall be High Efficiency Toilets (HETs), rated at not more than 1.28 gallons per flush on average and shall be listed on the approved District HET list;
 - (b) Urinals and associated flush valves shall be rated at not more than 0.125 gallons per flush or be a District approved non-water using urinal;
 - (c) Showerheads shall have a rated flow of 2.0 gallons per minute or less, and only one showerhead will be allowed per bathroom;
 - (d) Lavatory faucets and hand-washing sinks shall have aerators or laminar flow devices with flow control inserts, orifices or other devices that restrict flow to a maximum of 1.5 gallons per minute in residential construction and 0.5 gallons per minute in commercial construction. Kitchen faucets shall have a maximum flow of 2.02 gallons per minutes in all construction;
 - (e) Laundry facility washing machines shall be ~~front-loading horizontal-axis type~~ District approved high-efficiency models with an Energy Star rating and ~~an integrated modified-water factor of 45.5 or less;~~
 - (f) Dishwashers shall be high efficiency models with an Energy Star rating that use no more than 5 gallons per cycle.

F. Water Efficient Landscape Requirement

- (1) Purpose. Section 2 of Article X of the California Constitution specifies that the right to use water is limited to the amount reasonably required for the beneficial use to be served and the right does not and shall not extend to waste or unreasonable method of use. This Regulation protects water supplies through the implementation of a whole systems approach to design, construction, installation and maintenance of the landscape resulting

in water conserving climate-appropriate landscapes, improved water quality and the minimization of natural resource inputs.

(2) Applicability

- a. Requirements stated herein shall apply to all of the following new and rehabilitated landscape projects associated with construction that require a Building or Grading Permit, Plan Check, Design Review or water service upgrade for:

Commercial, industrial and institutional landscaping, park and greenbelt landscaping, multiple-family residential and single-family residential landscaping.

- i. At District Discretion, landscape requirements for applicable projects may be deferred to the State Model Water Efficient Landscape Ordinance (California Code of Regulations Title 23. Waters, Division 2. Department of Water Resources, Chapter 2.7. Model Water Efficient Landscape Ordinance)
- ii. For projects with irrigated landscape area less than 2,500 square feet, the District may choose to select any or all of the requirements to the State Model Water Efficient Landscape Ordinance (referenced above), Appendix D – Prescriptive Compliance Option.

- b. Requirements stated herein shall not apply to:

- i. Registered local, state or federal historical landscape area;
- ii. Ecological restoration or mined-land reclamation projects that do not require a permanent irrigation system.

(3) Landscape Design Plan. For each landscape project subject to this Regulation, applicants shall submit a landscape design plan and install a landscape in accordance with the following:

a. Amendments, Mulching and Soil Conditioning

- i. A minimum of 8" of non-mechanically compacted soil shall be available for water absorption and root growth in planted areas.
- ii. Prior to incorporating compost or fertilizer and planting of any materials, compacted soils shall be transformed into friable condition.
- iii. Incorporate compost or natural fertilizer into the soil to a minimum depth of 8" at a minimum rate of 6-8 cubic yards per 1000 square feet and/or per specific amendment recommendations from a soils laboratory management report.
- iv. A minimum 3" layer of District approved mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers or direct seeding applications. Mulch shall be made from recycled or post-consumer products when possible.

b. Plants

- i. Selected plants, other than allowable turf in residential projects, shall be Water Use Classifications of Landscape Species (WUCOLS) categorized "Very Low" or "Low" water use from the North-Central Coastal Region and shall not cause the Estimated Water Use (ETWU) to exceed the Maximum Applied Water Allowance (MAWA) using and evapotranspiration factor of 0.556 of evapotranspiration for residential and 0.45 for non-residential sites and a WUCOLS corresponding plant factor of 0.3 or less for Very Low or Low water

plants. (Special Landscape Area including areas dedicated to edible plants, recreational uses, or areas irrigated solely with recycled water shall not be subjected to the plant selection requirements and shall use an evapotranspiration factor of 1.0 for the purposes of calculating ETWU and MAWA).

- ii. Plants with similar water use needs shall be grouped together in distinct hydrozones and where irrigation is required the each distinct hydrozones shall be irrigated with a separate valve(s) and noted on the plans.
- iii. ~~Low and moderate water use plants can be mixed, but the entire hydrozone will be classified as moderate water use for MAWA calculations.~~
- iv. Moderate and High water use plants as categorized by WUCOLS, shall not be mixed with low or moderate water use plants.
- v. All non-turf plants shall be selected, spaced and planted appropriately based upon their adaptability to the climatic, soils, and topographical conditions of the project site.
- v. i. Turf shall not be planted in the following conditions:
 - 1. Slopes exceeding 10%.
 - 2. Planting areas 108 feet wide (in any direction) or less unless irrigated with District approved subsurface irrigation or with recycled water.
 - 3. Street medians, traffic islands, planter strips or bulbouts of any size
 - 4. Front yard landscaping of single family houses where the backyard landscape is not developer installed.
- vii. Total turf areas shall not exceed the following
 - 1. Single Family: 25% of the total landscape area not to exceed 400 square feet.
 - 2. Townhouse/Condominium (THC): 200-100 square feet.
 - 3. Apartment (APT): 50 square feet.
 - 4. Commercial and/or non-residential: 0 square feet.

Special Landscape Areas: The preceding turf limitations shall not apply to sites irrigated with recycled water or areas dedicated to District approved recreational uses.
- viii. Invasive plants as listed by the California Invasive Plant Council are prohibited.

c. Water Features

- i. Recirculating water systems shall be used for water features
- ii. Recycled water shall be used in water features when available onsite.

(4) -Irrigation Design Plan. For each landscape project subject to this Regulation, applicants shall submit an irrigation design plan that is designed and installed to meet the MAWA irrigation efficiency criteria and in accordance with the following:

- a. Dedicated irrigation meter or for private landscape water submeter for residential must be specified for all non-residential irrigated landscapes and residential irrigated landscapes of 5,000 square feet or greater.

- b. Irrigation systems with meters 1 ½" or greater or non-residential landscapes with irrigated landscapes over 5,000 square feet, require a high-flow sensor that can detect high-flow conditions and have the capabilities to shut off the system.
- c. Isolation valves shall be installed at the point of connection and before each valve or valve manifold.
- d. Weather-based or other sensor based self-adjusting irrigation controllers, with non-volatile memory, shall be required.
- e. Rain sensors shall be installed for each irrigation controller.
- f. Pressure regulation and/or booster pumps shall be installed so that all components of the irrigation system operate at the manufacturer's recommended optimal pressure.
- g. Irrigation system shall be designed to prevent runoff or overspray onto non-targeted areas.
- h. Point source irrigation is required where plant height at maturity will affect the uniformity of an overhead system.
- i. Minimum 24" setback of overhead irrigation is required where turf is directly adjacent to a continuous hardscape that flows or could runoff into the curb and gutter.
- j. Slopes greater than 105% shall be irrigated with point source or other low-volume irrigation technology.
- k. A single valve shall not irrigate hydrozones that mix high water use plants with moderate or low water use plants.
- l. ~~Trees shall not be placed on separate valves except when planted in turf areas.~~
- m. All non-turf landscape areas shall be irrigated with District approved drip irrigation systems or other alternative District approved point source irrigation equipment.
- n. Sprinkler heads, rotors and other emission devices on a valve shall have matched precipitation rates. All spray irrigation systems shall be a brake rotary type and or be multi-stream, multi-trajectory, adjustable arc, rotating stream sprinkler with matched precipitation rates. All rotating stream sprinkler units shall be installed in a 40 psi pressure regulated spray head body and provide the highest potential distribution uniformity. All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher.
- o. Head-to-head coverage is required unless otherwise directed by the manufacturer's specifications
- p. Swing joints or other riser protection components are required on all risers.
- q. Check valves shall be installed to prevent low-head drainage.
- r. Master shut-off valves are required on all projects with irrigated landscapes over 5,000 square feet.
- s. Irrigation efficiency factors of 0.75 for overhead spray devices and 0.81 for drip system devices shall be used for ETWU and MAWA calculations.
- t. A diagram of the irrigation plan, including hydrozones and equipment locations, shall be provided and kept with the irrigation controller for subsequent management purposes.

(5) Irrigation Audit: Project applicants shall submit an irrigation audit report for all applicable projects.

- a. The project applicant shall submit an irrigation audit report that includes inspection, system tune-up, system test with distribution uniformity, reporting overspray and runoff that causes overland flow, and precipitation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factors, slope, exposure and other factors necessary for accurate programming.
- b. All landscape irrigation audits shall be conducted by a local agency landscape irrigation auditor or a third party certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who designed or installed the landscape.
- c. In production home developments, audits of 15% of the landscapes shall be sufficient.

G. Rebate for Energy Star High-Efficiency Washing Machines in Residences

District customers in the West Marin Service area are eligible for rebate as available from time to time for ~~front loading / horizontal axis, Energy Star~~ District approved high-efficiency washing machines in existing residences. New residential construction in the District's West Marin service area are required to be equipped with high-efficiency washing machines in accordance with Section E. (2) (e) of this regulation. District rebates are not available for ~~Energy Star high-efficiency wWashing mMachines required~~ in new residential construction.

H. Rebate for Removing Irrigated Turf from Residential Properties

- (1) The owner of property containing a formal lawn area or areas shall be eligible for a cash rebate from the District if said owner removes all or part of the formal lawn area(s) and replaces same with eligible plant materials and meets the qualification requirements. "Formal lawn area" means an existing lawn in good condition which is irrigated regularly, by an automatic inground irrigation system, with water furnished by the District and mowed regularly.
- (2) Qualification requirements:
 - (a) Application for rebate must be made on District's form prior to removing the formal lawn area(s). All applicable information requested must be supplied.
 - (b) Application for rebate must include a landscape plan or sketch showing the size, in square feet, and location of all formal lawn area(s) on the Applicant's parcel and the location of formal lawn area(s) that will be removed and replaced.
 - (c) The Applicant must utilize only eligible replacement materials for the formal lawn area(s) removed which are to be considered in calculating the rebate. Eligible replacement materials are District-approved water-conserving and low water use California native plants or District-approved synthetic turf.
 - (d) If the automatic inground irrigation system will continue to serve some remaining formal lawn area(s), Applicant must modify the system so that water is not served to the proposed replacement area.
 - (e) Formal lawn area(s) removed and replanted with eligible replacement materials shall be mulched with material suitably thick to prevent weed growth (minimum three inches) and reduce water loss. Areas shall not be irrigated except for limited hand-watering or temporary drip irrigation to establish the plant material.

- (f) The owner of the property must sign a statement promising not to reinstall lawn in formal lawn area(s) where lawn has been removed as long as the owner holds property. The owner may be relieved of this promise at any time by returning the full amount of the District's rebate.
- (g) The General Manager may at any time halt or suspend acceptance of applications for rebate if the District's funds appropriated for this purpose become exhausted.
- (3) After reviewing the information supplied by the Applicant and making at least one site inspection to assure that qualification conditions have been met, District shall mail a rebate check.
- (4) The amount of the rebate shall be determined by the Board from time to time.
- (5) Rebates may be available for non-residential property or for hotels, motels, hospitals, government housing or a senior citizen complex on a parcel which is separately owned and assessed. Maximum rebate amount for a non-residential property shall be determined by General Manager on a case-by-case basis.
- ~~(5) Synthetic turf replacements of formal lawn area may be eligible for a higher rebate level to be determined by the General Manager on a case-by-case basis.~~

I. Landscape Rebate Alternatives

- (1) The District will consider, and may approve, requests to substitute for any of the requirements in section F., well-designed alternatives or innovations that will effect similar significant and continuing reductions of water requirements. Determination of eligibility shall be at the sole discretion of the General Manager or designated staff.
- ~~(2) The District will rebate \$50 for landscape installation in existing dwellings meeting the standards listed in Section J. and over 500 square feet in area if the customer has:~~
 - ~~(a) Removed or killed the lawn area prior to making application for rebate, and~~
 - ~~(b) Replaced the lawn with landscape no more than one month before alerting the District; or~~
 - ~~(c) Re-landscaping a lawn area that was not regularly mowed and irrigated.~~

~~Determination of eligibility shall be at the sole discretion of the General Manager or Designee.~~

J. Requirement for Installation of Water Conserving Plumbing Fixtures Upon Change of Property Ownership or Upon Bathroom Alteration

- (1) Definitions.
 - (a) "Water-Conserving Plumbing Fixtures" means any toilet rated at 1.6 gallons of water per flush or less, urinals rated at 1.0 gallons of water per flush, showerheads with a flow rated at 2.0 gallons of water per minute or lavatory faucets that can emit no more than 1.5 gallons of water per minute.
 - (b) "Change in Property Ownership" means a transfer of present interest of real property, or a transfer of the right to beneficial use thereof, the value of which is substantially equal to the proportion of ownership interest transferred.
 - (c) "Bathroom Alteration" means any alteration or addition of a bathroom that includes replacement or addition of any toilet(s).

- (d) "Retrofit" means replacing "Existing Plumbing Fixtures" with "Water-Conserving Plumbing Fixtures."
 - (e) "Existing Plumbing Fixtures" means any toilet using more than 1.6 gallons of water per flush, urinals using more than 1.0 gallons of water per flush, showerheads with a flow rated more than 2.0 gallons of water per minute or lavatory faucets that emit more than 1.5 gallons of water per minute.
 - (f) "Existing Structure" means any structure built and available for use or occupancy on or before March 1, 1992, which is equipped with a toilet using more than 1.6 gallons of water per flush or a urinal using more than 1.0 gallons of water per flush.
- (2) Retrofit Upon Change of Property Ownership.
- All Existing Plumbing Fixtures in Existing Structures receiving water from the District's water system, including residential, commercial, industrial and government structures, shall, at the time of Change of Ownership, be Retrofitted, if not already done, exclusively with Water-Conserving Plumbing Fixtures. This requirement shall affect all escrow accounts involving transfer of property opened after February 29, 1992. Escrow accounts opened before March 1, 1992 which close after March 1, 1992 shall not be affected by this requirement.
- (3) Retrofit Upon Bathroom Alteration.
- Effective March 1, 1992, all structures receiving water from the District's water system, including residential, commercial, industrial and government, shall, upon Bathroom Alteration, be Retrofitted exclusively with Water-Conserving Plumbing Fixtures.
- (4) Retrofit Exemptions.
- The District's General Manager may grant an exemption in the following instances:
- (a) Unavailability of Water-Conserving Plumbing Fixtures to either match a well-defined historic architectural style fitted with authentic plumbing fixtures or accommodates existing house plumbing without Bathroom Alteration.
 - (b) Special health circumstances upon submittal of reasonable evidence that demonstrates that specific plumbing fixtures are required by the user that may not meet the Water Conserving Plumbing Fixture criteria defined by this regulation.
 - (c) Faucets at kitchen sinks or antique faucets which do not have standard threaded openings for aerators.
- (5) Compliance and Penalties.
- Compliance shall be by the honor system. It shall be the Seller's responsibility (in the case of Change of Property Ownership) and the title holder's responsibility (in the case of Bathroom Alteration) to obtain, in addition to any normal permits required by agencies other than the District, to apply for and obtain from the District a Certificate of Compliance acknowledging that the Seller or title holder has stated that the Retrofit installation required by this regulation has been completed. If the District later determines or finds that the work was not done or was not completed or that Water Conserving Plumbing Fixtures are no longer present, the District may assess an annual fee of 20% of the estimated annual water bill as determined by the District

until the owner of the property demonstrates that the required Retrofit work has in fact been done. A site inspection shall be required in such cases and the owner shall be charged \$35 for each such site inspection as an added fee on the owner's water bill.

(6) **Alternative Compliance Procedure for Transfers of Residential Property**

At Seller's option, Seller shall pay the District \$315 per bathroom that does not fully comply with Regulation 17 H. Half bathrooms shall count as one bathroom. The District shall thereupon immediately provide a Certificate of Compliance to Seller. Buyer shall then be responsible for installation of the Water Conserving Plumbing Fixtures and Seller shall provide Buyer with a copy of District Regulation 17 H. and shall notify Buyer of this requirement in writing before close of escrow. Buyer shall have one year from the date of close of escrow to install such fixtures. Upon being notified that said fixtures have been installed and making a brief inspection confirming installation, the District shall pay the Buyer an amount equal to the payment made to District by Seller. If after one year, the Water Conserving Plumbing Fixtures have not been installed, the District shall use this money for any other Board approved water conservation program and shall be under no obligation to pay said money to Buyer.

(7) **Responsibility for Compliance Negotiable**

The Seller is responsible for compliance with Regulation 17 J, however responsibility for payment of the deposit specified in Section J (6) may be assumed by the Buyer so long as the agreement is not otherwise inconsistent with the terms of Regulation 17 J. Any such agreement shall be evidenced in a writing signed by both the Buyer and Seller.

K. **High Efficiency Toilet Replacement Program(s)**

- (1) A High Efficiency Toilet (HET) is defined as any toilet that is rated at 20% or less water use on average than a standard 1.6 gallon per flush toilet with an average flush volume of 1.28 gallons per flush or less. This includes District approved 1.0 gallons per flush pressure assist toilets or dual flush models. An Ultra High-Efficiency Toilet (UHET) also known as a MaP Premium toilet is defined as any toilet with an average flush volume less than 1.1 gallons per flush.
- (2) Any qualifying customer of the District who removes and recycles all toilets rated to use more than 1.6 gallons per flush and replaces same with a District approved HET or UHET may request and receive a cash rebate or bill credit in an amount established by the Board of Directors from time to time for each such toilet removed, recycled and replaced.
- (3) To qualify for a rebate(s) hereunder, application shall be made on a form available from the District and person signing application shall:
 - (a) Request District make a brief inspection of customer's structure at a time and date approved in advance by customer to identify water conservation measures appropriate and effective for the customer to implement or be pre-qualified by District staff via other communications means. Should customer refuse access for an inspection or not receive pre-qualification, District shall not be under any obligation to make a rebate. Inspection requirements are subject to available staff time.

- (b) Be a customer of the District and the customer's structure in which the replaced toilet(s) is located shall be served water in the District's West Marin Service Area and replacing a toilet installed prior to January 1, 1992, and manufactured to flush more than 1.6 gallons per flush; and
 - (c) Provide District with bill of sale or original receipt of sale within the current fiscal year and made out to said customer by person or vendor selling customer the HET or UHET or, in lieu thereof, provide District with letter addressed to said customer signed by a licensed plumber or contractor stating that a HET(s) or UHET(s) has been installed by said plumber or contractor at the customer's address; and
 - (d) ~~Recycle toilets at a predetermined District site with all internal mechanisms, toilet seat and all other wood, metal and plastic removed, if recycling outlet is available.~~
- (4) If the customer is renting the structure, a rebate will be made provided customer includes with the application a letter from the owner of the property consenting to District making rebate payment to customer for the replacement of a non-water conserving toilet(s).
 - (5) Rebates are not available for toilets installed in buildings constructed after January 1, 1992 or for replacement of toilets rated to use 1.6 gallons per flush or less.
 - (6) Free or subsidized UHET giveaways may be available to customers from time to time. Eligibility requirements listed in K (3) (a) to (d) apply to this program should it become available.

L. Rebates for District Approved Swimming Pool Covers

District customers are eligible for rebates as available from time to time for purchasing District approved swimming pool covers. Eligible pool covers must be a solar or safety cover with non-netted type material, at least 12 mil in thickness, and at least 450 square feet.

M. Weather Based Irrigation Controller Installation Program

- (1) A Weather Based Irrigation Controller is defined as any irrigation controller using weather data to create the actual irrigation schedule and which schedule is automatically adjusted by the controller to meet the applied water demand based on actual weather data. Weather Based Irrigation Controllers may either receive "real time" weather data or generate the weather data using an integrated solar radiation sensor.
- (2) District customers using more than an average of 400 gallons per day are eligible for rebates or vouchers as available from time to time for purchasing District approved Weather Based Irrigation Controllers. Directly installed Weather Based Irrigation Controllers may be available from time to time. Customers receiving Weather Based Irrigation Controller rebates or vouchers may be subject to a pre and post installation inspection.

N. Landscape Water Efficiency Rebate

- (1) Landscape water efficient rebates are available to customers who install District qualified water efficient landscape equipment including:
 - (a) Drip irrigation systems
 - (b) Water pressure-regulating devices

- (c) Check valves
 - (d) Multi-stream rotating sprinkler nozzles (lawn areas only)
 - (e) Rain shut-off devices
 - (f) Mulch
 - (g) Soil conditioner/amendment
- (2) Rebate amounts will be established by the Board of Directors from time to time depending on customer classification and water savings potential. Customers are allowed only up to the maximum rebate level for the life of the program.
 - (3) Applicant shall request and agree to a brief District pre-inspection of customer's property to identify water efficient landscape actions to be taken. District will pre-approve and post-inspect to confirm the retrofit installations. Inspections are subject to available staff time.
 - (4) Applicant shall provide District with a complete bill of sale or original receipt of sale within the current fiscal year, clearly showing the purchase of the landscape water efficiency installed items noted in the pre-inspection.
 - (5) Free or subsidized water efficient landscape items such as rain sensors, and mulch may be available to customers. Eligibility requirements listed in N(1) through (3) apply should items become available.

O. Exemptions from Provisions Set Forth in Regulation 17 (A. through M.)

(1) Retrofit Exemptions

The District's General Manager may grant an exemption from Section M. in the following instances:

- (a) Unavailability of Water-Conserving Plumbing Fixtures to either match a well-defined historic architectural style fitted with authentic plumbing fixtures or accommodate existing house plumbing without Bathroom Alteration;
- (b) Special health circumstances upon submittal of reasonable evidence that demonstrates that specific plumbing fixtures are required by the user that may not meet the Water Conserving Plumbing Fixture criteria defined by this regulation.
- (c) Faucets at kitchen sinks or antique faucets which do not have standard threaded openings for aerators.

(2) Other Exemptions

The District's General Manager may grant exemptions from Section A. through N. only for purposes of health, safety and sanitation or if applicant demonstrates an "at least as effective as" water efficiency alternative. The District's General Manager shall have the sole decision of determining whether applicant has demonstrated an "at least as effective as" water efficiency alternative.

DRAFT
RESOLUTION 16-01

**RESOLUTION OF THE BOARD OF DIRECTORS OF
NORTH MARIN WATER DISTRICT
AMENDING REGULATION 15 – WATER CONSERVATION – Novato Service Area**

BE IT RESOLVED by the Board of Directors of North Marin Water District that Regulation 15 – Water Conservation – Novato Service Area is adopted as amended on Attachment 1, effective January 6, 2016:

* * * * *

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 5th day of January 2016 by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

Katie Young, District Secretary
North Marin Water District

(SEAL)

DRAFT
RESOLUTION 16-02

**RESOLUTION OF THE BOARD OF DIRECTORS OF
NORTH MARIN WATER DISTRICT
AMENDING REGULATION 17 – WATER CONSERVATION – West Marin Service Area**

BE IT RESOLVED by the Board of Directors of North Marin Water District that Regulation 17 – Water Conservation – Novato Service Area is adopted as amended on Attachment 1, effective January 6, 2016:

* * * * *

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 5th day of January 2016 by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

Katie Young, District Secretary
North Marin Water District

(SEAL)

Marin Independent Journal
Marin Independent Journal

Publication Name:
Marin Independent Journal

Publication URL:
www.marinij.com

Publication City and State:
Novato, CA

Publication County:
Marin

Notice Popular Keyword Category:

Notice Keywords:
north marin water district

Notice Authentication Number:
201512281051455536292
855584889

Notice URL:

Notice Publish Date:

Wednesday, December 23, 2015

Notice Content

PUBLIC HEARING NOTICE Sponsor: North Marin Water District Purpose: Consider Proposed Changes to District Regulation 15 Water Conservation Novato Service Area and Regulation 17 Water Conservation West Marin Service Area Impact: Greater Novato and West Marin Service Areas Date: January 5, 2016 Time: 7:00 p.m. Place: 999 Rush Creek Place, Novato (District Headquarters) Summary of Proposed Changes: 1. Modifications to landscape efficiency requirements including additional turf limitations and requirements, plant selection criteria, soil amendment requirements and other changes in compliance with the updated 2015 State Model Water Efficient Landscape Ordinance. 2. Updated language to various rebate program participation and eligibility requirements. 3. Other minor changes and updates. For More Information Please Call the District's Water Conservation office at: (415) 761-8933 or email waterconserve@nmwd.com NO. 1399 DEC. 23, 30, 2015

[Back](#)

The review period for the mitigated negative direct-impact starts December 22, 2016 and ends January 20, 2017. Please mail comments to: Department of Fish and Wildlife, 830 S Street, Sacramento, CA 95833. Please make attention to Ms. Karen Campbell. Comments must be received by January 20, 2016. For additional information contact Mr. Trevor Hebertson, Senior


Public Hearing
Notice
12/23/15

6

MEMORANDUM

To: Board of Directors

Date: December 31, 2015

From: Drew McIntyre, Chief Engineer 

Subject: Approve – Outside District Boundary Water Service Agreements for (1) Yee (APN 019-320-010, 3351 Petaluma Blvd. South) and (2) Fontes (APN 019-320-021, 3357 Petaluma Blvd. South)


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RECOMMENDED ACTION: The Board approve authorization of both agreements**FINANCIAL IMPACT:** None: Funded by ApplicantsBackground

On March 7, 2006, the Board was first apprised of the proposed Dutra Haystack Landing Asphalt and Recycling Facility (Dutra) project via a Sonoma County Notice of Preparation of Draft Environmental Impact Report. At the March 16, 2007 meeting, staff advised the Board that Dutra's one-inch water meter (set in 1966 to serve a dairy operation) was also being used to provide water service to two adjacent parcels (Mr. Yee and Mr. Fontes as shown in Attachment 1). Staff subsequently contacted Mr. Yee (APN 019-320-010) who reported that both his parcel and the Fontes parcel (APN 019-320-021) had been receiving water from the Dutra meter since it was originally installed in 1966 (and prior to that date via spring water from the Dutra parcel). At the December 16, 2008 meeting, the Board approved moving forward with normalizing said two services subject to: (1) payment of required District fees, (2) acquiring necessary private water line easements for continued service from new meters (to be located on the east side of the railroad tracks at the end of NMWD's existing pipeline as shown in Attachment 1), (3) Local Agency Formation Commission (LAFCo) approval, and (4) execution of new Outside District Boundary Water Service Agreements.

At the November 3, 2015 meeting, the Board was apprised of pending Marin LAFCo approval at their November 12, 2015 meeting. Said approval occurred at this meeting as evidenced in the attached Marin LAFCo letter (Attachment 2). As the letter states, approval is conditioned on recorded agreements that specify:

- Water service is limited to the existing residential development and new development is prohibited unless approved by Marin LAFCo, and
- Property owners must consent to future annexation to NMWD (or an authorized substitute service provider) if and when a boundary change is legally permissible.

Approved by GM Date 12/31/2015

New Water Facilities

High pressure water from the Sonoma County Water Agency (SCWA) aqueduct will service each parcel via existing NMWD facilities in Landing Way downstream of the SCWA master meter (see map in Attachment 1). New water facilities for each agreement include installation of a 5/8-inch water meter and ~10-feet of 1-inch copper pipe. Each applicant will also be required to own and maintain a Reduced Pressure Principal (RPP) back flow protection device.

Sewer service to each parcel is by separate existing leach field/septic systems

Environmental Document Review

Establishment of regular water service to each existing parcel is categorically exempt from the requirements of the California Environmental Quality Act per Section 15301, Class 1.

Recommendation

That the Board approve by separate resolutions:

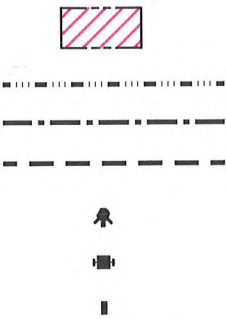
1. Authorization of Yee Outside Water Service Agreement (APN 019-320-10)
– Attachment 3
2. Authorization of Fontes Outside Water Service Agreement (APN 019-320-21)
– Attachment 4

Dec 21, 2015 10:48am W:\JOB\MISC\Presentation\petaluma bvd FOR YEE & FONTES.dwg User: ACANTILLER



LEGEND:

- SERVED BY NORTH MARIN WATER DISTRICT
- SCWA KASTANIA PIPELINE
- CITY OF PETALUMA PIPELINE
- NMWD PIPELINES
- FIRE HYDRANT
- MASTER METER
- SINGLE SERVICE METER



| | | | | | |
|--|------|----------|------------------|--------------|---------|
| | | | | | |
| | | | | | |
| | | | | | |
| NO. | DATE | REVISION | | | BY APP. |
| NORTH MARIN WATER DISTRICT NOVATO, CALIFORNIA | | | | | |
| SOUTH PETALUMA BOULEVARD NMWD OUTSIDE DISTRICT CUSTOMER | | | | | |
| DES | DR | CH | SCALE : 1"=1'-0" | | |
| | AC | DM | DATE : 10/31/11 | | |
| APPROVED: CHIEF ENGINEER | | | SHEET NO. | : 1 OF 1 | SHEETS |
| R.E. C40936 | | | SERVICE AREA 1 | JOB.NO. 0000 | NO.001 |



Marin Local Agency Formation Commission
Regional Planning Service / Subdivision of the State of California

November 16, 2015

Delivered by Electronic Mail

Mr. Drew McIntyre
North Marin Water District
99 Rush Creek Drive
Novato, California 94949
dmcintyre@nmwd.com

**SUBJECT: Conditional Approval of an Outside Service Extensions / 3367
and 3357 Petaluma Boulevard and North Marin Water District
(File No. 1326)**

Mr. McIntyre:

This letter provides notice the Marin Local Agency Formation Commission (LAFCO) has conditionally approved North Marin Water District (NMWD)'s joint request with landowners Leang Yee and Mike Fontes to establish regular domestic water service to 3367 and 3357 Petaluma Boulevard (19-320-10 and 19-320-21). Approval was made as part of Marin LAFCO's November 12, 2015 regular meeting and followed the staff recommendation provided to you in advance. **Approval is conditioned on all of the following terms being satisfied.**

- a) NMWD and the affected landowners provide copies of recorded agreements for each subject lot attesting water service use shall be limited to supporting existing residential development as of date. Any new development necessitating a building permit in the affected territory is strictly prohibited unless separately approved by the Commission.
- b) Both affected landowners provide recorded agreements consenting to future annexation to NMWD or an authorized substitute service provider if and when a boundary change is legally permissible.

Once all of the preceding terms have been satisfied I will issue a joint-letter addressed to you and NMWD authorizing the commencement of service.

Should you have any questions please contact me by telephone at 415-446-4409 at ksimonds@marinlafco.org.

Administrative Office
555 Northgate Drive, Suite 230
San Rafael, California 94903
T: 415.446.4409 F: 415.446.4410
marinlafco.org / staff@marinlafco.org

Jeffrey Blanchfield, Chair
Carla Condon, Vice Chair
Judy Arnold, Jack Baker, Damon Connolly, Craig K. Murray, Gary Phillips, Regular Members
Chris Burdick, Lew Kious, Kath Sears, Herb Weiner, Alternate Members
Keene Simonds, Executive Officer

RESOLUTION NO. 16-
AUTHORIZATION OF EXECUTION
OF
HIGH PRESSURE
WATER SERVICE FACILITIES CONSTRUCTION AGREEMENT
WITH
LEANG S. YEE

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 Leang S. Yee, an individual, providing for the installation of water distribution facilities to provide domestic water service to that certain real property known as 3351 PETALUMA BOULEVARD SOUTH, Sonoma County Assessor's Parcel Number 019-320-010, 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 5th day of January, 2016, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAINED:

(SEAL)

Katie Young, Secretary
North Marin Water District

HIGH PRESSURE
WATER SERVICE AGREEMENT
OUTSIDE DISTRICT BOUNDARIES
FOR 3351 PETALUMA BOUVELARD SOUTH
SONOMA COUNTY ASSESSOR'S PARCEL NUMBER
019-320-010

THIS AGREEMENT, is made and entered into as of _____, 2016, by and between NORTH MARIN WATER DISTRICT, herein called "District," and LEANG YEE, an individual, herein called "Applicant."

RECITALS

WHEREAS, the Applicant warrants that he is the sole owner of real property commonly known as 3351 Petaluma Boulevard South with respective Sonoma County Assessor's Parcel Number 019-320-010, located in Sonoma County, California, but outside of the District's Service Area boundary, and that said property is improved with an existing single family unit;

WHEREAS, the said land lies within the Urban Growth Boundary of the City of Petaluma and outside the City limit and water service is not presently available to the said land from existing facilities owned and operated by the City of Petaluma; and

WHEREAS, in 1999 the District transferred ownership of the 30-inch Kastania Pipeline from McNear Avenue to the Kastania Tank (previously known as a portion of the NORTH MARIN AQUEDUCT) to the Sonoma County Water Agency (SCWA); and

WHEREAS, The District continues to reserve rights to deliver surplus water to District customers in the Petaluma Blvd. South vicinity through a 12-inch SCWA turn-out near Landing Way; and

WHEREAS, the District currently provides irregular water service to said land by a previously unauthorized connection with a neighboring property to the west at 3355 Petaluma Boulevard South (APN 019-320-23), now owned by the Dutra Group; and

WHEREAS, the Applicant and District submitted a joint-request for Outside Water Service with Marin Local Agency Formation Commission (LAFCO) to formally establish direct potable water service to said real property; and

WHEREAS, at the November 12, 2015 meeting the Marin LAFCO Commission approved outside water service to the said real property subject to certain conditions.

NOW THEREFORE, the parties hereto agree as follows:

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

2. The term "surplus water" as used herein shall mean quantities of water which are not normally required by the District, as determined solely by the District, to provide normal water service to consumers within the legal boundaries of the District's Novato Service Area.

3. The Applicant acknowledges and agrees that authorization of this agreement and the provision of surplus water to said lands by the District represents an interim water service commitment by the District until such time as permanent water service from the City of Petaluma, with potable water, can otherwise be made available to said lands and that service shall be provided subject to the following conditions:

(a) The District reserves the right to transfer or assign its obligation to provide water service to any parcel under this agreement to the City of Petaluma or other agency at such time as such agency assumes responsibility for providing permanent water service to the Applicant's lands. Such transfer of service obligation shall be made at no cost to the District.

(b) In the event permanent service is not made available to said lands by the City of Petaluma or other appropriate agency, the District reserves the right to require annexation of the Applicant's lands into the legal boundaries of the District as a condition of providing permanent water service. Failure by the Applicant or Applicant's heirs or assigns to complete said annexation upon written notice by the District shall be cause for District termination of water service to the Applicant's lands.

(c) The Applicant acknowledges that said outside service could be curtailed at any time and is less reliable than the service provided to regular customers within the District's Novato Service Area. Should dry year conditions occur, the District's Water Shortage Contingency Plan for Novato Service Area will be activated and will trigger implementation of voluntary and or mandatory water shortage contingency measures. The Applicant acknowledges that mandatory water

reduction requirements may limit deliveries of water to outside service area customers to that amount needed for human consumption, sanitation and public safety.

(d) The Applicant shall pay for water used at such rates as may be adopted by the District from time to time for water service outside District boundaries.

(e) The Applicant shall install and maintain a private pressure regulating device in accordance with Section 9 of this agreement.

(f) The Applicant shall install and maintain an above-ground, reduced pressure principle (RPP) backflow prevention device at the meter in accordance with the District's Regulation 6 and California Department of Health Regulations (Title 17).

(g) District responsibility for water service shall terminate at the meter. The Applicant shall obtain necessary permits or approvals from the County of Sonoma and install private plumbing for the meter serving said land at Applicant's expense. Said private plumbing shall be maintained in good working order at all times. The District reserves the right to terminate service to the parcel at any time private plumbing is shown to be defective.

(h) In the event of sales of any land receiving water service pursuant to this agreement, the Applicant/Owner shall provide the buyer(s) with a copy of this agreement and advise the buyer(s) of the conditions under which water service is being rendered by the District.

4. Water service pursuant to this agreement shall be limited to the one (1) existing single family dwelling unit. Any new development requiring a building permit is strictly prohibited unless authorized by the County of Sonoma and separately approved by Marin LAFCO prior to the date of this agreement.

Any expansion of water usage beyond that specifically authorized herein or not in conformance with District Regulations shall be cause for termination of service by the District. Any change or expansion of land use requiring discretionary approval by the County of Sonoma shall require concurrent approval of the District as a condition of continuation of water service by the District.

5. 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 8 of this agreement.

6. 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 a written construction schedule to provide for timely for ordering of materials to be furnished by the District.

7. 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 (Domestic) (Included in Estimated District Costs) | ... One 5/8-inch @ | \$ 0.00 | \$ 0.00 |
| Reimbursement Fund Charges | One @ | \$ 420.00 | \$ 420.00 |
| Facilities Reserve Charges..... | One @ | \$ 8,600.00 | \$ 8,600.00 |
| Facilities Reserve Charge Credit (Previously Paid)... | @ | \$ <8,600.00> | \$ <8,600.00> |
| Subtotal - Initial Charges..... | | | \$ 420.00 |

Estimated District Costs

| | |
|---|--------------------|
| Pipe, Fittings & Appurtenances..... | \$ 500.00 |
| District Construction Labor..... | \$ 4,200.00 |
| Engineering & Inspection..... | \$ 500.00 |
| Bulk Materials..... | \$ 800.00 |
| Subtotal - Estimated District Costs..... | \$ 6,000.00 |

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..... \$ 6,420.00

8. The Applicant shall pay to the sum of Initial Charges and estimated District costs associated with implementation of this Agreement. Initial Charges and estimated District Costs as set forth in Section 7 hereof, in the amount of \$6,420.

9. High pressure water service will be rendered to said land in accordance with District Regulation 12 entitled "High Pressure Service". The Applicant shall install a private pressure regulating device to said lot as required by local ordinances and plumbing codes prior to occupancy of any structures, shall inform the buyer or buyers of said lot 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 device 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 device shall be the responsibility of the property owner.

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. 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"

John Schoonover, President

ATTEST:

Katie Young, Secretary

(SEAL)

LEANG S. YEE
An Individual
"Applicant"

LEANG S. YEE

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 all Initial Charges (connection fees) and cost estimates pursuant to District Regulations then in effect.

ALL SIGNATURES MUST BE ACKNOWLEDGED BEFORE A NOTARY PUBLIC.

RESOLUTION NO. 16-
AUTHORIZATION OF EXECUTION
OF
HIGH PRESSURE
WATER SERVICE FACILITIES CONSTRUCTION AGREEMENT
WITH
MICHAEL FONTES TRUST

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 Michael Fontes, trustee, providing for the installation of water distribution facilities to provide domestic water service to that certain real property known as 3357 PETALUMA BOULEVARD SOUTH, Sonoma County Assessor's Parcel Number 019-320-021, 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 5th day of January, 2016, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAINED:

(SEAL)

Katie Young, Secretary
North Marin Water District

HIGH PRESSURE
WATER SERVICE AGREEMENT
OUTSIDE DISTRICT BOUNDARIES
FOR 3357 PETALUMA BOUVELARD SOUTH
SONOMA COUNTY ASSESSOR'S PARCEL NUMBER
019-320-021

THIS AGREEMENT, is made and entered into as of _____, 2016, by and between NORTH MARIN WATER DISTRICT, herein called "District," and MICHAEL FONTES, an individual, herein called "Applicant."

RECITALS

WHEREAS, the Applicant warrants that he is the sole owner of real property commonly known as 3357 Petaluma Boulevard South with respective Sonoma County Assessor's Parcel Number 019-320-021, located in Sonoma County, California, but outside of the District's Service Area boundary, and that said property is improved with an existing single family unit;

WHEREAS, the said land lies within the Urban Growth Boundary of the City of Petaluma and outside the City limit and water service is not presently available to the said land from existing facilities owned and operated by the City of Petaluma; and

WHEREAS, in 1999 the District transferred ownership of the 30-inch Kastania Pipeline from McNear Avenue to the Kastania Tank (previously known as a portion of the NORTH MARIN AQUEDUCT) to the Sonoma County Water Agency (SCWA); and

WHEREAS, The District continues to reserve rights to deliver surplus water to District customers in the Petaluma Blvd. South vicinity through a 12-inch SCWA turn-out near Landing Way; and

WHEREAS, the District currently provides irregular water service to said land by a previously unauthorized connection with a neighboring property to the west at 3355 Petaluma Boulevard South (APN 019-320-23), now owned by the Dutra Group; and

WHEREAS, the Applicant and District submitted a joint-request for Outside Water Service with Marin Local Agency Formation Commission (LAFCO) to formally establish direct potable water service to said real property; and

WHEREAS, at the November 12, 2015 meeting the Marin LAFCO Commission approved outside water service to the said real property subject to certain conditions.

NOW THEREFORE, the parties hereto agree as follows:

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

2. The term "surplus water" as used herein shall mean quantities of water which are not normally required by the District, as determined solely by the District, to provide normal water service to consumers within the legal boundaries of the District's Novato Service Area.

3. The Applicant acknowledges and agrees that authorization of this agreement and the provision of surplus water to said lands by the District represents an interim water service commitment by the District until such time as permanent water service from the City of Petaluma, with potable water, can otherwise be made available to said lands and that service shall be provided subject to the following conditions:

(a) The District reserves the right to transfer or assign its obligation to provide water service to any parcel under this agreement to the City of Petaluma or other agency at such time as such agency assumes responsibility for providing permanent water service to the Applicant's lands. Such transfer of service obligation shall be made at no cost to the District.

(b) In the event permanent service is not made available to said lands by the City of Petaluma or other appropriate agency, the District reserves the right to require annexation of the Applicant's lands into the legal boundaries of the District as a condition of providing permanent water service. Failure by the Applicant or Applicant's heirs or assigns to complete said annexation upon written notice by the District shall be cause for District termination of water service to the Applicant's lands.

(c) The Applicant acknowledges that said outside service could be curtailed at any time and is less reliable than the service provided to regular customers within the District's Novato Service Area. Should dry year conditions occur, the District's Water Shortage Contingency Plan for Novato Service Area will be activated and will trigger implementation of voluntary and or mandatory water shortage contingency measures. The Applicant acknowledges that mandatory water

reduction requirements may limit deliveries of water to outside service area customers to that amount needed for human consumption, sanitation and public safety.

(d) The Applicant shall pay for water used at such rates as may be adopted by the District from time to time for water service outside District boundaries.

(e) The Applicant shall install and maintain a private pressure regulating device in accordance with Section 9 of this agreement.

(f) The Applicant shall install and maintain an above-ground, reduced pressure principle (RPP) backflow prevention device at the meter in accordance with the District's Regulation 6 and California Department of Health Regulations (Title 17).

(g) District responsibility for water service shall terminate at the meter. The Applicant shall obtain necessary permits or approvals from the County of Sonoma and install private plumbing for the meter serving said land at Applicant's expense. Said private plumbing shall be maintained in good working order at all times. The District reserves the right to terminate service to the parcel at any time private plumbing is shown to be defective.

(h) In the event of sales of any land receiving water service pursuant to this agreement, the Applicant/Owner shall provide the buyer(s) with a copy of this agreement and advise the buyer(s) of the conditions under which water service is being rendered by the District.

4. Water service pursuant to this agreement shall be limited to the one (1) existing single family dwelling unit. Any new development requiring a building permit is strictly prohibited unless authorized by the County of Sonoma and separately approved by Marin LAFCO prior to the date of this agreement.

Any expansion of water usage beyond that specifically authorized herein or not in conformance with District Regulations shall be cause for termination of service by the District. Any change or expansion of land use requiring discretionary approval by the County of Sonoma shall require concurrent approval of the District as a condition of continuation of water service by the District.

5. 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 8 of this agreement.

6. 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 a written construction schedule to provide for timely for ordering of materials to be furnished by the District.

7. 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 (Domestic) (Included in Estimated District Costs) | ...One 5/8-inch @ | \$ 0.00 | \$ 0.00 |
| Reimbursement Fund Charges |One @ | \$ 420.00 | \$ 420.00 |
| Facilities Reserve Charges..... |One @ | \$ 8,600.00 | \$ 8,600.00 |
| Facilities Reserve Charge Credit (Previously Paid)... |@ | \$<8,600.00> | \$<8,600.00> |

Subtotal - Initial Charges..... \$ 420.00

Estimated District Costs

| | |
|-------------------------------------|-------------|
| Pipe, Fittings & Appurtenances..... | \$ 500.00 |
| District Construction Labor..... | \$ 4,200.00 |
| Engineering & Inspection..... | \$ 500.00 |
| Bulk Materials..... | \$ 800.00 |

Subtotal –Estimated District Costs..... \$ 6,000.00

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..... \$ 6,420.00

8. The Applicant shall pay to the sum of Initial Charges and estimated District costs associated with implementation of this Agreement. Initial Charges and estimated District Costs as set forth in Section 7 hereof, in the amount of \$6,420.

9. High pressure water service will be rendered to said land in accordance with District Regulation 12 entitled "High Pressure Service". The Applicant shall install a private pressure regulating device to said lot as required by local ordinances and plumbing codes prior to occupancy of any structures, shall inform the buyer or buyers of said lot 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 device 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 device shall be the responsibility of the property owner.

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11. 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"

John Schoonover, President

ATTEST:

Katie Young, Secretary

(SEAL)

MICHAEL FONTES TRUST
An Individual
"Applicant"

MICHAEL FONTES (Trustee)

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 all Initial Charges (connection fees) and cost estimates pursuant to District Regulations then in effect.

ALL SIGNATURES MUST BE ACKNOWLEDGED BEFORE A NOTARY PUBLIC.

7

MEMORANDUM

To: Board of Directors
 From: Ryan Grisso, Water Conservation Coordinator *RG*
 Subject: Rising Sun Energy Center Water Use Survey Agreement
V:\Memos to Board\CYES Agreement 010516.doc

December 31, 2015

RECOMMENDED ACTION: Authorize General Manager to Execute Amendment

FINANCIAL IMPACT: \$11,000 from the FY 2016/2017 and FY 2017/2018 Water Conservation Budget

The District has participated with Rising Sun Energy Center (RSEC), to implement the California Youth Energy Services (CYES) "Green House Call" program in Novato for the past eight years. The Green House Call program includes the installation of energy and water saving fixtures and conservation education and is mostly funded by Pacific Gas and Electric through the Marin Energy Watch Partnership. The water portion of the Green House Call program specifically includes installation of showerheads and sink aerators plus toilet gallons per flush determination and toilet leak detection. The District provides the fixtures needed for installation and provides leak detection tablets and District staff assists in CYES training as necessary. This partnership helps to increase participation in our residential water use surveys and gives the District an opportunity to partner with energy conservation efforts. To date, the CYES has performed over 1,400 "Green House Calls" in the District service areas. This summer, the CYES program will continue to operate an office in Novato to target the District's service areas, which also includes West Marin customers if there is enough demand. An agreement between the District and RSEC, to run the CYES "Green House Call" program has been drafted to authorize 240 "Green House Calls" per year through the end of calendar year 2017 (Attachment 1). The proposed agreement is consistent with prior agreements executed with RSEC in 2011 and 2014.

Recommendation

Authorize the General Manager to execute the agreement for an amount not to exceed \$11,000, with RSEC, to fund the water portion of the CYES "Green House Call" program through calendar year 2017, with contingency for future amendments not to exceed \$5,000.

Approved by GM *GD*
 Date *12/31/2015*

CALIFORNIA YOUTH ENERGY SERVICES 2016-2017

SCOPE OF WORK

The purpose of the Scope of Work is to outline the planning, coordination, and implementation of a California Youth Energy Services (CYES) program within the North Marin Water District (District's) service area.

Rising Sun Energy Center (Rising Sun) is fully responsible for all services in this Scope of Work that are designated to be performed by CYES, and will use all reasonable effort to meet the requirements herein.

SCOPE OF WORK

Rising Sun Energy Center (Rising Sun) is a Bay Area nonprofit workforce development organization established in 1994. Since 2000, Rising Sun has promoted local resource conservation via a young adult employment program, California Youth Energy Services (CYES). As the residential program arm of the East Bay, Marin, San Joaquin, Solano, and Sonoma County Energy Watch partnerships, the CYES program trains and employs young adults ages 15-22 to provide energy and water conservation assessments and installations to local residents at no cost to the customer. This service, called a Green House Call, is offered to both homeowners and renters, and checks homes for efficiency, installs equipment, and provides personalized recommendations for further savings.

CYES has two goals that set it apart from other youth programs. First, it provides direct-install energy and water efficiency services to the community at no cost, with a focus on hard-to-reach households. These include:

- Non-English speakers, who often miss out on services due to language barriers
- Renters
- Moderate income households
- Multifamily dwellings
- Senior citizens

Second, CYES Energy Specialists are local youth, who often struggle to find paid work experience on a meaningful career track.

Rising Sun operates the CYES program by setting up satellite CYES site offices in partner cities. Youth Energy Specialists are hired locally from the partner city and serve the local community. The total cost of running of a CYES satellite office is \$148,320. This cost includes youth salaries, manager salaries, site set-up and breakdown, outreach and marketing, equipment and materials, transportation, planning, coordination, and all overhead costs.

Rising Sun will run and manage two California Youth Energy Services program site offices in Marin County during summers of 2016 and 2017. Rising Sun will execute the CYES programs in

Marin County in three phases: Design and Planning, Training and Implementation, and Closing and Reporting.

LOGISTICS

Each CYES site is run by an adult Site Manager and a Site Outreach Manager. The Site Outreach Manager markets the service to the local community and identifies residents interested in Green House Calls, signing them up for scheduled appointments. Outreach techniques include event tabling, bill inserts, social and traditional media, neighborhood canvassing, and partnerships with community groups and property management companies. The Site Manager is responsible for overseeing the physical site office and coordinating logistics and administration.

Both the Site Manager and the Site Outreach Manager are responsible for training and supervising the youth Energy Specialists, of whom there are eight at each site. The youth are chosen for their professionalism, ability to work in teams, critical thinking skills, and self-motivation. Both adult staff are trained and supervised by permanent Rising Sun staff that work throughout the year to ensure the program's success.

Energy Specialists work in pairs composed of a minor and a youth aged 18 or over, so that there is always a legal adult on each assignment. Comprehensive field monitoring policies are in place to ensure the quality of the work. A pair of Energy Specialists can visit three to six households a day.

WORK SCHEDULE

Program Design and Planning: January - May 2016, January - May 2017

Upon finalizing the contract, Rising Sun will begin program planning and design. Rising Sun will also launch its community marketing and outreach campaign to generate a waitlist of residents for the summer. In order to meet outreach and recruitment goals, a contract should be in place with NMWD no later than January 31, 2016. Rising Sun will also conduct a youth and manager recruitment campaign in the spring, as well as site office setup. Rising Sun will set up the Marin County site offices in late May and early June. Program design and planning includes:

- Marketing and outreach to community renters and homeowners
- Youth recruitment and hiring
- LIFT recruitment and hiring
- Manager recruitment and hiring
- Inventorying and purchasing of tools, equipment, and materials
- Preparation of outreach and audit forms
- Site set-up (IT, etc.) and distribution of tools, equipment, and materials

Program Training and Implementation: June - August 2016, June - August 2017

CYES program implementation begins with training. Rising Sun will conduct Manager and LIFT trainings, followed by youth training. Youth Energy Specialists will conduct fieldwork for six weeks following training. Program training and implementation includes:

- Manager Training
- Youth Training
- LIFT Training
- Program Implementation (six weeks of field work/Green House Calls – see below)

Green House Calls

CYES Energy Specialists perform Green House Calls that provide renters and homeowners with free energy and water conservation assessments, equipment installation, and education. Because the equipment installed does not alter the infrastructure of a home, renters are eligible for CYES services. The CYES program serves single-family, 2-4 plex, and multi-unit dwellings. Mobile homes are not eligible.

A CYES Green House Call consists of:

- A walkthrough energy assessment of the house with the client, looking for energy- and water-saving opportunities
- Direct installation of free energy and water saving measures; for example:
 - Efficient-flow faucet bath and kitchen aerators
 - Efficient-flow showerheads
 - Screw-in compact fluorescent lamps (CFLs)
 - Screw-in light emitting diodes (LEDs)
 - Smart powerstrips (Tier 1)
 - LED nightlight
 - Fluorescent floor lamps, in exchange for halogen floor lamps
 - Additional measures as available
- E-waste removal
- Solar assessments for single-family homeowners
- Testing gallon per minute (GPM) flow rate tests on all feasible shower, kitchen, and bathroom water fixtures
- Assessment of toilets for leaks and flush volume
- Assessment of refrigerator and water heater temperature settings
- Collection of irrigation information
- Energy and water conservation education, including personalized recommendations
- Customized report to the client documenting work completed and ways to further capture energy savings after the CYES appointment

Program Close, Reporting, and Analysis: August - December 2016, August - December 2017

The reporting process begins in late August, after all CYES sites have been properly closed down, and continues through November. Due to the large amount of data collected across CYES cities, the data analysis and translation process takes 2-3 months to complete. Final reports will be distributed to partner cities and water districts (including the report for NMWD) no later than November 15, 2016 and November 15, 2017. Program close and reporting includes:

- Site breakdown and closeout
- Data analysis and translation

- Create and distribute all reports

DELIVERABLES AND OUTCOMES

Youth Employee Services – Water Conservation

CYES youth Energy Specialists will provide residents in NMWD's service area with water conservation audits and retrofits. CYES youth Energy Specialists will be responsible for installing water conservation hardware, collecting audit data, and disseminating information to residents. CYES conservation audits will include the following components:

- Water bill account number and name
- Water meter reading
- Water pressure (PSI) measurement at outside hose bib
- Gallon per minute (GPM) flow rate tests on all feasible shower, kitchen, and bathroom fixtures
- Install efficient-flow showerheads, if appropriate
- Install efficient-flow kitchen aerators, if appropriate
- Install efficient-flow bathroom aerators, if appropriate
- Test or assess for toilet flapper and overflow leaks
- Record if toilet water level is within ½ inch of the top of overflow tube
- Determine toilet flush volume or date for each toilet (GPF)
 - If a date stamp or other markings which indicate the flush volume cannot be located, then determine flush volume by measuring and recording the water depth, height, width in the tank and converting to gallons
- Track number of high efficiency toilets (HET) found
- Collect irrigation and landscape information data, such as: the square footage of the irrigated area, % of lawn, and whether residents have and know how to adjust an automatic irrigation system

Data Collection

All field data will be collected using the CYES Green House Call form. All pertinent water information on the Green House Call form will be digitized and sent electronically to the District. CYES will keep electronic and hard copy backup of the survey forms, which will be furnished to the District upon request.

Reporting

Rising Sun Energy Center will provide a report that includes a summary and itemization of services performed, including names and addresses of all households served and quantities of services provided. The reports will include the raw data, including year built and housing type (single-family or multi-family), in addition to a summary page with the following components:

- Total number of each measure installed
- Average GPM rate for each fixture type
- Total GPMs saved

- Average GPMs saved for each fixture type
- Toilet leak and flush volume data
- Summary of irrigation data
- Summary report of data collected from NMWD customers on the customer follow-up surveys. The report will include the summary data for each survey question and comments collected on the surveys.

PAYMENT SCHEDULE

The following agreed-upon contributions by the District are necessary for the implementation and execution of the outlined Scope of Work. The total District contribution for the program during 2016 and 2017 will not exceed \$5,280 each year, to serve up to 240 units per year (480 units total over the two years). Note: There is an additional \$440 in the P.O. to buffer against an unanticipated overage in units served.

- The District agrees to pay for and furnish to Rising Sun Energy Center conservation hardware for installation, including: showerheads, kitchen aerators, bathroom aerators, water flow bags, pressure gauges, and toilet dye tablets. Additional measures may be provided if available and if the District is interested, such as toilet flappers and spray hose nozzles.
- Fee Schedule: Rising Sun Energy Center will perform the services described in this agreement and will bill the District for these services at the following rate:
 - \$22.00 per completed survey: \$16.00 of which will cover the field visit, and \$6.00 of which will cover the cost of data digitizing for electronic transmittal to the District
 - Payments must be paid in full no later than 30 days after an invoice is submitted for each survey
 - This rate of \$22.00 per completed survey includes any and all costs and expenses incurred in the process of completing this body of work, except for the cost of conservation hardware listed above to be provided by the District
- Rising Sun will submit a report and invoice for the summer program no later than November 15, 2016 and 2017.

Rising Sun Energy Center's Employer Identification Number is 77-0359133. As a 501(c)3 organization, Rising Sun Energy Center is exempt from Federal income tax.

8

MEMORANDUM

To: Board of Directors
From: Chris DeGabriele, General Manager 
Subject: Board of Directors Planning Workshop
t:\gm\bod misc 2016\planning workshop date memo.doc

December 31, 2015

RECOMMENDED ACTION: Board Schedule a date and time for a Planning workshop

FINANCIAL IMPACT: \$1,025

About every two years, the Board holds a planning workshop. In the past the Board has indicated that a special meeting is more appropriate to concentrate on workshop activities. The last planning workshop was held on January 14, 2014, from 6 to 8 p.m.

Options for the Board to consider are:

1. An evening meeting on Tuesday, January 28th
2. An evening meeting on Tuesday, February 9th
3. An evening meeting on Tuesday, February 23rd

RECOMMENDATION

Board select day and time to hold the Board Planning Workshop.

9

MEMORANDUM

To: Board of Directors
From: Chris DeGabriele, General Manager 
Subject: Ethics Training for Board of Directors
T:\GMBOD Misc 2016\ethics training memo.doc

December 31, 2015

RECOMMENDED ACTION: Board schedule a date and time for Ethics Training
FINANCIAL IMPACT: \$2,520 Attorney Cost + \$1,025 Board meeting compensation

Effective January 1, 2006, state law (Assembly Bill No. 1234) required that all local agencies that provide compensation, salary or stipend to, or reimburses the expenses of, members of a legislative body must provide ethics training to local agency officials by January 1, 2007 and every two years after. NMWD Directors and officers are required to complete the training this year.

NMWD's Directors and officers last completed AB 1234 Compliance Training for Special Districts in 2014 using the Fair Political Practices Commission (FPPC) free online Ethics Training Course which is available again this year. The FPPC website is <http://www.fppc.ca.gov/index.php>.

This year District staff suggest to use legal counsel to conduct the training. This will provide an opportunity to become more familiar with legal counsel staff as the senior attorney in the firm transitions to a role with less frequent interaction with Board and staff.

A proposal for training is attached.

Options for the special meeting to conduct the training are:

1. An afternoon meeting on Tuesday, January 28th
2. An afternoon meeting on Tuesday, February 9th
3. An afternoon meeting on Tuesday, February 23rd

Recommendation:

Board select a day and time to receive ethics training from District legal counsel.

Chris DeGabriele

From: Katie Young
Sent: Monday, December 28, 2015 11:14 AM
To: Chris DeGabriele
Subject: FW: AB 1234 Ethics Training

From: Carl Nelson [<mailto:CNelson@bpmnj.com>]
Sent: Friday, December 18, 2015 5:38 PM
To: Katie Young
Cc: Robert Maddow; Doug Coty; Mike Nelson
Subject: AB 1234 Ethics Training

Katie-

Bob asked me to send you a brief proposal for our firm to conduct the Ethics Training required by AB 1234.

We understand that this training is anticipated to occur at a Special Meeting of the Board to be scheduled in late January 2016.

Depending upon availability, we propose to have Doug Coty and Michael Nelson provide the training, which is required to be 2 hours in duration. Doug has provided Ethics Training programs, typically with Carl Nelson; Michael Nelson has been very involved in the preparation of such programs, mostly in the form of ensuring that all necessary updates were incorporated into the materials.

We would propose to use PowerPoint materials and a brief written handout that provides sources for additional information on some of the most important subject areas, both of which we would adapt and update from prior presentations to minimize costs.

Our proposed budget is \$2,520, based on 12 hours of billable effort at a blended 2016 rate of \$210 per hour.

A very brief outline of the subject areas appears below. Should there be interest in proceeding, we can "flesh it out" as desired. The five general required subject matter areas are listed below, and the most important laws that would be covered in the training are identified in the appropriate subject matter area(s). Our presentation includes numerous examples to help bring the subject matter "to life."

- I. Personal Financial Gain
 - A. Bribery
 - B. Conflicts of Interest
 - 1. Political Reform Act & FPPC regulations (financial interests impacted by decision-making, campaign contributions)
 - 2. Government Code section 1090 (financial interest in contracts)
 - C. Post-Employment Laws
- II. Perquisites of Office
 - A. Gifts (Political Reform Act)
 - B. Honoraria (Political Reform Act)
 - C. Misuse of Public Funds/Resources (California Constitution)

- D. Gifts of Public Funds (California Constitution)
- E. Mass Mailings (Political Reform Act)
- F. Free Travel (California Constitution)

III. Transparency Laws

- A. Disclosure of Financial Interests (Form 700-Political Reform Act)
- B. Brown Act
- C. Public Records Act

IV. Fair Process Laws

- A. Common Law Bias (caselaw)
- B. Due Process (United States & California Constitution)
- C. Incompatible Offices (Government Code section 1099)
- D. Competitive Bidding (Public Contract Code)
- E. Anti-Nepotism Laws (Government Code section 1090 & following)

V. General Ethics Principles (Going Beyond the Law)

- A. What is the Right Thing to Do?)
- B. Will a Lawful Action Have an Appearance of Impropriety

Carl

Carl P. A. Nelson
Bold, Polisner, Maddow, Nelson & Judson, PC
500 Ygnacio Valley Road, Suite 325
Walnut Creek, CA 94596
(925) 933-7777 (office)
(925) 933-7804 (fax)

From: Robert Maddow
Sent: Tuesday, December 08, 2015 10:04 PM
To: Katie Young
Cc: Carl Nelson; Doug Coty; Mike Nelson
Subject: RE: Ethics Training

Katie – Yes – we can assist in any way that the District wants. Please give me a call on Wednesday to discuss this for a few minutes. I have a conf call that will keep me busy from 8:15 till probably 10:00 am, but I am pretty free the rest of the day.

Bob Maddow

From: Katie Young [<mailto:kyoung@nmwd.com>]
Sent: Tuesday, December 08, 2015 10:17 AM
To: Robert Maddow
Subject: Ethics Training

Good morning Bob,
Chris would like me to check in with you to see if we can set up a time/date in the New Year in order to complete Ethics Training in house with the Board and staff. Any ideas??

Katie Young
District Secretary

10

MEMORANDUM

To: Board of Directors

December 31, 2015

From: Chris DeGabriele, General Manager

LD

Subj: NMWD Comments on Coastal Multi-Species Recovery Plan – Public Draft

t:\gm\nmfs steelhead recovery plan\nmwd comments bod memo.docx

RECOMMENDED ACTION: Board authorize General Manager to submit comments on the Coastal Multi-Species Recovery Plan to NOAA Fisheries Recovery Team

FINANCIAL IMPACT: None at this time (Board did approve \$5,000 for fishery consultant assistance)

Attached please find the District's comments on the subject recovery plan, principally for steelhead in Novato Creek. The recovery plan is a voluminous document covering Chinook salmon and steelhead trout from the Oregon border to Santa Cruz, including streams tributary to San Francisco Bay. I have included in your board packet the Executive Summary of the plan along with excerpts from Volume 1, pertaining to issues we are concerned with on Novato Creek. Also attached is the excerpt from Volume IV, including a map of Novato Creek with the steelhead intrinsic potential identified, a write up of Novato Creek and the listing of recovery actions. More information can be found at www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/north_central_california_coast/north_central_california_coast_salmon_recovery_domain.html

I have had the opportunity to comment on the recovery plan twice previously as signatory to the Statement of Understanding for Recovery Planning Partnership. Many of my comments herein are consistent with those made previously. However they have been edited, embellished and guided by fishery consultants we have recently hired to aid in this effort, Jean Baldrige from CARDNO Associates and Bill Hearn from Hearn Consulting and formerly a NMFS senior staff member in their Santa Rosa office.

RECOMMENDED ACTION:

Board authorize General Manager to send the comments on the Coastal Multi-Species Recovery Plan to NOAA Fisheries recovery team.

DRAFT

WCR_CMSRecoveryPlan.Comments@NOAA.gov

November 18, 2015

NOAA Fisheries Recovery Team
777 Sonoma Ave. Room #325
Santa Rosa, CA 95404

Re: NMWD Comments on Coastal Multispecies Recovery Plan – Public Draft

Dear Recovery Team:

Attached please find North Marin Water District (NMWD) comments on the subject Coastal Multi-Species Recovery Plan (Plan). We appreciate the opportunity to comment and are especially grateful for the time extension to submit comments. The time extension enabled NMWD to hire a fisheries consultant and develop what we hope are both pertinent and constructive comments on the subject plan. NMWD's comments are specific to northern California Steelhead primarily in the Coastal San Francisco Bay Diversity Strata and Novato Creek.

1. Volume I, Table 24, pages 147-149 - Coastal San Francisco Bay Spawner

Spawner Densities in the Coastal San Francisco Bay Diversity Strata average 32.74 per IPkm. Functionally independent and potentially independent populations Spawner Densities listed in this diversity strata average 37.9 including:

Corte Madera Creek – 39.5

Guadalupe River – 35.2

Novato Creek – 38.2

San Francisquito Creek – 37.3

Stevens Creek – 39.1

These are the highest Spawner Densities of all the diversity strata and do not appear reasonable when compared to adjacent streams (Petaluma River - 33.2,

Sonoma Creek - 24.3) and other less urbanized streams in the vicinity which have much more viable populations (Upper Russian River - 20, Dry Creek - 26.1, Walker Creek - 32, Lagunitas Creek - 30.4). Spawner Density ranges from 20-40 per IPkm dependent on the watershed size to yield density based criteria representing low risk and all watersheds with stream reaches of viable IPkm greater than 16 are deemed independent. NMWD requests NMFS compare these densities to population data available in non-listed steelhead streams of similar size in Washington and Oregon to confirm that they are indeed reasonable for Novato Creek.

For Novato Creek, (Volume IV page 625), Action 10 NvC-CCS-5.1.1.2 states: "Evaluate the feasibility and benefit of providing passage (both adult immigration and adult/smolt emigration) to the stream reaches located upstream of Stafford Dam and the dams of the Marin County Club property."

Action ID NvC-CCS-5.1.1.3 states: "If deemed feasible and beneficial, evaluate and prescribe volitional and non-volitional passage methodologies at Stafford Dam and the dams on the Marin County Club property." The recovery plan suggests that because of its small size, Novato Creek would likely need to support near optimal production of steelhead throughout most of its historic Intrinsic Potential habitat, including segments upstream of Stafford Dam, in order to support a viable, potentially independent population. In mid December 2015 field reconnaissance of the Novato Creek main stem, both upstream and downstream of Stafford Dam, was undertaken by a team of biologists (Cardno and Bill Hearn Consulting) to make a preliminary assessment of the steelhead habitat. That reconnaissance investigation identifies that at present, Novato Creek primarily provides highly degraded steelhead spawning and rearing habitat both upstream and downstream of Stafford Dam. Furthermore, upstream of

Stafford dam, available juvenile rearing habitat is probably negligible in most years during summer and fall months. Indeed, there is probably no surface flow in this segment during most summers. Therefore, benefits of a fish passage facility at Stafford Dam would be negligible unless the habitat features of the creek upstream of the dam were very greatly enhanced during summer and fall months. Moreover, even if the segment upstream of the dam supported high quality spawning and summer rearing habitat throughout areas identified as Intrinsic Potential habitat, the production of steelhead in this upper segment would not approach the target numbers required to establish a potentially independent population of steelhead in Novato Creek. For that, very extensive, additional habitat restoration would need to be done in Novato Creek and its major tributaries located downstream of Stafford Dam.

NMWD has recently reviewed the February 1949 Clyde C. Kennedy Report on Development of Water Supply for North Marin County Water District which includes rainfall and runoff data in the Novato Creek basin prior to construction of Stafford Dam (excerpt included as Attachment 1). The rainfall data is from four gaging stations, three of which are private and one installed by the U.S. Engineers and subsequently taken over by the U.S. Geological Survey. From the records of these four gages normal seasonal precipitation over the Basin has been estimated at 28 inches. These records also indicate that the lowest amount of rainfall occurred in 1930-31 during which year there was a total of 13.31 inches. During the year 1940-41 a high in excess of 50 inches was reported. Additionally Annual Runoff is calculated for years 1924-25 through 1947-48 using measured flows recorded at the U.S. Engineers and U.S. Geological Survey together with rainfall data recorded at different gaging stations. This data shows that in 7 of the 24 years (nearly 1 in every 3 years),

annual runoff at the Stafford Dam location is less than 1,000 acre feet, and the lowest annual runoff, in 1930-31 totaled only 180 acre feet at that location. This evidence substantiates that the Novato Creek watershed is very dry and likely had many years with ephemeral stream flow and poor conditions for steelhead.

NMWD will work with NMFS and other agencies to evaluate passage feasibility above Stafford Dam. However, if passage is not feasible NMWD requests this IPkm above Stafford Dam be removed from the Novato Creek total and the Spawner Abundance target be adjusted to reflect potential habitat downstream of Stafford Dam only.

2. Volume I, Table 29, page 166 – Priorities for Monitoring Populations throughout the CCC Steelhead DPS for Coastal San Francisco Bay Diversity Strata.

Footnote 26 states "...priority A and B locations are preferred areas for life cycle station monitoring to inform progress toward meeting recovery plan biological viability criteria. Adult monitoring in Priority C and D areas would inform progress toward meeting viability criteria for essential populations and adult or juvenile monitoring in supporting populations would inform progress toward meeting recovery plan occupancy and connectivity criteria."

Volume I, Page 158, states: "Currently, the CMP (California Coastal Monitoring Program) is limited in scope and funding; thus, obtaining data from other monitoring and research activities may be used to augment NOAA's required 5-year status reviews and assessment on the status and trends of populations, habitats, recovery action implementation, and the federal listing factors and threats."

NMWD asks that the final recovery plan clarify funding requirements or liabilities of NMWD and others for such monitoring.

3. **Volume I, Table 32, page 178 CCC Steelhead in the Coastal SF Bay Diversity Stratum CCC Steelhead DPS Annual Spawning Ground Survey Cost Estimates** - The Table asterisk (*) includes IPkm currently inaccessible to Steelhead due to dams; assumes passage in the future Novato Creek monitoring estimated at \$11,480 per year with 9.8IPkm above the dam, while Corte Madera Creek monitoring at \$7,920 and no monitoring above the dam.

When and where monitoring above dams is required appears to be applied inconsistently and should be clarified.

4. **Volume I, page 210, Section 7 (A)(1) – To Aid in the Development of Conservation Programs NMFS will:** “Support the establishment of conservation bank sites that will protect and restore habitat and provide credits as compensation for unavoidable impacts from actions that may affect salmonids.” NMWD supports Sonoma County Water Agency work in Dry Creek, both financially and politically, and suggests this support be credited as equivalent to a conservation bank site toward impacts on Novato Creek.
5. **Volume IV, Central California Coast Steelhead – Actions required for passage above dams in the Coastal SF Bay Diversity Stratum are inconsistent between the various watersheds. See the Attachment 2 table for Name of Creek, Action ID and Action Description. NMWD recommends that, where appropriate, passage related actions should be consistent to “evaluate the feasibility and benefit of providing passage to stream reaches located upstream of dams, and if deemed feasible and beneficial evaluate and prescribe volitional and non-volitional passage methodologies or support establishment of conservation bank sites that will protect and restore habitat and provide credits as compensation for unavoidable impacts.”**
6. **Volume V, Appendix B, page 162, Appendix C, Biological Viability Report,**

spence et al. (2008) and spence et al. (2012), Discussion of Density Criteria and their Application - At the November 3, 2015 Public Workshop held in Oakland, Joyce Ambrosius stated that “Each diversity strata within an ESU must meet the Spawner Abundance Target for delisting.” However the above referenced Appendix B states “the TRT has offered its best recommendations regarding recovery criteria with full acknowledgement that they should be considered preliminary and subject to change on a population by population basis if credible evidence suggests that they are too conservative or not conservative enough. However, the reality is that the vast majority of independent populations within the NCCC recovery domain are so far from reaching the proposed targets that resolving whether a recovery target should be 2,000 or 3,000 fish does little to advance recovery planning. Regardless of the specific targets, the critical actions needed for recovery will, in the majority of cases, be the same. Should we ever get to the point where (a) we have sufficient data to estimate population abundances with reasonable precision, and (b) we begin to approach the proposed viability targets, the questions about the uncertainties can and undoubtedly will be reassessed.”

Due to the limited information available in the Novato Creek watershed regarding the creek’s potential to support a viable potentially independent steelhead population, NMWD strongly questions the appropriateness of the Spawner Abundance target established for Novato Creek at this time.

7. **Volume V, Appendix G, page 3 – Assessment of Dams** “In general IPkm upstream of large impassable dams were removed from consideration in most populations. However, for populations within the two San Francisco Bay diversity strata, the currently accessible IPkm would not yield the density-based abundance targets required to meet the minimum biological viability criteria in

Spence et al. (2008) and spence et al. (2012)."

This conflicts directly with Appendix B, see Comment #7, and Appendix G, Table 3 (page 9 & 10 for Walker Creek and Lagunitas Creek, which notes are not consistent with the actions listed in Volume V for Walker Creek and Lagunitas Creek). Additionally Appendix C, Table 7, page 42 ranks Corte Madera Creek and Novato Creek #1 and #2 respectively in current vulnerability and overall vulnerability due to climate change. See NMWD comment #5.

8. **Volume V, Appendix G, Table 3, page 11** – Novato Creek "...9 IP-km removed as not viable habitat (Tidal) (SOU); 6.1 IP-km added back as viable habitat (SOU)."

The annotation in this table for Novato Creek is incomprehensible. It should be made arithmetically transparent. There is no explanation as to why 6.1 km is added back in. How is the "Current" 24.5 IPkm derived; why is IP with Passage above the dam 8.6 IPkm more than Current IPkm, when the text suggests 9.8 IPkm above Stafford Dam?

9. **Volume IV, CCC Steelhead, page 184 Map & 196** – NMWD notes IP above Nicasio, Peters, Alpine, BonTempe, Lagunitas and Hagmaier Dams is not included for passage above these barriers; yet without explanation, it is retained above Stafford Dam (see NMWD Comment #5).

10. **Volume IV, CCC Steelhead, page 206, Action ID LaC-CCCS-25.1.2.3** – Discourage the proposed water diversion through Groundwater Well by North Marin Water District which could adversely affect stream flows.

NMWD objects to this Action Step and requests it be removed from the Plan. NMWD holds water rights at existing permitted points of diversion for wells to divert water from Lagunitas Creek, a fully appropriated, flow regulated stream, to serve the West Marin county communities of Point Reyes Station, Olema, Bear

Valley, Inverness Park and Paradise Ranch Estates. NMWD's wells are located near the U.S. Coast Guard Housing Facility in Point Reyes Station and at the Gallagher Ranch. The USCG Point Reyes wells are subject to periodic salinity intrusion due to the tidal action from the adjacent Tomales Bay, and which will be exacerbated with future sea level rise. The Gallagher well is above the tidal reach and water diverted there does not experience salinity intrusion. An additional point of diversion outside the Lagunitas Creek stream reach subject to tidal action will be required in the future to address sea level rise.

NMWD participated in the Lagunitas Creek Water Rights proceedings now stipulated in State Water Resources Control Board Order 95-17; holds Pre-1914 water right (SWRCB S-8763, 1844 date of priority), licensed senior water right (SWRCB L-4324B, 1950 date of priority) and permitted water rights (SWRCB P-19724 & P-19725, 1976 date of priority) to divert water from Lagunitas Creek. NMWD's permits are conditioned on year type and the license is restricted if the only flow in Lagunitas Creek is comprised of water released for purpose of preserving or enhancing fish and wildlife resources in the water. Marin Municipal Water District, not NMWD, has storage on Lagunitas Creek and maintains the ability and obligation to maintain flows in Lagunitas Creek pursuant to SWRCB 95-17.

11. **Volume IV, Steelhead Abundance and Distribution, page 599** –
References to Rich 1997, Fawcett Environmental Consulting 2000, Fawcett Environmental Consulting 2006, and Fawcett Environmental Consulting 2009 are permit related reports on fish in the vicinity of flood control construction projects and are not useful for documenting the "distribution and abundance" of steelhead in Novato Creek. NMFS response to NMWD's comment about the insignificance of these data (i.e., "Listed in Lit Cited, described as "limited"... may be best

available data,") only confirms that there is little biological information on existing steelhead population in Novato Creek. The first priority for recovery should be improving the biological information to determine what can and should be done to improve conditions.

12. **Volume IV, Recovery Actions, page 623-635** - The abbreviation for North Marin Water District is incorrect (NBWD) throughout. It should be abbreviated NMWD. NMFS response to comments that "Revised text" is incorrect.
13. **Volume IV, General Recovery Strategy, page 610-** The General Recovery Strategy to improve conditions may be worthwhile, but there is little biological information on the existing steelhead population in Novato Creek and what can and should be targeted to improve those conditions for continued survival. It seems that should be a priority strategy to assist recovery. NMFS response to comments that "Made minor revision to include, identify and target habitat constraints" is unsatisfactory.
14. **Volume IV, Map, page 614** – The Novato Creek Map showing Potential Habitat used to derive Population Abundance Targets overstates the streams where water is present during all months of the year to support all life stages of Steelhead trout. See comment #1 with reference to 1949 Report on Development of Water Supply for the North Marin County Water District (Attachment #1).
15. **Volume IV, Recovery Actions, page 623-635** – NMWD notes that the table includes 17 Objectives, 47 Recovery Actions, and 129 Action Steps, 4 of which are Priority 1, 31 of which are Priority 2 with the remainder Priority 3. The extensive listing makes it difficult to determine the realistic priorities for Steelhead recovery in Novato Creek. NMFS response to comments that "Reviewed action steps and modified some priority numbers. Add text in mini

methods for each profile of how priorities were made” does not provide realistic guidance.

16. **Volume IV, Novato Creek, CCC Steelhead Recovery Actions NVC-CCCS-3.1.2.5, page 625** – NMWD currently operates conjunctively by utilizing Russian River water supply and local recycled water supplies. Remove NMWD as a Recovery Partner from this action because NMWD already undertakes this action.
17. **Volume IV, Recovery Actions, page 623-635** – Most of the “Targeted Attribute or Threat” incorrectly identifies NMWD (NBWD [sic]) as a Recovery Partner when NMWD has no jurisdiction, property or responsibility to implement said action. Those actions are listed as follows: NVC-CCCS-1.1.3.4, 2.1.1.1, 2.1.2.1-4, 5.1.1.1, 6.1.2.1 & 2, 6.1.3.1.2, 6.1.4.1, 8.1.2.1-4, 10.1.1.1-3, 10.1.2.1-3, 12.1.1.1 & 2, 12.1.3.1, 12.1.6.1, 13.1.2.1 & 3, 13.1.3.1 & 2, 21.1.1.1-3, 21.1.2.1 & 2, 21.1.1.2 & 3, 22.1.3.1-3, 22.1.4.1-3, 22.1.6.1, 23.1.3.1-4. Please remove NMWD as a Recovery Partner for these items.
18. **Volume IV, Recovery Actions, page 623-635** – Even those “Targeted Attribute or Threat” where NMWD can respond to an Action Step are limited. Since NMWD’s property is limited, its ability to improve streamflow is limited to the main stem of Novato Creek below Stafford Dam and by the volume of water available. These actions are listed as follows: NVC-CCCS-3.1.1.1 & 2, 3.1.2.1, 3 & 4, 5.1.1.2 & 3, 6.1.1.1-4, 7.1.1.1-4, 8.1.1.1-3, 10.1.1.4 & 5, 11.1.1.1-7, 22.1.5.1 & 2. Please remove NMWD as a Recovery Partner for these items.

Thank you for the opportunity to participate in this important process as an SOU partner and in commenting on this public draft. NMWD appreciates the attention NMFS staff has provided us to date and look forward to future opportunities in addressing steelhead

recovery in Novato Creek.

Sincerely,

Chris DeGabriele
General Manager

Enclosures

CC:

Jean Baldrige, Cardno Associates

Bill Hearn, Bill Hearn Consulting

CD/kly

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REPORT ON

DEVELOPMENT OF WATER SUPPLY

FOR THE

NORTH MARIN COUNTY

WATER DISTRICT

ENGINEERING OFFICE

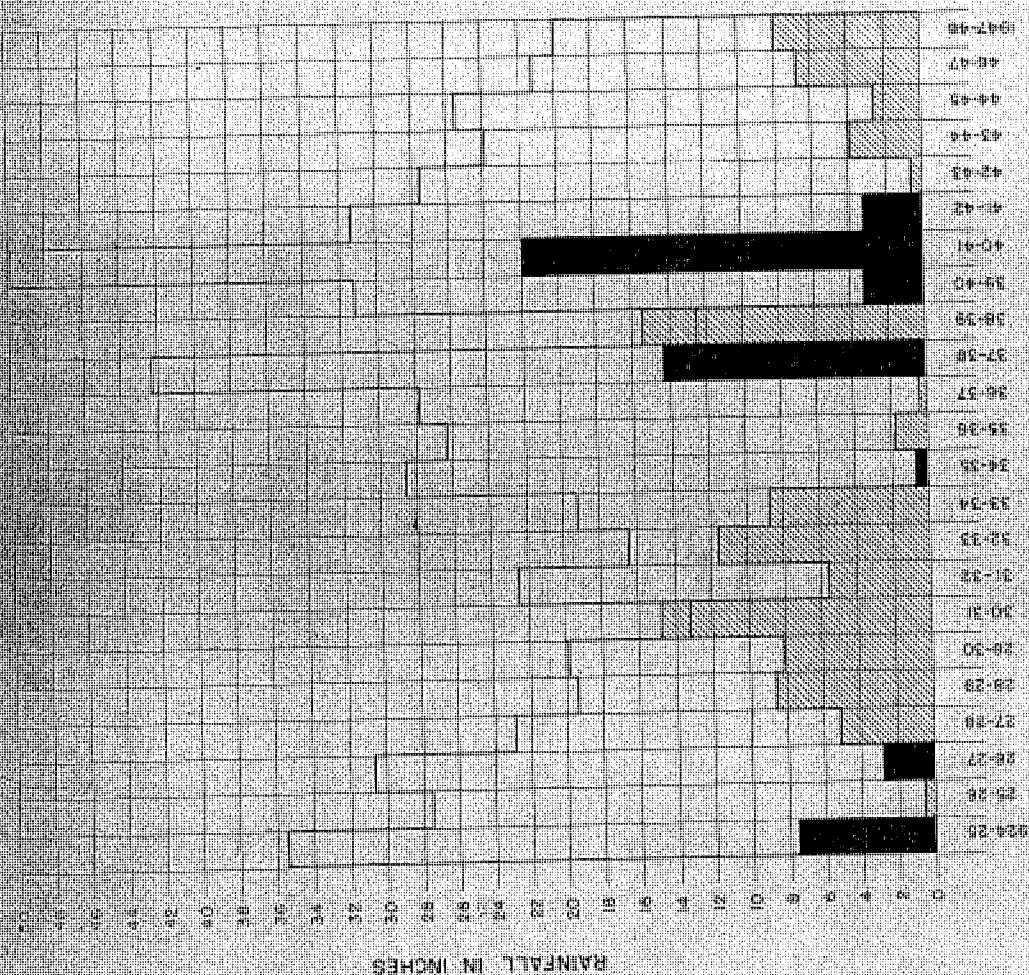
OF

CLYDE G. KENNEDY

FEBRUARY 1966

PLATE NO. 3

LEGEND
 TOTAL ANNUAL RAINFALL
 INCHES ABOVE NORMAL
 INCHES BELOW NORMAL



TO ACCOMPANY
 REPORT ON
 DEVELOPMENT OF WATER SUPPLY
 FOR THE
 NORTH MARIN COUNTY
 WATER DISTRICT
 ANNUAL RAINFALL
 IN
 NOVATO BASIN

ENGINEERING OFFICE OF CLARE O. KENNEDY

6

REQUIREMENTS AFFECTING DAM SITES

Consideration of underground water sources together with present and future demands, previously discussed, makes it apparent that provision must be made for storage, to make certain a sustained yield of 3 million gallons per day. To provide this storage a dam must be built at some point behind which the required quantity of water might be impounded. In order to select a proper site various factors had to be canvassed. At each possible site it was necessary to determine the water shed area tributary to the site, maximum practicable storage capacity, geological factors, type and size dam required and economic feasibility.

RAINFALL

Rainfall data has been accumulated from four gaging stations, three of which are private and one of which was installed by the U. S. Engineers and subsequently taken over by the U. S. Geological Survey. From the records of these four gages normal seasonal precipitation over the Basin has been estimated at 28 inches. These records also indicate that the lowest amount of rainfall occurred in 1930-31 during which year there was a total of 13.31 inches. During the year 1940-41 a high in excess of 50 inches was reported.

RUNOFF OF NOVATO CREEK AT SIMMONS LANE

The total drainage area contributing to flow at Novato Creek and Simmons Lane is approximately 17.4 square miles. From measured flows recorded by the U. S. Engineers in 1944 and 1945 and the U. S. Geological Survey in 1946, 1947 and 1948, together with rainfall data recorded at different gaging stations by John Burkman, J. A. Brandt, W. O. Wright and the U. S. Engineers Table IV has been compiled showing the runoff in acre feet for successive years.

TABLE IVANNUAL RUNOFF - NOVATO CREEK AND SIMMONS LANE - DRAINAGE AREA = 17.4 SQ MI

| <u>Year</u> | <u>Runoff in Acre Feet</u> |
|-------------|----------------------------|
| 1924-25 | 7590 |
| 1925-26 | 7590 |
| 1926-27 | 12890 |
| 1927-28 | 6360 |
| 1928-29 | 940 |
| 1929-30 | 5760 |
| 1930-31 | 370 |
| 1931-32 | 5370 |
| 1932-33 | 1520 |
| 1933-34 | 1910 |
| 1934-35 | 8090 |
| 1935-36 | 8570 |
| 1936-37 | 6510 |
| 1937-38 | 20530 |
| 1938-39 | 480 |
| 1939-40 | 15620 |
| 1940-41 | 26000 |
| 1941-42 | 18490 |
| 1942-43 | 7970 |
| 1943-44 | 6190 |
| 1944-45 | 4410 |
| 1945-46 | 9570 |
| 1946-47 | 1890 |
| 1947-48 | 1025 |

NOVATO CREEK

Two sites on Novato Creek were first investigated. One site was located east of Bowman Canyon and the other between Bowman Canyon and Burdell School. Field inspections were made of these sites and it was concluded that neither one was suitable for dam construction. However, a site above Burdell School was inspected and considered suitable. Subsequent investigations bore out this consideration.

The north abutment rises rather steeply for the first 100 feet, more or less. Franciscan sandstone and chert outcrop all along this abutment and is generally covered by 2 feet to 5 feet of overburden consisting of clay silt with much angular gravelly material.

The floor of the valley is approximately 400 feet wide and slopes gently from the north abutment to Novato Creek which is adjacent to the toe of the south abutment.

Franciscan sandstone and chert occur frequently in the alluvium at the south abutment and the overburden varies from 10 feet to 20 feet in depth. The lower portion of this abutment has a small talus slope of rubble at its base which must be removed.

The drainage area tributary to this site is 8.38 square miles. It has been previously stated that the total drainage area contributing to flow at Novato Creek and Simmons Lane is 17.4 square miles. The runoff at the dam site has been computed by applying a straight area ratio. The annual runoff for successive periods from 1925 to 1948 is shown in Table VII.

TABLE VIIANNUAL RUNOFF - NOVATO CREEK DAM SITE

| <u>Year</u> | <u>Runoff in Acre Feet</u> |
|-------------|----------------------------|
| 1924-25 | 3650 |
| 1925-26 | 3650 |
| 1926-27 | 6200 |
| 1927-28 | 3060 |
| 1928-29 | 450 |
| 1929-30 | 2770 |
| 1930-31 | 180 |
| 1931-32 | 2580 |
| 1932-33 | 730 |
| 1933-34 | 920 |
| 1934-35 | 3890 |
| 1935-36 | 4120 |
| 1936-37 | 3130 |
| 1937-38 | 9870 |
| 1938-39 | 230 |
| 1939-40 | 7510 |
| 1940-41 | 12500 |
| 1941-42 | 8890 |
| 1942-43 | 3830 |
| 1943-44 | 2980 |
| 1944-45 | 2120 |
| 1945-46 | 4600 |
| 1946-47 | 909 |
| 1947-48 | 500 |

Multi-Species Recovery Plan Creeks

| <u>Name of Creek</u> | <u>Action ID</u> | <u>Action Description</u> |
|----------------------------------|--------------------|---|
| Novato Creek | NvC-CCCs-5.1.1.2 | Evaluate the feasibility and benefit of providing passage (both adult immigration and adult/smolt emigration) to the stream reaches located upstream of Stafford Dam and the dams on the Marin County Club property. |
| | NvC-CCCS-5.1.1.3 | If deemed feasible and beneficial, evaluate and prescribe volitional and non-volitional passage methodologies at Stafford Dam and the dams on the Marin County Club property. |
| Corte Madera Creek | CMC-CCCS-5.1.1.2 | Evaluate and prescribe volitional and non-volitional passage methodologies for all dams in the watershed, including Phoenix Lake on Ross Creek. |
| Miller Creek | MiC-CCCS-5.1.1.2 | Modify or remove passage impediments |
| Guadalupe River | GudR-CCCS-5.1.1.4 | Perform passage feasibility study specific to each dam and reservoir. Almaden Reservoir on Alamos Creek is of highest priority for this action in this watershed. Include water system uses, reservoir operations, and both adult immigration and adult/smolt emigration passage requirements. See HDR's field report prepared for the Santa Clara Valley Water District (HDR 2010) for initial reconnaissance efforts. |
| | | Coordinate with NMFS. |
| Stevens Creek | StC-CCCS-5.1.1.4 | Perform a passage feasibility study specific to Stevens Creek Reservoir. See HDR's field report prepared for the Santa Clara Valley Water District (HDR 2010) for initial reconnaissance efforts. Include water system uses and reservoir operations in this assessment. Include both adult immigration and adult/smolt emigration passage requirements. |
| | | Develop and implement a plan to provide steelhead passage at Searsville Dam. Passage at Searsville Dam will open a large percentage of the watershed to steelhead. Areas of the watershed above the dam remain in relatively good condition for steelhead and passage at the dam is a key action for recovering the species in San Francisquito Creek. |
| San Francisquito Creek | SFC-CCCS-5.1.1.2 | |
| San Mateo Creek | SMatC-CCCS-5.1.1.1 | Evaluate and if deemed biologically beneficial, and technically feasible, prescribe and implement passage methodologies for Crystal Springs reservoir. |
| Arroyo Corte Madera Del Presidio | | |

t:\gm\nmfs steelhead recovery plan\[nmfs multispecies creek table.xlsx]sheet1

Coastal Multispecies Recovery Plan

NORTH CENTRAL CALIFORNIA COAST RECOVERY DOMAIN

CALIFORNIA COASTAL CHINOOK SALMON

NORTHERN CALIFORNIA STEELHEAD

CENTRAL CALIFORNIA COAST STEELHEAD

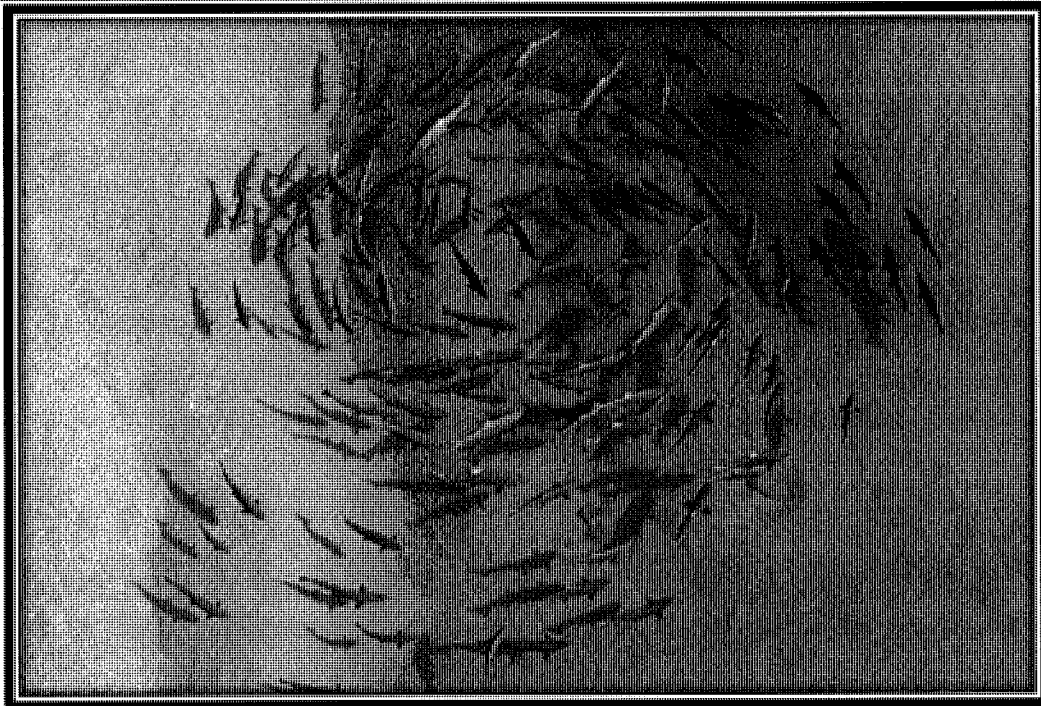


Photo Courtesy of Cathy Myers, Dos Rios, Eel River California Coastal Chinook Salmon

PUBLIC DRAFT

Version: October 2015

National Marine Fisheries Service

West Coast Region

Santa Rosa, California



DISCLAIMER

Recovery plans delineate such reasonable actions as may be necessary, based upon the best scientific and commercial data available, for the conservation and survival of listed species. Plans are published by the National Marine Fisheries Service (NMFS), sometimes prepared with the assistance of recovery teams, contractors, State agencies, and others. Recovery plans do not necessarily represent the views, official positions or approval of any individuals or agencies involved in the plan formulation, other than NMFS. They represent the official position of NMFS only after they have been signed by the Assistant or Regional Administrator. Recovery plans are guidance and planning documents only; identification of an action to be implemented by any public or private party does not create a legal obligation beyond existing legal requirements. Nothing in this plan should be construed as a commitment or requirement that any Federal agency obligate or pay funds in any one fiscal year in excess of appropriations made by Congress for that fiscal year in contravention of the Anti-Deficiency Act, 31 U.S.C 1341, or any other law or regulation. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery actions.

LITERATURE CITATION SHOULD READ AS FOLLOWS:

National Marine Fisheries Service. 2015. Public Draft Coastal Multispecies Recovery Plan. National Marine Fisheries Service, West Coast Region, Santa Rosa, California.

ADDITIONAL COPIES MAY BE OBTAINED FROM:

Attn: Recovery Coordinator
National Marine Fisheries Service
777 Sonoma Avenue, Room 325
Santa Rosa, CA 95404

Or on the web at:

http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/index.html

EXECUTIVE SUMMARY

The California Coastal Multispecies Recovery Plan was developed for three salmon and steelhead species: the California Coastal (CC) Chinook salmon Evolutionarily Significant Unit (ESU), and the Northern California (NC) and Central California Coast (CCC) steelhead Distinct Population Segments (DPS). Between 1997 and 2000, NOAA's National Marine Fisheries Service (NMFS) listed the CCC steelhead DPS (1997), the CC Chinook ESU (1999), and the NC steelhead DPS (2000), as threatened under the Federal Endangered Species Act (ESA) due to the precipitous and ongoing declines in their populations. Under the ESA, a recovery plan (which is a non-regulatory document) must be developed and implemented for each threatened or endangered species. The purpose of a recovery plan is to provide a framework for the conservation and survival of the listed species [ESA section 4(f)(1)] that focuses and prioritizes threat abatement and restoration actions necessary to recover, and eventually delist, a species.

GEOGRAPHIC SETTING AND BIOLOGICAL FOUNDATION OF THIS RECOVERY PLAN

This recovery plan was developed by the NMFS North Central Coastal Office (NCCO) recovery team with assistance from staff in the North Coast Office (NCO); both offices are located within the California Coastal Office of NMFS' West Coast Region (WCR). This plan covers the geographic area of approximately 8 million acres along California's central coast that extends from the Redwood Creek watershed in Humboldt County, south to the Aptos Creek watershed in Santa Cruz County, including the San Francisco Bay Estuary and its tributaries (except for the Sacramento-San Joaquin rivers) and Humboldt Bay and its tributaries. The diverse geographic setting includes redwood and oak forestlands, rural working forests and agricultural lands, as well as the highly urbanized areas surrounding San Francisco Bay.

The biological setting and foundation for the plan were provided in two technical memoranda prepared by a group of experts and fishery scientists (The Technical Recovery Team or TRT) led by the NMFS Southwest Fisheries Science Center. These memoranda describe each of the species' historical population structure and biological viability and also describe the environmental and

biological settings necessary to reduce the risk of extinction. For each species, individual populations were classified as functionally independent, potentially independent or dependent populations, and the populations were grouped into Diversity Strata, which are geographically distinct areas with similar environmental conditions. Functionally independent populations are larger populations that are likely to persist over a 100-year time scale in isolation and without the influence of migrants from neighboring populations. **Potentially independent populations**, as **those likely to persist over a 100-year time scale but are influenced by immigration from neighboring populations**, and dependent populations are those likely to go extinct within a 100-year time period in isolation and rely on immigration from neighboring populations to persist.

The TRT developed biological viability criteria for the three levels of biological organization (i.e., populations, Diversity Strata, ESU/DPS), important for the long term persistence of salmon and steelhead. These criteria involve a minimum number of populations achieving viability and populations, not required to achieve viability, demonstrating occupancy and distribution patterns to suggest sufficient connectivity within and between populations.

The TRT determined the CC Chinook salmon ESU was historically comprised of 38 populations (32 fall run and 6 spring run) distributed among four Diversity Strata. Of the 32 fall run populations, 15 were considered functionally or potentially independent, and the remaining were considered dependent populations. All six of the spring-run populations in the ESU were considered functionally independent, but all are now considered extinct. For the NC steelhead DPS, the TRT identified a total of 40 historically independent populations (18 functionally and 22 potentially independent) and 10 summer run populations (all functionally independent). The NC steelhead DPS winter run populations were delineated among five Diversity Strata, and the summer run populations were split into two Diversity Strata. For the CCC steelhead DPS, the TRT identified a total of 37 independent winter run populations (10 functionally independent and 27 potentially independent) distributed across five Diversity Strata.

Not all populations are needed for, or capable of supporting, recovery in the ESU or DPS. The recovery team evaluated quantitative and qualitative information provided by a large suite of stakeholders regarding current presence or absence of Chinook salmon and steelhead, habitat suitability, threats likely affecting habitat suitability and current protective efforts ongoing in the watershed. Using this assessment, the NCCO recovery team selected populations from each species and Diversity Stratum that will be essential for their recovery; these are termed essential populations. The remaining populations are expected to play a supporting, although important, role in recovery; these are termed supporting populations. In nearly all cases, essential populations consist of independent populations expected to meet a low risk of extinction, while supporting populations are independent populations expected to meet a moderate risk of extinction and dependent populations. Spawner abundance numeric targets were established for each essential and supporting population, for each Diversity Strata, and for the ESU and DPS.

CHINOOK SALMON AND STEELHEAD LIFE CYCLE

Chinook salmon and steelhead are anadromous (ocean-going) fish and return from the ocean to the streams where they were born to spawn and die. This cycle of life takes them from freshwater to tidal zones to the ocean and back again in as few as three years. Each transition into a new habitat is associated with a different life stage. Salmon and steelhead begin as eggs in stream gravels where their parents spawned, they then emerge from the gravels up into the stream flow as juveniles where they will stay for a few months (some Chinook salmon) or a few years (steelhead) before beginning their downstream migration to the ocean as smolts. As adults, time spent in the ocean usually lasts between one to three years (depending on the species) before they return to the stream where they were born to spawn. Unlike Chinook salmon (and coho salmon), steelhead are iteroparous, meaning some adults do not die after spawning but instead return to the ocean and repeat the adult portion of their lifecycle one or more times.

Juvenile Chinook salmon and steelhead need cool and clean water that flows unimpaired and unconstrained from the headwaters to the ocean. The suitability of a river or stream to provide the necessary habitats for Chinook salmon or steelhead survival at each life stage is critical to

their persistence. This means streams must have: (1) clean loose gravels free of fine sediment; needed for spawning and egg development; (2) adequate pools and natural instream cover for juveniles; (3) connected alcoves and off-channel habitats for juveniles to survive winter flows; (4) clean cool water; and (5) unimpaired passage to and from the ocean. Coastal estuaries, or lagoons, play an equally important role in the life history of Chinook salmon and steelhead because they serve as transitional habitat between life in freshwater and marine environments. Properly functioning estuaries provide highly productive feeding opportunities where rapid growth occurs and where they can acclimate to saltwater prior to entering the ocean; this is particularly important during the smolt life stage for both species.

ASSESSMENT AND PRIORITIZATION

The more impaired a watershed, the less likely juvenile Chinook salmon and steelhead will survive to reach the ocean and return as adults to spawn. The suitability of habitats to provide for salmon and steelhead survival across life stages, and ultimately abundant populations, is inexorably linked to factors that impair these habitats or diminish their ability to support these species (*e.g.*, threats). We evaluated numerous habitat conditions as well as natural and anthropogenic threats to their habitat and survival. Using two different analyses, the NCCO recovery team evaluated these conditions based on the best available information. The larger independent populations were analyzed using the Nature Conservancy Conservation Action Planning (CAP)¹ analysis; these populations are the essential populations. The dependent populations and independent populations expected to achieve a moderate extinction risk were analyzed at the Diversity Stratum scale (not population level) using an abbreviated CAP protocol called the rapid assessment; these are the supporting populations. The rapid assessments utilized a subset of the factors analyzed in the full CAP protocol.

¹ CAP is an Excel-based user-defined tool with specific protocols to organize a project, assess conditions and threats, and identify strategies. See Chapter 4, Methods for more information.

CURRENT STATUS

Low survival of juveniles in freshwater, in combination with poor ocean conditions, has led to the precipitous declines of Chinook salmon and steelhead populations throughout the central and northern California coastal areas. A recent status review for these species concluded that the CC Chinook salmon ESU and both the NC and CCC steelhead DPSs remained threatened (Williams *et al.* 2011). Estimates by researchers and agencies indicate Chinook salmon and steelhead have declined substantially in coastal populations of central and northern California over the past 70 years (*e.g.* Figure 1).

Long time-series of adult return data are extremely scarce and for most populations only estimates based on best professional judgement are available. For steelhead, populations most impacted over the last 70 years are those surrounding San Francisco Bay.

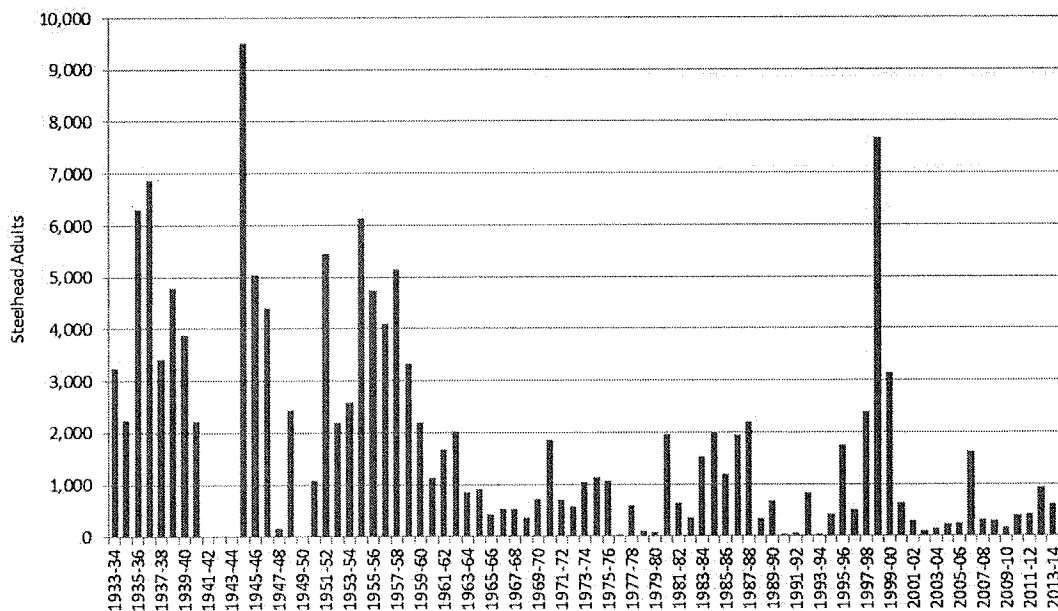


Figure 1: Adult steelhead returns counted at the Van Arsdale Fisheries Station on the Upper Mainstem Eel River, 1933-34 through 2013-2014.

Based on our evaluation of current habitat conditions and ongoing and future threats, we conclude that all life stages of Chinook salmon and steelhead are impaired by degraded habitat conditions. These impairments were due to a lack of complexity and shelter formed by instream wood, high sediment loads, lack of refugia during winter, low summer flows, reduced quality

and extent of coastal estuaries and lagoons, and reduced access to historic spawning and rearing habitat. The major sources of these impairments are roads, water diversions and impoundments, logging, residential and commercial development, severe weather patterns, and channel modification. Comparing results across the ESU and DPSs, patterns emerged. For CC Chinook salmon and NC steelhead, conditions and threats tend to worsen from south to north. This spatial difference is largely attributed to historic and current effects of intensive logging practices on the availability of instream large wood, reduced habitat complexity and shelter, and sediment generated from poor road construction throughout the northern coastal forests of Humboldt and Mendocino counties. For the CCC steelhead DPS, conditions are more degraded in the Santa Cruz Mountain and San Francisco Bay Diversity Stratum populations.

TURNING THE PLAN INTO ACTION

Threat abatement and restoration recommendations (recovery actions) were developed site-specifically and for the ESU/DPS, Diversity Stratum, and population (watershed). Taking focused action equitably across the range is essential for ESU/DPS viability. Actions described in the plan are prioritized as: (1) Priority 1 is an action that must be taken to prevent extinction or to identify those actions necessary to prevent extinction; (2) Priority 2 is an action that must be taken to prevent a significant decline in population numbers, habitat quality, or other significant negative impacts short of extinction; and (3) Priority 3 actions are all other actions necessary to provide for full recovery of the species.

Unlike many other recovery planning efforts in the western United States, few Federal or State lands are available to aid in the recovery this species. The majority of lands in the recovery domain for this plan (approximately 83%) are in private ownership. The primary mechanism for Chinook salmon and steelhead protection on forestlands is California's Forest Practice Rules, while the primary mechanisms of protection from other land uses are more indirect and associated with State regulations, county ordinances, etc. Developing and nurturing partnerships with private landowners, concerned citizens, various State and Federal agencies, and non-governmental organizations is essential. Furthermore, creating incentives and expanding

public/private partnerships for restoration and improving land and water use practices are critical for the recovery of the CC Chinook salmon ESU and the NC and CCC steelhead DPSs.

To track progress towards recovery, we must develop and implement a comprehensive monitoring program that will provide the necessary data to inform species status and trends as well as the five federal listing factors and associated threats (including the adequacy or inadequacy of regulatory mechanisms). For this, we will rely primarily on the California Coastal Monitoring Plan (CMP), which is a statewide program developed by the California Department of Fish and Wildlife (CDFW) and NMFS to standardize monitoring of coastal populations of anadromous native salmonids and inform recovery, conservation, and management. Currently, the CDFW and NMFS are in the process of developing protocols for measuring habitat conditions in both freshwater and estuarine environments. Dedicated funding necessary to expand and refine the CMP will be critical.

THE PRICE TAG OF CLEAN WATER AND FLOWING STREAMS

The ESA requires recovery plans to include estimates of the time required and the cost to carry out those measures needed to achieve the plan's goals. For this plan, NMFS estimates recovery of the CC Chinook salmon ESU and the NC and CCC steelhead DPSs would take 50 to 100 years and provides costs for known recovery actions. While many other actions (action steps) have been included in this plan, costs for these actions are not fully realized and will depend on further study, local assessments of conditions, development of new technology and methodologies, and the interim response of populations to implementation of other actions; cost estimates for these are "To Be Determined". Although the cost for their recovery will be a significant amount of money, it is important to note the cost for recovery of each species will bring many ancillary benefits to the public as well as other species. For example, once implemented, many of the identified recovery actions described in this plan will also provide direct benefits towards the

recovery of other salmon populations throughout coastal California and vice versa². Therefore, costs of salmonid recovery will be shared among species within the recovery domain.

Healthy salmon and steelhead populations provide significant economic benefits. Entire communities, businesses, jobs and even cultures have been built around the salmon and steelhead of California. Similarly, many communities, businesses and jobs have been lost as wild populations have steadily declined. In other words, unhealthy salmon and steelhead populations signify lost economic opportunities and an unhealthy environment. Investments in watershed restoration projects can promote the economy through the employment of workers, contractors, and consultants, and the expenditure of wages and restoration dollars for the purchase of goods and services. Such investments also provide opportunities for enhanced education and ways of connecting (or reconnecting) younger generations with nature. In addition, viable salmonid populations provide ongoing direct and indirect economic benefits as a resource for fishing, recreation, and tourist-related activities. Every dollar spent on salmon and steelhead recovery will promote local, State, Federal, and tribal economies, and should be viewed as an investment with both societal (*e.g.*, healthy ecosystems and clean rivers where we and our children can swim and play) and economic returns.

RECOVERING SALMON

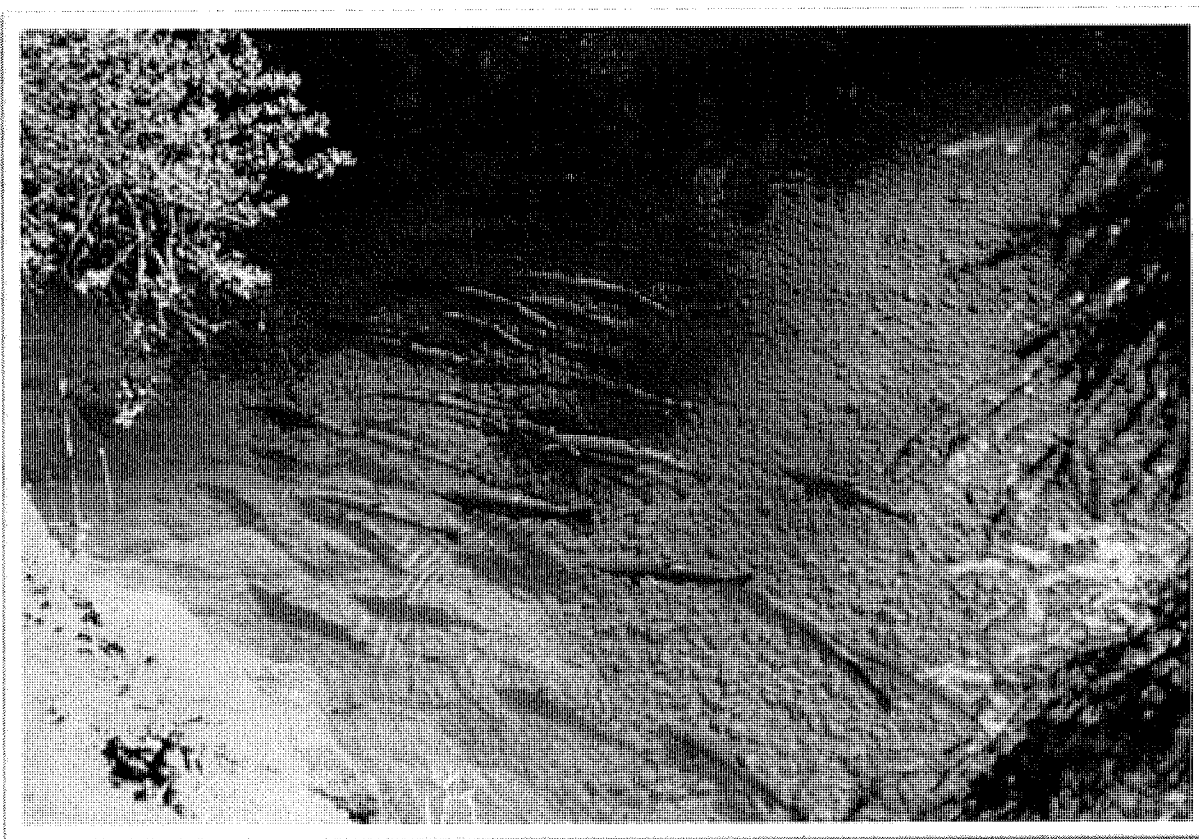
The plight of salmonid species is inexorably tied to the story of the changing landscape. Many naturalists, fishermen and biologists across Europe, Eastern Pacific and North America have monitored salmonids and chronicled their decline and extinctions. NMFS alone cannot shift the trajectory of Chinook salmon and steelhead from their continued decline towards recovery. Their recovery will require a united community forming alliances and strategically implementing

² In 2012 and 2014, the NMFS NCCO and NCO offices finalized the recovery plans for the Central California Coastal (CCC) coho salmon and Southern Oregon Northern California Coast (SONCC) coho salmon ESUs. Both of these ESUs overlap with CC Chinook and either the NC steelhead or CCC steelhead DPSs. This plan includes recovery actions at the three spatial scales that will ultimately benefit all salmonid species present within these populations and similarly, actions identified in the CCC and SONCC coho salmon plans will benefit CC Chinook and either NC or CCC steelhead populations.

recovery actions to this single purpose. Salmon survival will depend on us not regarding “...*this inhabitant of the waters with something like annoyance*” (Fearing 1876), but embracing a paradigm that we can live, work and use the land and water compatibly with the needs of the larger ecological community, including fish.

“...restoring salmon runs will require reshaping our relationship to the landscape, guided by the humility to admit that we do not know how to manufacture, let alone manage, a natural ecosystem...”

David Montgomery 2003



Picture 1: Northern California Steelhead in North Fork Eel River, *Courtesy: Tom Daugherty NOAA Fisheries*

COASTAL MULTISPECIES PLAN

- Volume I: Recovery Plan: Chapters 1 - 8
- Volume II: California Coastal (CC) Chinook Salmon Evolutionarily Significant Unit (ESU)
- Volume III: Northern California (NC) Steelhead Distinct Population Segment (DPS)
- Volume IV: Central California Coast (CCC) Steelhead Distinct Population Segment
- Volume V: Appendices

The recovery plan is organized into five volumes. Volume I details general information on recovery planning, methods, results, actions, criteria, and implementation. Volumes II, III and IV describe CC Chinook, and NC and CCC steelhead, respectively. These volumes describe which essential and supporting populations were selected for recovery, general trends in conditions and threats, priorities for the ESU/DPS, climate change implications, factors leading to decline, status of conservation/protective efforts, recovery actions and delisting criteria. For each population, information is provided on watershed setting, habitat and threat results, and actions required for the populations' recovery. Volume V contains the appendices which include: (1) a discussion of marine and estuarine condition and threats; (2) climate change scenarios; (3) the foundational document on population viability developed by the Technical Recovery Team (TRT) (Spence *et al.* 2008); (4) reports detailing how current conditions and future threats were analyzed; (5) a description of attributes produced by the stream summary application; (6) tables used to estimate costs; and (7) intrinsic potential updates.

COASTAL MULTISPECIES PLAN

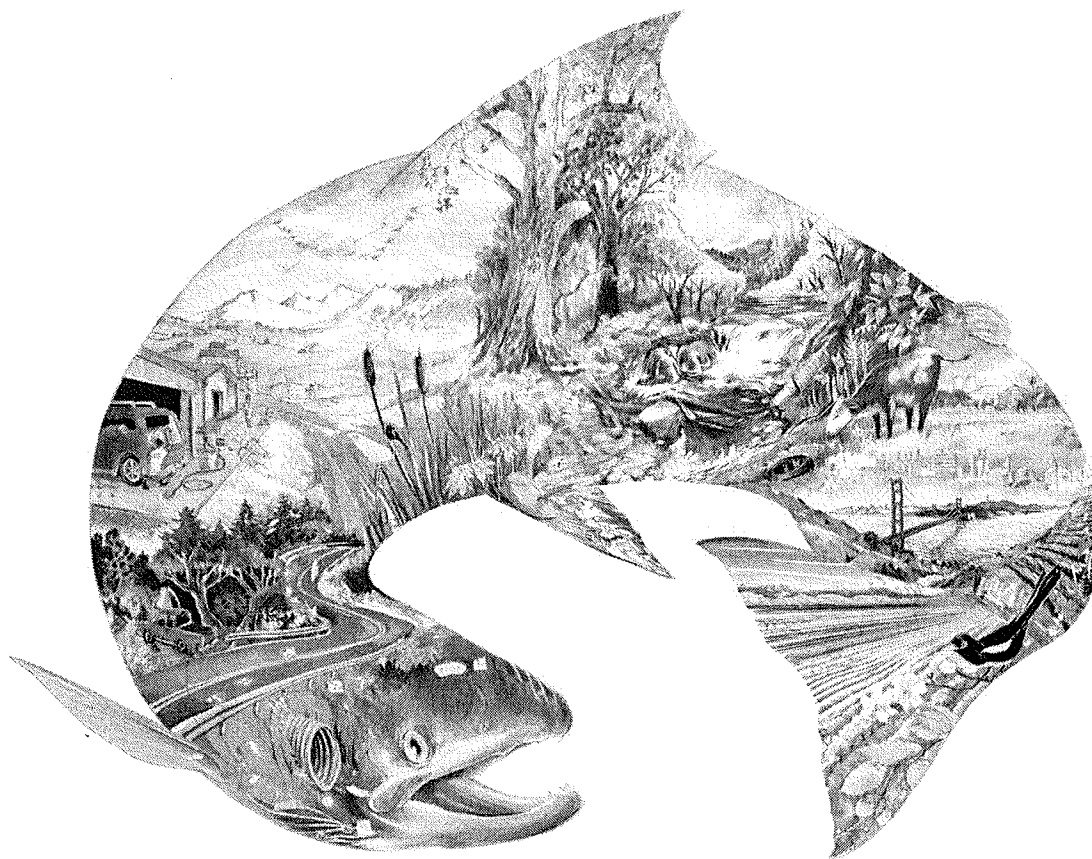


Photo Courtesy: Esteban Camacho Steffensen, NOAA Fisheries, Environmental Protection Agency, and the Pacific Northwest College of Arts

VOLUME I

CHAPTERS 1-8

PUBLIC DRAFT
OCTOBER 2015



ACKNOWLEDGEMENTS

The authors acknowledge and thank the many individuals and organizations who have been vital partners during the development of this public draft recovery plan and on whose partnerships we will depend to recover Northern California steelhead, Central California Coast steelhead, and California Coast Chinook salmon.

First, we thank the North Central California Coast Domain Technical Recovery Team (TRT) for their service in formulating the biological foundations to the recovery plan as outlined in their three NOAA technical memoranda (Bjorkstedt *et al.* 2005; Spence *et al.* 2008; Spence *et al.* 2012). The TRT members were Brian Spence Ph.D., Eric P. Bjorkstedt Ph.D., John Carlos Garza Ph.D., Jerry J. Smith Ph.D., David G. Hankin Ph.D., David Fuller, Weldon E. Jones, Richard Macedo, Thomas H. Williams Ph.D., and Ethan Mora Ph.D. A special recognition goes to Brian Spence and Tommy Williams for their reviews of earlier drafts and providing valuable and prompt feedback to the recovery team's many questions; thank you both.

We appreciate the coordination and collaboration with The California Department of Fish and Wildlife throughout the process; including reviews of earlier drafts, providing data and information used in the plan, and working with us to develop and refine recovery actions.

Many public and private entities have collected watershed and population data, and worked tirelessly to conserve and protect California's salmonids and their habitats. We thank all of you who care about salmonids. The financial support from Sonoma County Water Agency made it possible for us to compile the best available information at a scale and depth unprecedented for the central coast of California. These funds supported work of The Nature Conservancy, the Sonoma Ecology Center, and the exceptional work of the UC Davis Hopland Research staff.

The Nature Conservancy has been a close partner providing extensive training, support, and advice as we applied the Conservation Action Planning tool and protocol which is foundational to our analyses. The Nature Conservancy has also allowed for us to display our Conservation Action Planning tables and associated analysis on Miradi Share³ and outputted and formatted results tables displayed in this recovery plan.

We would like to thank the members of our Statement of Understanding (SOU), which includes; Sonoma County Water Agency, Zone 7 Water Agency, Alameda County Water District, East Bay Municipal Utility District, Contra Costa County Flood Control & Water Conservation District, Santa Clara Valley Water District, Alameda County Flood Control & Water Conservation District, Marin Municipal Water District, North Bay Watershed Association, East Bay Regional Park District, North Marin Water District, Solano County Water Agency, San Mateo County Resource Conservation District, Mendocino County Resource Conservation District, Marin Resource Conservation District, Gold Ridge Resource Conservation District, San Francisquito Creek Joint Powers Authority, Sonoma Resource Conservation District, Contra Costa Resource Conservation District, Resource Conservation District of Santa Cruz County, County of Santa Cruz, Alameda County Resource Conservation District, Marin County Public Works, and San Mateo County Public Works. A special thanks to Carl Morrison who has worked to bring this group together and bring attention to this recovery plan.

We extend sincere and deep appreciation to the vast number of staff in the NMFS West Coast Region's North Central Coast (Santa Rosa) and North Coast (Arcata) Offices who contributed in critical ways such as writing, technical assistance, mapping, graphing, figures, database development, or help on the recovery plan. The support of supervisors and other staff to help relieve workloads and dedicate resources was greatly appreciated. We thank Dan Hytrek, NMFS' General Council and Therese Conant, NMFS' Headquarters for their thoughtful review of this draft.

³ <https://www.miradishare.org/>

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LIST OF ACRONYMS

| | |
|----------|---|
| a.k.a | Also Known As |
| BACI | Before After Control Impact |
| BFW | Bankfull Width |
| BiOp | Biological Opinion |
| BKD | Bacterial kidney disease |
| BLM | Bureau of Land Management |
| BMP | Best Management Practices |
| BRT | Biological Review Team |
| C | Celsius |
| CC | California Coastal |
| CalFire | California Department of Forestry and Fire Protection |
| Caltrans | California Department of Transportation |
| CAP | Conservation Action Planning |
| CIE | Center for Independent Experts |
| CCC | Central California Coast |
| CDFG | California Department of Fish and Game |
| CDFW | California Department of Fish and Wildlife |
| CESA | California Endangered Species Act |
| CFPA | California Forest Practices Act |
| cm | Centimeters |
| CMP | California Coastal Salmonid Monitoring Plan |
| CV | Coefficient of Variation |

3.0 POPULATION STRUCTURE AND VIABILITY

"Our estimates of habitat lost behind barriers include only major obstructions to fish passage and do not factor in the hundreds, if not thousands, of culverts and other smaller barriers that may partially or completely prevent fish passage."

Spence et al. 2008

3.1 INTRODUCTION

The NCCC Domain TRT evaluated the historical structure and developed biological viability criteria that, if met, would indicate the Domain's salmon ESUs and steelhead DPSs are at a low risk of extinction (i.e. viable). The analyses and results of the NCCC Domain TRT are characterized in two NOAA Technical Memoranda (Bjorkstedt *et al.* 2005; Spence *et al.* 2008). In 2012, the SWFSC prepared a memo and report updating the viability criteria for the NCCC Domain steelhead populations (Spence *et al.* 2012). These three documents set the biological foundations to establish recovery criteria for the NCCC Domain recovery plans. This chapter provides a summary of the three memoranda. Appendix C provides Spence *et al.* (2008) and Spence *et al.* (2012).

3.2 SALMONID POPULATIONS

A salmon ESU or steelhead DPS consists of smaller units called populations. Since salmon and steelhead have a high fidelity to return to their natal rivers with some occasional straying into neighboring streams, they share more similar genetic characteristics within and between neighboring streams than those separated by hundreds of miles (Shapovalov and Taft 1954; Quinn 2005; Garza *et al.* 2014). Multiple populations across river systems are connected by a small degree of genetic exchange, which ensures genetic diversity and distribution providing resilience for species' persistence overtime. The CC Chinook ESU and NC and CCC steelhead DPS populations in the NCCC Domain coincide with watersheds or subwatersheds. The risk an ESU or DPS will go extinct is determined by the size, distribution, and viability of populations and the

size and viability of populations are dependent on the survival of individual salmonids across all life stages. The extent and quality of habitats, natural events and anthropogenic factors dictate the survival of salmonids at each life stage.

3.3 HISTORICAL STRUCTURE

Salmonid populations have persisted in great abundance for nearly a million years; their persistence has been contingent on ecological, biological, and evolutionary dynamics across both space and time. These historical conditions under which salmonids have evolved represent a baseline for population structure and viability. As a population departs from its baseline, the risk of extinction rises. To describe these historical conditions in a data poor environment, the TRT: (1) utilized models to predict the intrinsic potential of each watershed to support populations of salmon and steelhead; (2) reviewed historical records on population size and distribution; (3) defined populations and their viability in context to the ESU/DPS; (4) grouped populations into geographical units (*i.e.*, Diversity Strata) within an ESU/DPS; and (5) analyzed genetic structure, historical out-of-basin transfers, and other information (See Bjorkstedt *et al.* 2005). The final information from Bjorkstedt *et al.* (2005) included historical habitats expected to support spawning and juvenile salmonids (*i.e.*, Intrinsic Potential in km), the likelihood of each population to persist in isolation (*e.g.*, independent versus dependent) and the geographic groupings of populations across their range (*i.e.*, Diversity Strata).

3.3.1 INTRINSIC POTENTIAL OF HISTORICAL HABITATS

Salmonid habitats are largely determined by the interactions of landform, lithology, and hydrology. These interactions are relatively constant over long time scales and govern movement of water and deposition of sediment, large wood, and other structural elements along a river network (Agrawal *et al.* 2005). Thus, modeling specific habitat characteristics is often used as a predictor of potential habitats in a watershed. Due to a lack of detailed population data and the availability of models, the TRT adopted the Oregon Coastal Landscape Analysis and Modeling Study (CLAMS) method (Burnett *et al.* 2003; Burnett *et al.* 2007) for the NCCC Domain to predict the likelihood, or intrinsic potential (IP), of stream reaches to support adult and juvenile salmonids including CC Chinook salmon and both NC and CCC steelhead (Bjorkstedt *et al.* 2005).

The three habitat attributes - channel gradient, valley width, and mean annual discharge - were modeled to serve as a predictor of historical habitat. Each of these three attributes were weighted between zero to one as to their potential to provide quality habitat with lower quality habitats scoring low, or near zero, and higher quality habitats scoring high, 0.7 to one. For example, narrow valley widths and steep channel gradients are less likely to provide good spawning habitats (IP score of <0.7) while wider valley widths and low gradients are more likely to provide higher quality spawning and rearing habitats (IP score of >0.7). The IP score for each reach in a watershed was multiplied by its respective reach length (in km), and the values totaled to estimate historical IP in km (IP-km) for each watershed. These weighted IP-km, which are not a linear measurement, were used to calculate the likely historical carrying capacity of adult salmonids. Depending on watershed size, 20 to 40 spawners per km were calculated relative to the amount of IP in a watershed to yield density-based criteria representing a low risk of extinction for each population (i.e. viable) (Figure 13).

Uncertainties exist with nearly all model outputs, and there is some bias in the IP model to over or underestimate IP and historical habitat potential. To evaluate the bias and assess whether the population size predictions were reasonable, the TRT made comparisons of the modeled IP density-based spawner abundances with historical records. The TRT found in the majority of cases that modeled adult abundances were lower than those observed during the 1930s into the 1950s and concluded that projected spawner abundance targets did not overestimate natural carrying capacity for most populations within each ESU and DPS. In 2012, due to reviewer comments and field observations, IP for steelhead was re-examined and revised (Spence *et al.* 2012). IP modifications resulted in reductions in estimates of IP-km, and accordingly, spawner targets for a number of populations (Spence *et al.* 2012).

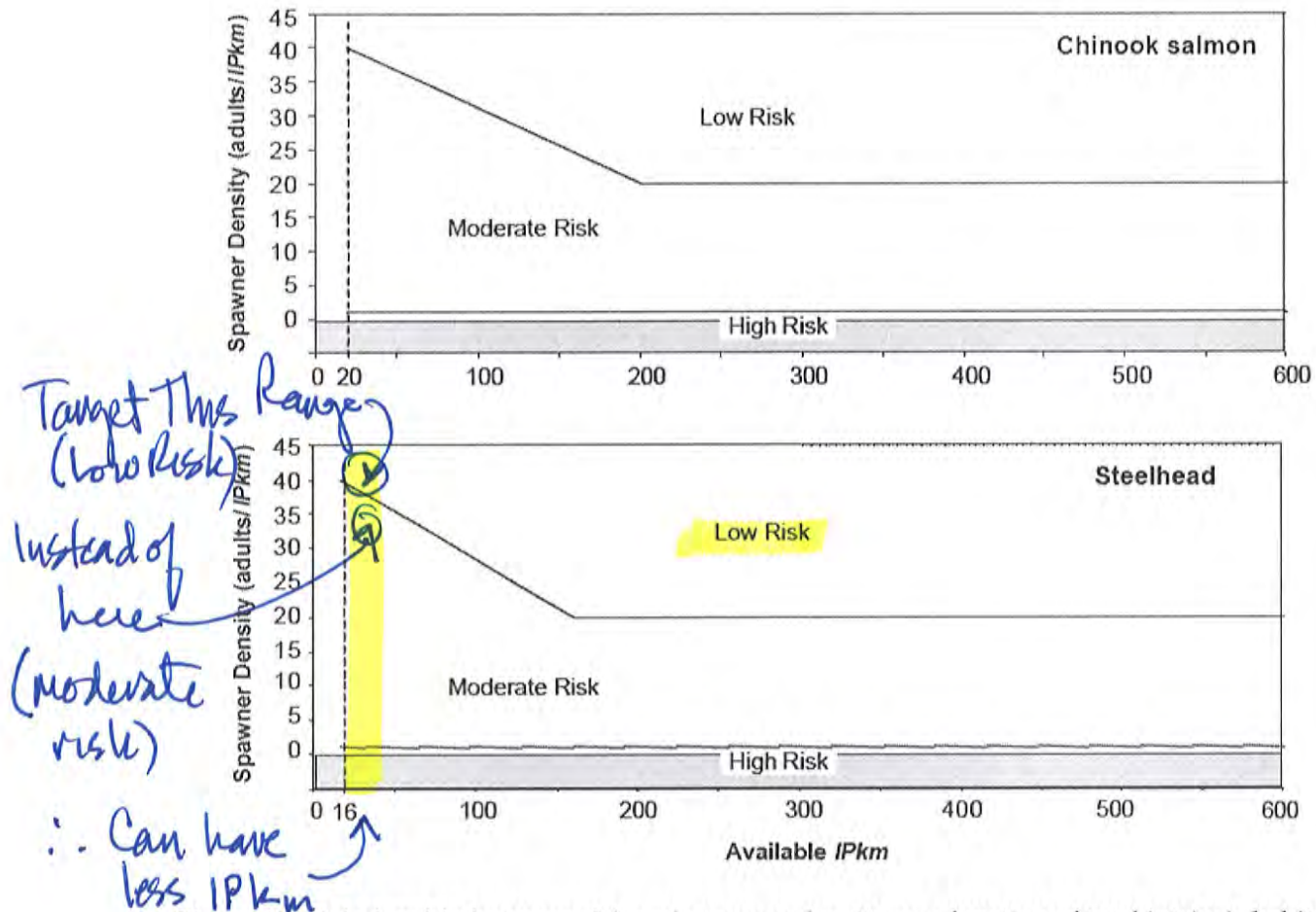


Figure 13: Relationship between risk and spawner density as a function of total intrinsic habitat potential. Values above the upper lines indicate populations at low risk of extinction (*i.e.*, viable), values below this line are at a moderate risk of extinction. Values below 1 spawner/IPkm are at a high risk of extinction.

3.3.2 ROLES OF POPULATIONS IN ESU/DPS VIABILITY

IP was also used to determine if populations were independent (*i.e.*, viable in isolation) or dependent (*i.e.*, non-viable in isolation). The independence of a population establishes its relative importance to ESU/DPS viability. For example, a large population (*e.g.*, functionally independent or potentially independent) likely functions as a regular source of surplus individuals through straying to smaller populations (*e.g.*, dependent populations). Straying adds resilience to the ESU/DPS when smaller populations are impacted by adverse environmental conditions (*e.g.*, catastrophic wildfire). Surplus individuals from large populations can re-colonize these

watersheds overtime. This resilience confers more importance onto large populations for their role in the viability and recovery of the ESU/DPS.

The TRT defined (1) functionally independent populations (FIP) as those likely to persist over a 100-year time scale in isolation and without the influence of migrants from neighboring populations; (2) potentially independent populations (PIP) as those likely to persist over a 100-year time scale but are influenced by immigration from neighboring populations; and (3) dependent populations (DP) as those likely to go extinct within a 100-year time period in isolation and rely on immigration from neighboring populations to persist. While independent populations have a more significant role in ESU/DPS viability, the role of dependent populations is very important in situations where associated historical independent populations are extirpated or at a high risk of extirpation. In these cases, dependent populations can become the vital source of colonizers and genetic diversity to support restoration of the extirpated populations associated with the larger watershed.

For NC and CCC steelhead, watersheds with ≥ 16 IP-km of potential habitat were deemed independent populations and < 16 IP-km were deemed dependent populations. Due to the lack of sufficient information, the TRT selected 16 IP-km, which is one-half the threshold used for coho salmon, as the threshold for viability-in-isolation. The threshold is based on the following assumptions:

1. A given reach of equal IP to coho is capable of supporting more juvenile steelhead than coho since steelhead can use a broader range of habitats.
2. Life history of winter run steelhead with broader distributions of age-at-ocean entry and age-at-maturation allow greater flexibility over coho.
3. Steelhead spawn across greater distances (and time scales) and in upper tributaries, spreading the risk of disturbance over space and time and reducing overall impacts to the species.

For CC Chinook, watersheds with ≥ 20 IP-km of potential habitat are independent populations and < 20 IP-km dependent populations.

The 20 IP-km was derived from the following assumptions:

1. IP score of 1.0 corresponds to a maximum density of 20 redds per linear stream km.
2. Chinook populations require an average abundance of 2500 spawners per generation to be at a negligible risk of extinction. A typical generation time for Chinook is 4 years which gives an average of 625 spawners per year for a population that is viable-in-isolation.
3. Chinook salmon exhibit a 1:1 sex ratio.

Using these assumptions, the TRT arrived at a viability-in-isolation threshold of 15.6 IP-km for Chinook. They adopted a precautionary approach and used a higher threshold of 20 IP-km to account for uncertainty.

3.3.3 RESULTS FROM HISTORICAL STRUCTURE ANALYSIS

To capture the historical environmental and ecological conditions under which groups of populations likely evolved, the TRT delineated units called Diversity Strata and assigned populations to each Diversity Stratum.

The NC steelhead DPS historically consisted of 5 Diversity Strata with 40 independent populations of winter-run steelhead (18 functionally independent and 22 potentially independent) and as many as 10 populations of summer steelhead (all functionally independent) (Figure 14). The CCC steelhead DPS was historically comprised of 5 Diversity Strata with 10 functionally independent populations and 27 potentially independent populations (Figure 15). The CC Chinook salmon ESU was historically comprised of 4 Diversity Strata, with 16 independent populations of fall-run Chinook salmon (11 functionally independent and 5 potentially independent) and six independent populations of spring-run Chinook salmon (all functionally independent) (Figure 16).

Central California Coast Steelhead DPS

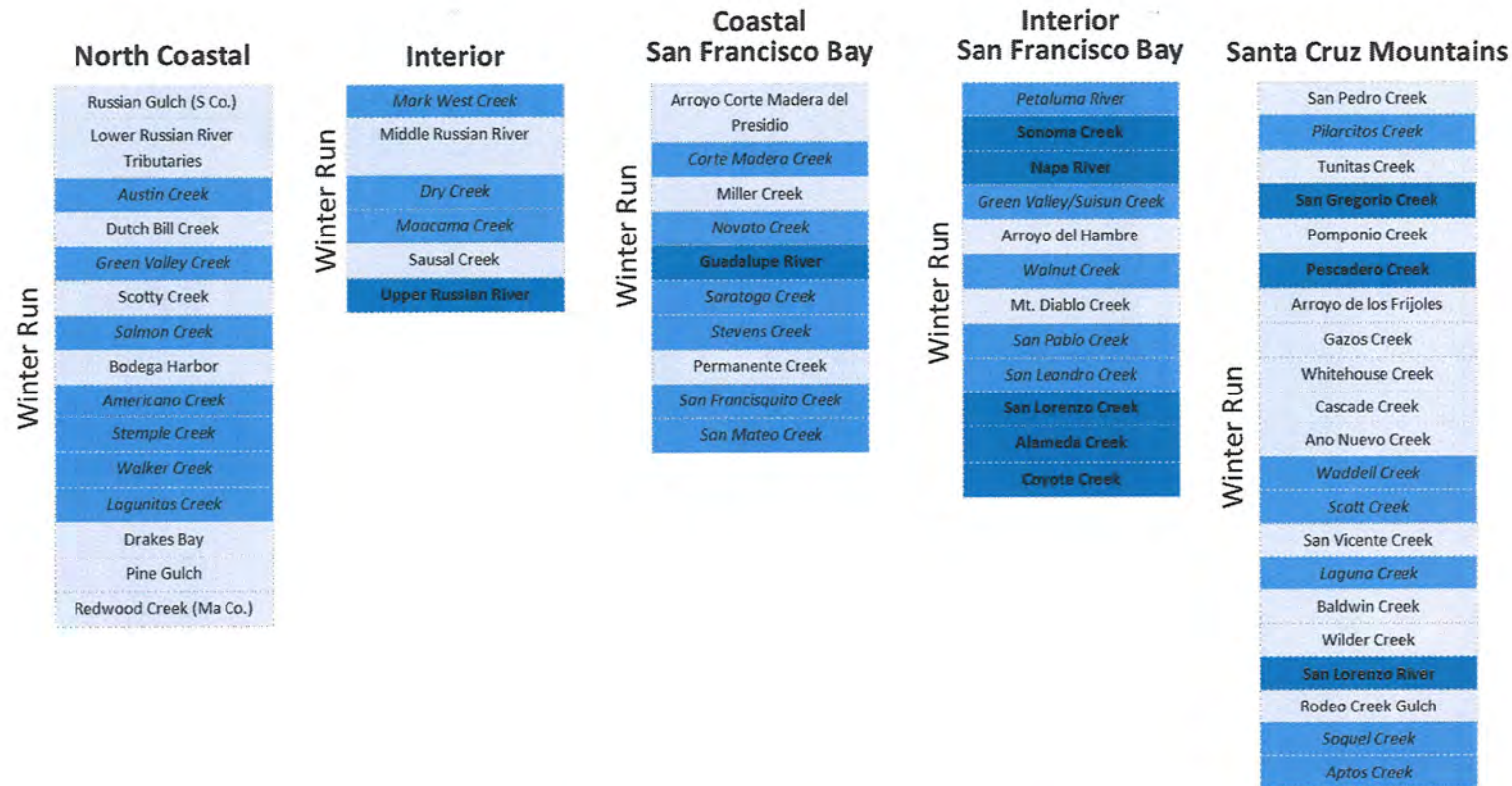


Figure 15: Historical Population Structure of the CCC steelhead DPS arranged by Diversity Strata. Functionally Independent Populations are listed in bold font with dark blue background. Potentially Independent Populations are listed in italic font with a medium blue background. Dependent Populations are listed in regular font, with a light blue background (not all Dependent Populations are shown). (From Spence *et al.*, 2012).

3.4 BIOLOGICAL VIABILITY CRITERIA

Spence *et al.* (2008) developed biological viability criteria for the three levels of biological organization (*i.e.*, populations, Strata, ESU/DPS), important for the long term persistence of salmon and steelhead as outlined by Bjorkstedt *et al.* (2005). The biological viability criteria “defines sets of conditions or rules that, if satisfied, would suggest that the ESU is at low risk of extinction” (*i.e.* viable) (Spence *et al.* 2008). These criteria involve a minimum number of populations achieving viability and populations, not required to achieve viability, demonstrating occupancy and distribution patterns to suggest sufficient connectivity within and between populations.

3.4.1 POPULATION VIABILITY CRITERIA

McElhany *et al.* (2000) states that four parameters form the key to evaluating population viability status: abundance, population growth rate, spatial structure, and diversity. Abundance is the number of adult spawners measured over time based on life history. Population growth rate (*i.e.*, productivity) is a measure of a population’s ability to sustain itself overtime (*e.g.*, returns per spawner). Population spatial structure describes how populations are arranged geographically based on dispersal factors and quality of habitats. Population diversity is the underlying genetic and life history characteristic providing for population resilience and persistence across space and time.

Spence *et al.* (2008) applied the population viability concept described in McElhany *et al.* (2000) in order to develop extinction risk categories for the Domain (Table 2). Low, moderate, and high extinction risk categories are described in terms of: (1) likelihood of extinction based on population viability modeling; (2) effective population size or total population size; (3) population decline; (4) catastrophic decline; (5) spawner density; and (6) hatchery influence (Table 2). For this recovery plan, a population that meets the low extinction risk criteria in Table 2 is considered a viable population.

Table 2: Population Extinction Risk Criteria (Spence *et al.* 2008)

| Population Characteristic | Extinction Risk | | |
|--|---|---|---|
| | High | Moderate | Low |
| Extinction risk from population viability analysis (PVA) | ≥ 20% within 20 yrs | ≥ 5% within 100 yrs but < 20% within 20 yrs | < 5% within 100 yrs |
| | - or any ONE of the following - | - or any ONE of the following - | - or ALL of the following - |
| Effective population size per generation | $N_e \leq 50$ | $50 < N_e < 500$ | $N_e \geq 500$ |
| -or- | -or- | -or- | -or- |
| Total population size per generation | $N_g \leq 250$ | $250 < N_g < 2500$ | $N_g \geq 2500$ |
| Population decline | Precipitous decline ^a | Chronic decline or depression ^b | No decline apparent or probable |
| Catastrophic decline | Order of magnitude decline within one generation | Smaller but significant decline ^c | Not apparent |
| Spawner density | $N_a/IPkm^d \leq 1$ | $1 < N_a/IPkm < MRD^e$ | $N_a/IPkm \geq MRD^e$ |
| Hatchery influence ^f | Evidence of adverse genetic, demographic, or ecological effects of hatcheries on wild population | | No evidence of adverse genetic, demographic, or ecological effects of hatchery fish on wild population |

^a Population has declined within the last two generations or is projected to decline within the next two generations (if current trends continue) to annual run size $N_a \leq 500$ spawners (historically small but stable populations not included) *or* $N_a > 500$ but declining at a rate of $\geq 10\%$ per year over the last two-to-four generations.

^b Annual run size N_a has declined to ≤ 500 spawners, but is now stable *or* run size $N_a > 500$ but continued downward trend is evident.

^c Annual run size decline in one generation $< 90\%$ but biologically significant (e.g., loss of year class).

^d $IPkm$ = the estimated aggregate intrinsic habitat potential for a population inhabiting a particular watershed (i.e., total accessible km weighted by reach-level estimates of intrinsic potential; see Bjorkstedt et al. [2005] for greater elaboration).

^e MRD = minimum required spawner density and is dependent on species and the amount of potential habitat available. Figure 5 summarizes the relationship between spawner density and risk for each species.

^f Risk from hatchery interactions depends on multiple factors related to the level of hatchery influence, the origin of hatchery fish, and the specific hatchery practices employed.

3.4.2 ESU/DPS VIABILITY CRITERIA

The goals of the ESU/DPS criteria are to reduce the risk of extinction by ensuring: (1) connectivity between populations; (2) representation of ecological, morphological, and genetic diversity; and (3) redundancy in populations to minimize risks associated with catastrophic events. In characterizing a viable ESU/DPS the TRT applied the hypothesis that populations as they functioned in their historical context were highly likely to persist and that “increasing departure

from historical characteristics logically requires a greater degree of proof that a population is indeed viable” (Spence *et al.* 2008). Due to the likely historical roles of functionally independent or potentially independent populations, these populations form the foundation of the ESU/DPS viability criteria. Dependent populations play a key role by providing reservoirs of genetic diversity, are a vital source of colonizers for adjacent FIPs in the ESU/DPS that are extirpated, provide connectivity between FIPs, reduce risk of ESU/DPS extinction, and act as a buffer to impacts resulting from poor ocean conditions and disturbances to independent populations. While viability criteria (i.e. low or moderate risk extinction criteria) were not developed for dependent populations since they are inherently non-viable, the TRT did develop guidance for recovery planners to include these populations into the biological goals and criteria for the recovery plan (See below).

The TRT developed four criteria which provide the framework for the minimum number and distribution of viable and non-viable populations likely to support ESU/DPS persistence over 100 year time frame (*i.e.*, a viable ESU/DPS).

The four ESU/DPS viability criteria are as follows:

(1) Representation

- 1.a. All identified Diversity Strata that include historical FIPs or PIPs within an ESU/DPS should be represented by viable populations for the ESU/DPS to be considered viable.
- 1.b. Within each Diversity Stratum, all extant phenotypic diversity (*i.e.*, major life-history types) should be represented by viable populations.

(2) Redundancy and Connectivity

- 2.a. At least 50 percent of historically independent populations (FIPs or PIPs) in each Diversity Stratum must be demonstrated to be viable. For strata with three or fewer independent populations, at least two populations must be viable.
- 2.b. Within each Diversity Stratum, the total aggregate abundance of independent populations selected to satisfy criterion 2.a. must meet or exceed 50 percent of the aggregate viable population abundance for all FIPs and PIPs in each Stratum.

Functionally Independent
Population
Potentially Independent Pop

- (3) Remaining populations, including historically dependent populations or any historical FIPs or PIPs not expected to attain a viable status, must exhibit occupancy¹⁴ patterns consistent with those expected under sufficient immigration subsidy arising from the essential independent populations selected to satisfy the preceding Redundancy and Connectivity criteria.
- (4) The distribution of extant populations regardless of historical status must maintain connectivity within the Diversity Stratum as well as connectivity to neighboring Diversity Strata.

These criteria set the framework for the Coastal Multispecies Recovery Plan. The framework described above for NC and CCC steelhead and CC Chinook salmon represents our best understanding of their historical biological structure at a low extinction risk (Bjorkstedt *et al.* 2005). However, we believe recovery is possible at a threshold below the historical setting and not all populations are needed for, or are capable of contributing to, recovery. In fact, the biological viability criteria (Spence *et al.* 2008) indicate there are several ways salmon and steelhead can achieve viability. The Spence *et al.* (2008) criteria provide guidance to attain a number and configuration of viable populations across the landscape without explicitly specifying which populations must be selected for the recovery scenario from each Diversity Strata. The application of these criteria for recovery of Chinook salmon and steelhead are outlined in Chapter 4 Methods and Volumes II, III and IV.

¹⁴ In the case of steelhead, occupancy is defined as the presence of the anadromous life history. In other words, the presence of juvenile *O. mykiss* alone does not confirm anadromy.

4.0 METHODS

"The wide-ranging migration patterns and unique life histories of anadromous salmonids take them across ecosystem and management boundaries in an increasingly fragmented world, which creates the need for analyses and strategies at similarly large scales."

- Good *et al.* 2007

4.1 INTRODUCTION

This chapter summarizes methods used to: (1) prioritize populations for recovery using the viability criteria framework provided by Bjorkstedt *et al.* (2005) and Spence *et al.* (2008); (2) assess current conditions; (3) identify future stresses and threats to these populations and their habitats; and (4) develop site-specific and range-wide recovery actions. Please see Appendix D for a full description of the methods.

4.1.1 SELECTING POPULATIONS FOR RECOVERY SCENARIOS

As described in Chapter 3, the historical role of independent populations in terms of ESU/DPS viability make them foundational for achieving the biological viability criteria requirements outlined in Spence *et al.* (2008). Dependent populations have a different role in recovery than independent populations. Dependent populations experience periodic local extinctions, and overtime are repopulated by immigration of spawners from nearby populations. Dependent populations: (1) are important reservoirs of genetic diversity; (2) are vital sources of colonizers for adjacent extirpated independent populations; (3) provide connectivity between independent populations; and (4) can act as a buffer for independent populations during poor ocean conditions and catastrophic disturbances (Spence *et al.* 2008).

NMFS applied the guidance and criteria in Bjorkstedt *et al.* (2005), Spence *et al.* (2008), and Spence *et al.* (2012) and considered the following conditions to select populations to represent the recovery scenario based on that guidance and criteria:

- Independent or dependent status;

- Likelihood to achieve a low extinction risk threshold;
- Phenotypic diversity (*i.e.*, major life-history types);
- Historical range and diversity;
- Susceptibility to catastrophic events;
- Current density, abundance and distribution of spawners;
- Connectivity of populations within and between Strata;
- Unique life history traits;
- Likelihood of the watershed to support the specified spawner abundances;
- Possibility of recolonization if extirpated and suitability of unoccupied habitats to support salmonids;
- Quantitative and qualitative information regarding current presence or prolonged absence of the species;
- Habitat suitability and severity of habitat degradation; and
- Threats and current protective efforts.

The historical IP-kms for selected populations were verified based on current habitat survey information, local knowledge, Google Earth images, watershed documents, several ground-truthing surveys, and outreach to agencies and other entities for information. IP and critical habitat are not the same, at times IP is designated for a stream that does not have critical habitat. IP is an historical designation that does not take into account as is done for critical habitat, the impact to the economy, tribes, national security, or any other relevant impact. Changes to IP-kms were made for several populations where natural barriers (Passage Assessment Database 2014¹⁵), steep gradient changes, or stream flow dynamics were undetected by the model. In addition, IP-kms above dams were included for CCC steelhead populations where minimum viability criteria could not be achieved using the current conditions and passage in these areas is being explored (See Appendix G and Vol. IV for more information). Using the Spence *et al.* (2008) formulas,

¹⁵ <https://nrm.dfg.ca.gov/PAD/>

spawner targets for each changed population were re-calculated by multiplying the number of spawning adults per IP-km.

4.1.2 METHODS TO ESTABLISH BIOLOGICAL RECOVERY CRITERIA

Three categories of independent and dependent populations were selected for ESU and DPS recovery scenarios based on viability criteria. Table 3 describes these criteria in more detail.

1. Essential independent populations attaining a low extinction risk threshold and contribute to meeting the ESU/DPS viability criteria. These populations are expected to achieve a spawner density of 20-40 spawners per IP-km depending on watershed size. The spawner density required for recovery across these independent populations must meet or exceed 50 percent of the aggregate historical abundance for each Diversity Stratum.
2. Supporting independent populations expected to attain a moderate extinction risk threshold and contribute to meeting the occupancy/connectivity criteria. These populations are expected to achieve a spawner density of 6-12 spawners per IP-km depending on watersheds size. The numeric targets for these populations do not contribute to meeting 50 percent of the aggregate historical abundance for the Stratum.
3. Supporting dependent populations expected to attain a spawner density of 6-12 spawners per IP-km and contribute to meeting the redundancy/occupancy/connectivity criteria. The numeric targets for these populations do not contribute to meeting 50 percent of the aggregate historical abundance for the Stratum.

The 20-40 spawners per IP-km range was derived according to Spence *et al.* (2008). The 6-12 spawners per IP-km range for independent and dependent populations was derived based on our assessment of depensation literature. Depensation is a reduction in per capita growth rate of the population with declining abundances and involves factors such as reduced probability of

finding mates, inability to withstand predator populations, impairment to group dynamics, and loss of environmental adaptation and genetic diversity (Spence *et al.* 2008). In Spence *et al.* (2008), the high risk extinction threshold used for biological viability criteria is a population averaging 1 spawner per IP-km. Spence *et al.* (2008) notes, however, that various other authors suggest thresholds ranging from 1 to 5 spawners per IP-km (Chilcote 1999; Sharr *et al.* 2000; Barrowman *et al.* 2003; Wainwright *et al.* 2008). Extinction risk is high for populations with these densities due in large part to depensation conditions. For coho salmon, Barrowman (2003) estimates depensation at 0.6 spawners per km; Sharr (2000) estimates 3.1 spawners per km; Chilcote (1999) estimates 2.3 spawners per km; and Wainwright (2008) estimates 2.5 spawners per km. Wainwright (2008) found six spawners per km the threshold where depensation is likely not occurring and 12 spawners per km the threshold where depensation is highly likely not to be occurring. Thus, 6-12 were selected to meet redundancy and connectivity criteria.

All selected populations play an important role in recovery regardless of status (*e.g.*, essential independent, supporting independent or supporting dependent). The selected populations meet the ESU/DPS viability criteria for representation, redundancy, connectivity, occupancy, and distribution required in Spence *et al.* (2008). While not all historical populations were included, they are still important to ESU/DPS persistence because they: (1) produce fish; (2) have habitats supporting environmental conditions that may lead to local adaptation; and (3) provide biological insurance against catastrophic loss of genetic material from neighboring independent populations. These small populations, therefore, contribute to overall ESU/DPS viability (Spence *et al.*, 2008).

4.5.2 COSTS

We assigned costs to the lowest level actions (e.g. specific action steps). Our cost estimates are presented in five year intervals out to 25 years and include a total cost for the duration of the action. Costs are aggregated to estimate a total cost for recovery. Cost estimates are provided wherever practicable. The accuracy of recovery cost estimates will vary and are governed by many factors such as the specificity of the recovery action step, labor, materials, site location, duration, and timing of action. As a result, predicting costs into the future becomes increasingly imprecise due to a lack of information regarding these various constraints. Furthermore, many actions either build on previous actions to create cost benefits or are required under mandates other than the ESA, such as other federal, state and local laws. In some cases, information essential to the development of even the roughest of cost estimates are unavailable. In these situations, “To Be Determined” or TBD was used. Examples of these situations include:

- Costs are known by a third party, but such information has not been provided to NMFS;
- Action is so novel that no comparable actions can be identified;
- Action involves new technology and it is impracticable to provide a reasonable estimate;
- Action is based on broad government directives/guidelines; and
- Site specific investigations and adaptive management approaches are needed.

To account for uncertainties, we developed a framework to estimate costs. The framework was based on *Habitat Restoration Cost References for Salmon Recovery Planning* (Thomson and Pinkerton 2008) and *Cost and Socioeconomic Impacts of Implementing the California Coho Recovery Strategy* (see Appendix I in CDFG 2004). Costs developed for actions to recover coho salmon are considered similar (if not identical) to similar actions for steelhead and Chinook salmon. Where the species overlap, all may benefit from the actions taken. Due to the varying degree of specificity for most identified recovery actions, assumptions about the type, magnitude, number, or extent of individual recovery action steps were necessary. Assumptions on the costs of recovery action steps were based on various information sources that estimated the cost of similar activities.

Assumption tables in Appendix F were adjusted for the NCCC Domain to include information from CDFW's cost estimates in the State Coho Salmon Recovery Strategy (CDFG 2004) and reflect regional variability in costs for labor wage, materials, and inflation. To account for regional variability in costs, a multiplier was applied to standard costs. For example, Mendocino and Sonoma counties have an average county wage similar to the average of all counties in California and no multiplier was applied to costs in those areas. The San Francisco Bay Area and San Mateo County have an average county wage 20 percent higher than the average of all California counties; thus, a multiplier of 0.20 was adjusted for these areas. For Santa Cruz County, a multiplier of 0.14 was added since the average county wage is 14 percent higher than the average across California. Assumption tables were also adjusted to current values. Appendix F provides all the cost estimates, including the difference in cost of recovery actions from 2004 to 2014.

Cost estimates are mainly focused on the direct expenditure required to physically perform the task and may not always include secondary costs associated with administrative needs and permitting. In instances where the timing or extent of recommended action steps was not available or was undetermined, assumptions were developed from the CAP or Rapid Assessment ratings and the projected amount of potential habitat requiring improvements. These assumptions include:

- Large wood placement in 50 percent of potential habitats;
- Off-channel habitat improvements are one project per mile across 25 percent of potential habitats;
- Water projects are assumed at one per mile across 55 percent of potential habitats;
- Riparian thinning assumes 80 acres/mile planted across 5 percent of potential habitats;
- Road decommissioning should reduce road density to two miles per square mile;
- 25 percent of roads are upgraded;
- Levee setback for 1 percent of potential habitat and cost of breach for 1 percent of potential habitat at a rate of one project per mile;
- Barrier removal assumes 1 barrier per five miles of potential habitat;
- Stabilizing banks assumes 1 percent of potential habitat;

- Purchasing or leasing water rights assumes 10 percent of low flow volume affected;
- Fuel reduction assumes 25 percent of potential habitat treated with mechanical thinning and 25 percent of potential habitat fuel management; and
- Invasive vegetation species control assumed 80 acres/mile treated in 5 percent of potential habitats.

Actions were grouped into four categories, in-kind, planning, monitoring, and implementation, as described in more detail below (Table 18).

Table 18: Recovery Action Categories

| Recovery Action Categories and Types | |
|--------------------------------------|-------------------------------|
| Category | Action Type |
| In-Kind Actions | Existing Requirement/Actions |
| Planning | Scoping |
| | Design |
| | Permitting |
| Monitoring | Pre-project |
| | Post-Project |
| | Effectiveness |
| | Biological/Ecological |
| Implementation | Habitat Complexity |
| | Riparian Vegetation Structure |
| | Species Diversity |
| | Floodplain Connectivity |
| | Species Migration Pattern |
| | Sediment Transport |
| | Estuarine Restoration |

In-Kind Actions

In an effort to identify only the additional cost of species recovery, we considered what is already required under local, State, or Federal regulation, or settlement agreements, to be required actions, and thereby estimated them at \$0. For example, the cost of an action required by a Reasonable and Prudent Alternative action which has already been adopted by an action agency is listed as \$0. Also, actions were assumed to have no additional cost to recovery if the action would be accomplished under the existing work programs of government agencies and would not require an agency or group to acquire funding beyond their existing budgets. Because several

federal and state agencies have significant budgets directed to natural resource protection in general, and anadromous salmonids in particular, many of the actions identified in this recovery plan will be implemented through those existing programs; as such, many actions are identified to cost \$0, since the action will not cause agency budgets to expand.

Planning

Planning actions were included in the cost of implementing the action. They were assigned a cost estimate when known. Planning actions include scoping, designing, and permitting.

Monitoring

Specific habitat and fish monitoring costs are provided in the Monitoring and Adaptive Management Chapter (Chapter 6). Actions organized into monitoring include pre-project, post-project, effectiveness, and biological/ecological. Costs were calculated by mile, year, and acre or project level. Costs were applied but may vary substantially between populations depending on level of intensity, duration, and protocol.

Implementation

These actions have a specific focus on improving freshwater habitat conditions and were assigned costs based on the type of action as described below:

Habitat Complexity

Cost of in-stream habitat complexity varies with techniques implemented. To determine the cost of increasing habitat complexity for recovery actions, such as increasing LWD frequency, shelter ratings, and primary pools, a flat rate of \$26,000 per mile was applied. This assumes a minimum of one project per mile (involving multiple structures along the targeted stream reach). In instances when placement of LWD was not feasible, the cost of an engineered log jam at a rate of \$104,000 per jam was applied.

Check
w/ scmt

Riparian Vegetation Structure

To rehabilitate riparian composition and distribution, an estimated cost of \$20,057 per acre was used. The variability in riparian buffers is difficult to determine, therefore, we assumed that an average of 80 acres per mile (40 acres per stream bank) would be treated to achieve the desired recovery targets.

Species Diversity

The variability in vegetative composition between regions and populations is diverse. Therefore, NMFS established a standard rate of \$1,422 per acre with the assumption of 80 acres per mile treated for upslope vegetative management. Non-native species recovery actions consist of several distinct activities, including assessment, control, education and outreach, as well as development of monitoring programs. The costs for controlling and removing non-native species were derived on a per acre basis.

Floodplain Connectivity

SCW 7
The costs to reconnect floodplains are contingent upon the restoration method implemented. Removing or setting back levees, creating alcove and backwater habitat, or off-channel wetlands are some methods used to reconnect floodplains; each with a varying degree of planning, design, and implementation. A rate of \$36,046 per mile, assuming one project per mile, was considered the average across the various implementation methods outlined in this recovery plan.

Species Migration Patterns

The costs of recovery actions associated with dams and diversions were calculated using the CalFish.org mapping viewer when available. When specific information was unavailable, the assumption table for fish passage improvement was used. Culvert replacement costs were calculated from the assumption that a minimum of one culvert would be replaced in each identified watershed, or sub-watershed, annually for the first five years of Recovery Plan implementation.

Sediment Transport

Costs to execute recovery actions associated with road upgrades or decommissioning were calculated from \$12,000 per mile to \$21,000 per mile depending on method. If number of miles to be upgraded or decommissioned were unknown, then road densities were reduced to 2 mi/sq mile to meet viable criteria.

Estuarine Restoration

Costs to implement estuarine recovery actions were calculated at a rate of \$272,120 per acre. Estimates incorporate components of wetland restoration, LWD placement, and riparian planting. Each estuary was mapped for the current extent of acres, and a total of 10 percent of total estuarine habitat was estimated for treatment.

4.5.3 NMFS RECOVERY ACTION DATABASE AND SOURCES

In 2008, NMFS developed a database to facilitate the development, revision process, and final output of recovery actions. The recovery actions database is in Access and has a user interface to enable staff to input and query actions across any and all fields. The database outputs the actions into the Word or Excel formats. These Excel files are available upon request.

4.6 CONCLUSIONS

The Interim Recovery Planning Guidance (NMFS 2010) strongly recommends utilizing “a structured approach to assessing threats, sources of threats, and their relative importance to the species’ status...” For this recovery plan, NMFS selected populations for recovery scenarios, assessed the status of conditions and threats, and developed site-specific recovery actions to shift the status of listing factors. Actions are linked with NMFS’ threats/conditions analysis and organized according to the ESA Section 4(a)(1) listing factors. This approach will provide a foundation for future status reviews and evaluations regarding the threats identified at the time of listing.

5.0 LISTING, STATUS REVIEWS AND RECOVERY

ESA Section 2(a) states, "The Congress finds and declares that -- (1) various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation; (2) other species of fish, wildlife, and plants have been so depleted in numbers that they are in danger of or threatened with extinction; (3) these species of fish, wildlife, and plants are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people; (4) the United States has pledged itself...to conserve to the extent practicable the various species of fish or wildlife and plants facing extinction, pursuant to [several international agreements]; and (5) encouraging the States and other interested parties...to develop and maintain conservation programs which meet national and international standards is a key to meeting the Nation's international commitments and to better safeguarding, for the benefits of all citizens, the Nation's heritage in fish, wildlife, and plants" (16 U.S.C. 1531(a)).

5.1 INTRODUCTION

When making determinations for a species' ESA listing status, NMFS must (1) evaluate species status, (2) analyze the five ESA section 4(a)(1) factors that may pose a threat to the species, and (3) assess the extent to which conservation measures and protective efforts mitigate threats, all without reference to economic impacts associated with the determination (50 CFR 424.11). The SWFSC evaluates species status, according to the biological viability criteria in Spence *et al.* (2008) and Spence *et al.* (2012), and provides updated summaries to NMFS regional offices. NMFS regional staff conduct an assessment of: (1) ESA section 4(a)(1) factors and associated threats pursuant to NMFS regulations, policies and guidance (Figure 20) (50 CFR 424; USFWS and NMFS 2006; USGAO 2006; NMFS 2010) and (2) the efficacy of conservation efforts according to the "Policy for Evaluation of Conservation Efforts When Making Listing Decisions" (PECE) (68 FR 15100). Status review determinations are conducted in accordance with the "5-Year Guidance: Procedures for Conducting 5-Year Reviews under the Endangered Species Act" (USFWS and NMFS 2006). We publish our findings for listing and delisting in FRNs and post 5-year status review findings on the NOAA WCR website²³.

²³ http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/salmon_and_steelhead.html

NMFS Listing Status Decision Framework

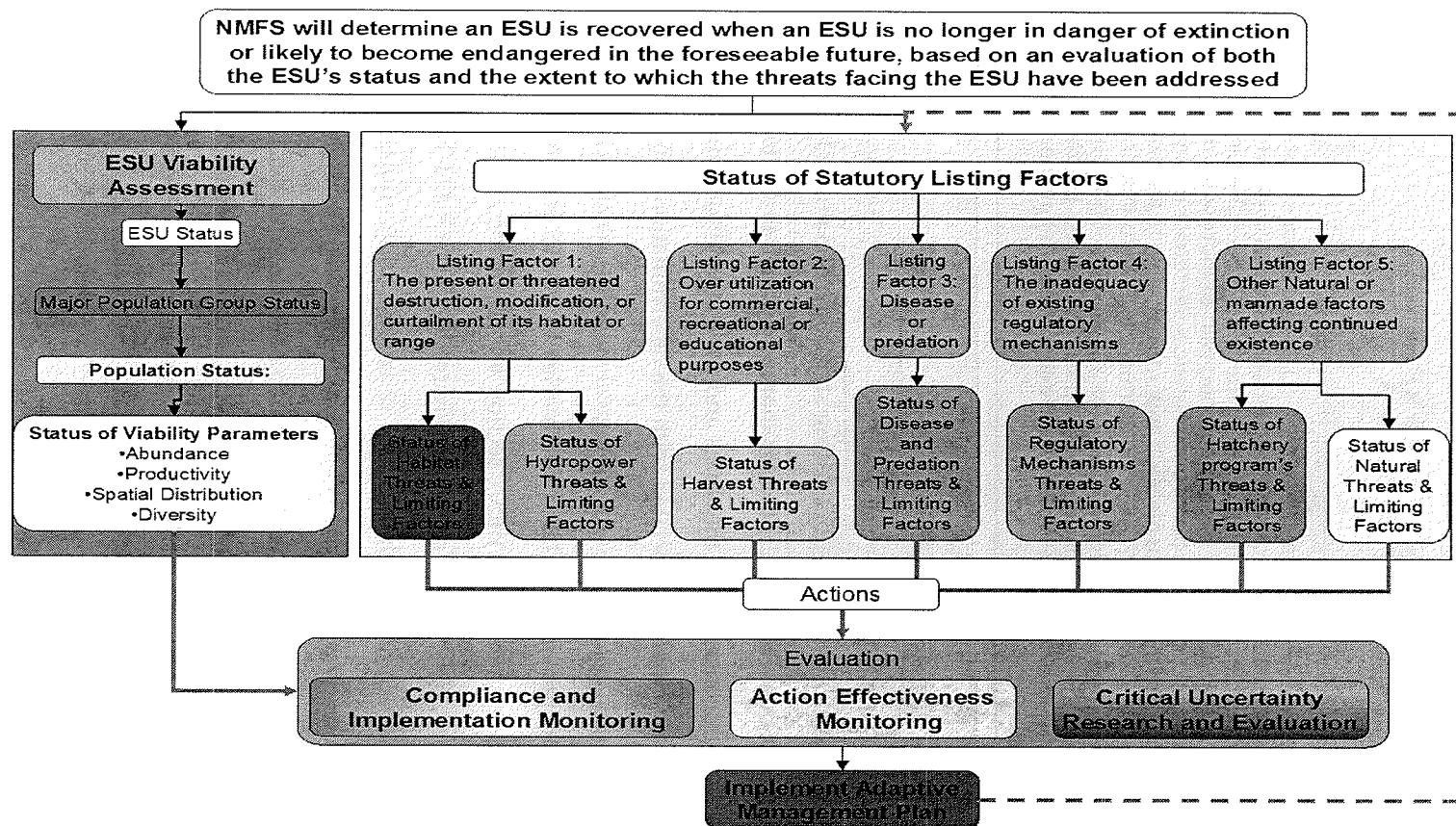


Figure 20: NMFS Listing Status Decision Framework

Recovery plan information provides continuity from listing and status reviews to delisting determinations and details the conditions needed for recovery (*i.e.*, recovery criteria). We intend to use eight categories of recovery criteria for conducting status reviews and making delisting decisions for CC Chinook salmon and NC and CCC steelhead: biological status; the level of threats identified under each of the five ESA section 4(a)(1) factors; the degree to which recovery actions for each factor have been implemented; and the efficacy of protective/conservation efforts.

This chapter describes the process we used to evaluate the section 4(a)(1) factors and conservation efforts and, generally, the results of our analyses for CC Chinook salmon and NC and CCC steelhead. It also specifies recovery goals, objectives and criteria that will guide our delisting determinations for the three salmonid species. The terms “recovery” and “delisting” refer to the same outcome, that is, the successful plan development and implementation which have led to the conservation and survival of these threatened species (ESA section 4(f)(1)).

5.2 FACTORS FOR DECLINE, EFFORTS AND STATUS REVIEWS

To ensure the recovery plan analysis and criteria are sufficiently correlated with the five ESA section 4(a)(1) factors and conservation efforts identified at listing, we examined all FRNs and status reviews for the CC Chinook salmon ESU and NC and CCC steelhead DPSs (Table 19). We catalogued into Excel spreadsheets all threats associated with each ESA section 4(a)(1) factor A through E, and associated conservation efforts, identified at the time of listing. The spreadsheets record FRN dates, page numbers, threats, and conservation efforts described in each FRN (either specifically or incorporated by reference) and their current status according to status review documents and other currently available information. The specific threats and conservation efforts associated with each ESU and DPS are included in Volumes II, III and IV of this recovery plan.

Table 19: Federal Register Notices reviewed to assess threats and protective efforts for CC Chinook salmon and NC and CCC steelhead

| Date | Citation | Title | Content Description |
|--------------------|-------------|--|--|
| August 9, 1996 | 61 FR 41541 | Endangered and Threatened Species: Proposed Endangered Status for Five ESUs of Steelhead and Proposed Threatened Status for Five ESUs of Steelhead in Washington, Oregon, Idaho, and California | Proposed rule: proposed listing CCC steelhead as endangered and NC steelhead as threatened. |
| August 18, 1997 | 62 FR 43937 | Endangered and Threatened Species: Listing of Several Evolutionary Significant Units (ESUs) of West Coast Steelhead | Final rule: listing CCC steelhead as threatened. |
| March 09, 1998 | 63 FR 11482 | Endangered and Threatened Species: Proposed Endangered Status for Two Chinook Salmon ESUs and Proposed Threatened Status for Five Chinook Salmon ESUs; Proposed Redefinition, Threatened Status, and Revision of Critical Habitat for One Chinook Salmon ESU; Proposed Designation of Chinook Salmon Critical Habitat in California, Oregon, Washington, Idaho | Proposed rule: proposed listing Southern California and California Coastal Chinook salmon as threatened. |
| March 19, 1998 | 63 FR 13347 | Endangered and Threatened Species: Threatened Status for Two ESUs of Steelhead in Washington, Oregon, and California | Notice of Determination: NC steelhead listing not warranted. |
| March 24, 1999 | 64 FR 14308 | Endangered and Threatened Species; Threatened Status for Three Chinook Salmon Evolutionarily Significant Units (ESUs) in Washington and Oregon, and Endangered Status for One Chinook Salmon ESU in Washington | 6-month extension of final listing determination for Southern Oregon and California Coastal Chinook salmon. |
| September 16, 1999 | 64 FR 50394 | Endangered and Threatened Species; Threatened Status for Two Chinook Salmon Evolutionarily Significant Units (ESUs) in California | Final Rule: listing CC Chinook salmon as threatened. |
| February 11, 2000 | 65 FR 6960 | Endangered and Threatened Species: Threatened Status for One Evolutionarily Significant Unit of Steelhead in California | Proposed rule: proposed listing NC steelhead as threatened. |
| June 07, 2000 | 65 FR 36074 | Endangered and Threatened Species: Threatened Status for One Steelhead Evolutionarily Significant Unit (ESU) in California | Final rule: listing NC steelhead as threatened. |
| June 14, 2004 | 69 FR 33102 | Endangered and Threatened Species: Proposed Listing Determinations for 27 ESUs of West Coast Salmonids | Proposed rule: proposed reaffirming listing of CC Chinook salmon as threatened, CCC steelhead as threatened, and NC steelhead as threatened. |
| June 28, 2005 | 70 FR 37160 | Endangered and Threatened Species: Final Listing Determinations for 16 ESUs of West Coast Salmon, and Final 4(d) Protective Regulations for Threatened Salmonid ESUs | Final rule: reaffirmed listing of CC Chinook salmon as threatened. |
| January 05, 2006 | 71 FR 834 | Endangered and Threatened Species: Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead; Final Rule | Final rule: listing CCC steelhead DPS as threatened and NC steelhead DPS as threatened. |
| 2011 | N/A | North-Central California Coast Recovery Domain 5-Year Review: Summary and Evaluation of California Coastal Chinook Salmon ESU and Central California Coast Coho Salmon ESU | Approved retaining CC Chinook salmon threatened status classification |
| 2011 | N/A | North-Central California Coast Recovery Domain 5-Year Review: Summary and Evaluation of Central California Coast Steelhead DPS and Northern California Steelhead DPS | Approved retaining CCC steelhead DPS and NC steelhead DPS threatened status classification |

| | | | |
|----------------|-------------|---|---|
| April 14, 2014 | 79 FR 20802 | Endangered and Threatened Wildlife; Final Rule To Revise the Code of Federal Regulations for Species Under the Jurisdiction of the National Marine Fisheries Service | Final rule: clarified and updated descriptions of species under NMFS' jurisdiction and that are currently listed as endangered or threatened. |
| 2015 | N/A | Initiation of the North-Central California Coast Recovery Domain 5-Year Review for Northern California Steelhead DPS, Central California Coast Steelhead and California Coastal Chinook Salmon. | Final report due out Winter 2016 |

5.2.1 SECTION 4(A)(1) FACTORS

NMFS must consider the following five ESA section 4(a)(1) factors in determining whether to list, delist or reclassify any species as endangered or threatened (50 CFR 424.11):

- (A) Present or threatened destruction, modification, or curtailment of a species habitat or range;
- (B) Overutilization for commercial, recreational, scientific, or educational purposes;
- (C) Disease or predation;
- (D) Inadequacy of existing regulatory mechanisms; and
- (E) Other natural or manmade factors affecting its continued existence.

Therefore, this recovery plan addresses the threats that were considered in relation to these ESA section 4(a)(1) factors in the rules listing the CC Chinook salmon ESU and NC and CCC steelhead DPSs; and assesses whether there are any new threats, changes in severity of threats, and threats that have been reduced or removed since publication of the final rules listing the CC Chinook salmon ESU and NC and CCC steelhead DPSs. Table 20: Threats Identified At Listing for Each Section 4(a)(1) Factor provides an overview of threat categories identified at listing for CC Chinook salmon and NC and CCC steelhead as they relate to each of the five ESA section 4(a)(1) factors. These factors include the human activities and natural events that constitute threats to a species survival and long term recovery. While the term “threat” carries a negative connotation, it does not mean that activities identified as threats are always inherently undesirable. Often they are legitimate human activities with unintended negative consequences on fish and their habitats that could be offset with protective efforts or managed in a manner that minimizes or eliminates their negative impacts. In considering the inadequacy of existing regulatory mechanisms under Factor D we evaluate regulatory mechanisms as if the ESA were not in place. “If improvements in status are solely dependent on regulatory effects of the ESA and those effects would disappear

upon delisting, then threats under Factor D have not been reduced or eliminated” (USFWS and NMFS 2006). The greatest threats for all three salmonid species relate to habitat modification (*i.e.*, Listing Factor A), inadequacy of regulatory mechanisms (*i.e.*, Listing Factor D), and other natural or manmade factors such as low abundances and lack of monitoring (*i.e.*, Listing Factor E). Detailed descriptions of the specific threats associated with each ESU and DPS are found in Volumes II, III, and IV of this recovery plan.

Table 20: Threats Identified At Listing for Each Section 4(a)(1) Factor

| |
|--|
| Listing Factor A: Habitat & Range |
| Agriculture |
| Estuarine modification |
| Forestry |
| Freshwater Conditions |
| Habitat Degradation |
| Mining |
| Removal of Riparian Habitat |
| Removal of Wetland Habitat |
| Urbanization |
| Water Diversions |
| Wildfires |
| Listing Factor B: Overutilization |
| Collection |
| Freshwater Harvest |
| Illegal Harvest |
| Overfishing |
| Listing Factor C: Disease & Predation |
| Avian Freshwater Predation |
| Predation |
| Disease |
| Marine Mammal Predation |
| Marine Predation (other) |
| Piscivorous Predators |
| Predation by non-native species |
| Predation by seabirds |
| Listing Factor D: Inadequate Regulatory Mechanisms |
| Federal, State, local governments, municipalities and others |
| Listing Factor E: Other natural or manmade factors |
| Artificial Propagation |
| Ocean Conditions: El Nino |
| Ocean Conditions: Other |

| |
|--|
| Floods – scour, sedimentation, erosion |
| Forest Fires |
| Natural Climatic Conditions |
| Natural Events |
| Drought |
| Ocean Conditions - El Nino |

5.2.2 CONSERVATION EFFORTS AT LISTING

A summary of organization’s conservation efforts assessed at listing are outlined below. A more detailed discussion of the organization’s conservation efforts is provided in Volumes II, III and IV. In making listing determinations, ESA section 4(b)(1)(A) requires NMFS to “tak[e] into account those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species...” In ESA section 4(a)(1), Factors (D) (“the inadequacy of existing regulatory mechanisms”) and (E) (“other ... manmade factors affecting [the species’] continued existence”) require us to consider the pertinent laws, regulations, programs, and other specific actions of any entity that either positively or negatively affect the species. Thus, the analysis outlined in section 4 of the Act requires us to consider the conservation efforts of not only State and foreign governments but also of Federal agencies, Tribal governments, businesses, organizations, or individuals that positively affect the species’ status. Therefore, ESA section 4(a)(1) and 4(b)(1)(A) act together to ensure threats are identified and that protective efforts and conservation efforts taken to reduce those threats are also acknowledged. We used the PECE when assessing conservation efforts and whether they positively affect the species. The policy specifies the use of 15 evaluation criteria when assessing formalized conservation efforts: nine criteria to assess the certainty an effort will be implemented and six criteria to assess the certainty an effort will be effective. Conservation efforts are specific actions, activities, or programs designed to eliminate or reduce threats or otherwise improve a species’ status. Formalized conservation efforts are conservation efforts identified in conservation agreements, conservation plans, management plans, or similar documents. As described in PECE, ESA section 4 requires us to consider the conservation efforts of Federal agencies, State and local governments, Tribal governments, businesses, organizations, and individuals (68 FR 15100). PECE directs NMFS to consider the following 15 evaluation criteria:

A. The certainty that the conservation effort will be implemented:

1. The conservation effort, the party(ies) to the agreement or plan that will implement the effort, and the staffing, funding level, funding source and other resources necessary to implement the effort are identified.
2. The legal authority of the party(ies) to implement the formalized conservation effort, and the commitment to proceed are described.
3. The legal procedural requirements necessary to implement the effort are described, and information is provided indicating that fulfillment of these requirements does not preclude commitment to the effort.
4. Authorizations (*e.g.*, permits, landowner permission) are identified and there is a high level of certainty these authorizations will be obtained.
5. The type and level of voluntary participation necessary to implement the conservation effort are identified, and a high level of certainty is provided that the necessary level of voluntary participation will be realized.
6. Regulatory mechanisms necessary to implement the conservation effort are in place.
7. A high level of certainty is provided that necessary funding will be obtained.
8. An implementation schedule is provided.
9. The conservation agreement or plan that includes the conservation effort is approved by all parties to the agreement or plan.

B. The certainty that the conservation effort will be effective:

1. The nature and extent of threats being addressed, and how the conservation effort reduces those threats, are described.
2. Explicit incremental objectives for the conservation effort and dates for achieving them are stated.
3. The steps necessary to implement the conservation effort are identified in detail.
4. Quantifiable, scientifically valid parameters that will demonstrate achievement of objectives, and standards for these parameters by which progress will be measured, are identified.

5. Provisions for monitoring and reporting progress on implementation and effectiveness are provided.
6. Principles of adaptive management are incorporated.

A summary of organizations whose formalized conservation efforts were assessed at listing are outlined below. A more detailed discussion of the organizations and their efforts is provided in Volumes II, III and IV.

Organizations Assessed At Listing

- Association of California Water Agencies
- Caltrans Operations
- California Fish and Game Commission – Rearing programs, water development/wetlands policies, fishing regulations
- California Regional Water Quality Control Board – Water codes, water management plans
- California Department of Fish and Game (now CDFW) – Fisheries management, California Steelhead Management Plan, Hatchery programs, Stock Management Policies, Coastal Monitoring Management Plan, Streamside Alteration Agreements, the Fisheries Restoration Grant Program, Keene-Nielsen Fisheries Restoration Act, predation control, Senate Bill 271, Steelhead Report Card, Trout and Steelhead Conservation and Management Planning Act of 1979, and CDFG codes 1385, 1600-1616, 2786, 5937, 6900
- Environmental Protection Agency – Coastal waters and wetland protection programs
- FishNet 4C – Multi-county forum to protect and enhance salmonid habitats
- Local watershed councils and other local restoration programs
- Mattole Salmon Group
- NRCS
- NMFS – ESA section 4, 7, 10, Magnuson-Stevens Fishery Conservation and Management Act, Pacific Coastal Salmon Recovery Fund, hatchery reforms, NMFS/CDFG agreements, NMFS/5Counties agreement, NMFS/California State Resources Memorandum of Understanding

- North Coast Regional Water Quality Control Board – Total Maximum Daily Load program
- National Park Service
- Pacific Fisheries Management Council
- Range Management Advisory Committee
- Resource Conservation Districts
- State Land Management and Timber Harvest Practices
- State Parks and Recreation
- Sub-watershed groups and organizations
- U.S. Forest Service and Bureau of Land Management
- U.S Army Corps of Engineers

5.2.3 STATUS REVIEWS SINCE LISTING

NMFS reviews the status of listed species at least once every five years to determine whether they should be removed from the list or have their listing status changed. These 5-year reviews are required by section 4(c)(2) of the ESA and are conducted according to the “5-Year Review Guidance: Procedures for Conducting 5-Year Reviews under the Endangered Species Act” (USFWS and NMFS 2006). We base these five-year reviews on the best scientific and commercial data available including new information since the last listing or 5-year review. We publish a FRN announcing the 5-year review to notify the public and solicit new information for us to consider in the review. Each 5-year review includes:

1. A summary and analysis of available information on a given species.
2. Tracking of a species’ progress toward recovery, including an assessment of the five section 4(a)(1) factors, and if applicable, recovery criteria outlined in the species recovery plan.
3. A description of the deliberative process we used to make a recommendation on whether or not to reclassify a species.
4. A recommendation on whether reclassification of the species is warranted.

To complete the reviews for CC Chinook salmon and NC and CCC steelhead, NMFS asks scientists from the SWFSC to collect and analyze new information about ESU and DPS viability

according to the biological viability criteria (See Chapter 3). The SWFSC prepares Technical Memoranda detailing the findings and whether new information suggests a change in extinction risk. NMFS considers the biological status information along with recovery plan criteria (for species with recovery plans), listing factors, and protective/conservation efforts to prepare final recommendations on whether the species should be removed from the list or have its status changed. If a status change is found warranted, we initiate rulemaking.

Previous status review updates for CC Chinook salmon and NC and CCC steelhead were conducted in 2005 (Good *et al.* 2005) and 2011 (NMFS 2011; Williams *et al.* 2011). In its most recent five-year reviews for the CC Chinook salmon ESU and NC and CCC steelhead DPSs, after considering the status reviews and other information described above, NMFS determined that the ESU and DPSs should remain listed as threatened (NMFS 2011). NMFS is currently in development of a status review for NC and CCC steelhead and CC Chinook and the report is expected to be published winter of 2016.

5.3 DELISTING AND RECOVERY

In recovery plans, NMFS must, to the maximum extent practicable, include “objective, measurable criteria which, when met, would result in a determination...that the species be removed from the list.”²⁴ (ESA section 4(f)(1)(B)(ii)). These criteria (recovery criteria) must: (1) be objective and measurable; (2) provide a measure to of progress toward achievement of recovery objectives; and (3) address each of the five ESA section 4(a)(1) factors. The importance of addressing the five section 4(a)(1) listing factors in recovery criteria was underscored in a Federal district court opinion:

“Congress has spoken in clarion terms: the objective, measurable criteria must be directed towards the goal of removing the endangered or threatened species from the list. Since the same five statutory factors must be considered in delisting as in listing, 16

²⁴ The delisting criteria in this plan will only focus on delisting because the species in this plan are listed as threatened not endangered and thus cannot be downlisted.

U.S.C. § 1533 (a), (b), (c), the Court necessarily concludes that the FWS, in designing objective, measurable criteria, must address each of the five statutory delisting factors and measure whether threats to the [species] have been ameliorated.” *Fund for Animals v. Babbitt*, 903 F. Supp. 96, 111 (D.D.C. 1995) (emphasis added).

In addition, in *Defenders of Wildlife v. Babbitt*, 130 F.Supp.2d 121, 133-134 (D.D.C. 2001), the court remanded a recovery plan to FWS to incorporate the five section 4(a)(1) factors into the objective, measurable criteria of the recovery plan or provide adequate explanation why it is not practicable to do so. Finally, in a U.S. Government Accountability Office (GAO) report on time and costs to recover listed species, the GAO recommended that the Secretaries of Commerce and the Interior direct FWS and NMFS “to include in recovery planning guidance, direction that all new and revised recovery plans have either recovery criteria evidencing consideration of all five delisting factors or a statement regarding why it is not practicable to do so” (USGAO 2006). Therefore, NMFS’ recovery planning guidance provides:

“For this reason, we require that all the criteria section of all plans now list out the 5 factors, and place the criteria that will address them below the appropriate factor. In the case that there are no threats that correspond to a given factor, simply note that this factor, e.g., habitat loss or destruction or modification, is not considered a threat to the given species. We anticipate that recovery plans will also include demographic criteria (abundance, distribution etc.), and that these appear separately from the ‘threats-based’ criteria.” (NMFS 2010)

5.3.1 RECOVERY PLAN GOALS, OBJECTIVES AND CRITERIA

The goal for this plan is to remove the NC steelhead DPS, CCC steelhead DPS and CC Chinook salmon ESU from the Federal List of Endangered and Threatened Wildlife (50 CFR 17.11; 50 CFR 223.102) due to their recovery. Our vision is to have restored freshwater and estuarine habitats that are supporting self-sustaining, well-distributed and naturally spawning salmonid populations that provide ecological, cultural, social and economic benefits to the people of California. Recovery plan objectives are to:

1. Reduce the present or threatened destruction, modification, or curtailment of habitat or range;
2. Ameliorate utilization for commercial, recreational, scientific, or educational purposes;
3. Abate disease and predation;
4. Establish the adequacy of existing regulatory mechanisms for protecting the ESU and DPSs now and into the future (*i.e.*, post-delisting);
5. Address other natural or manmade factors affecting the continued existence of the ESU and DPSs; and
6. Ensure the status of the ESU and DPSs are at a low risk of extinction (*i.e.* viable) based on abundance, growth rate, spatial structure and diversity.

Recovery goals, objectives and criteria provide a means by which the public can measure progress in the efforts at recovery and are used to link listing with status reviews and reclassification determinations. We developed the following categories of recovery criteria for the CC Chinook salmon ESU and NC and CCC steelhead DPSs: biological viability, criteria for each of the five listing factors (including degree recovery actions have been implemented), and certainty conservation efforts are ameliorating threats.

5.3.2 BIOLOGICAL RECOVERY CRITERIA

Populations selected for recovery scenarios must achieve the following criteria based on their role in recovery. Populations selected for recovery scenarios in all the Diversity Strata of the DPS or ESU must meet these criteria in order for the DPS or ESU to meet biological recovery criteria (*BR-4 only applies to CCC steelhead).

BR1 Low Extinction Risk Criteria: Essential independent populations (those selected to be viable), the low extinction risk criteria for effective population size, population decline, catastrophic decline, hatchery influence and density-based spawner abundances must be met according to Spence *et al.*(2008) (See Chapter 3, Table 2)

AND

BR2 Moderate Extinction Risk Criteria: Spawner density abundance targets have been achieved for Supporting Independent populations

AND

BR3 Redundancy and Occupancy Criteria: Spawner density and abundance targets for dependent populations, which are the occupancy goals for each of those populations, have been achieved. See Spence *et al.* (2008) (Table 2)

AND

BR4 Redundancy and Occupancy Criteria: For the Pinole Creek, San Pedro Creek, Drakes Bay, Wildcat Creek, and Codornices Creek dependent populations, that did not have IP developed for them by the SWFSC, confirm presence of steelhead juveniles and/or adults for at least one year class over 4 generations (*i.e.*, a 16 year period).

AND

BR5 NC steelhead summer-run populations must meet effective population size criteria outlined by Spence *et al.* (2008) (Table 2)

The selected populations and associated recovery criteria for the CC Chinook salmon ESU (Also see

Table 21):

- a. Selected populations in all four Diversity Strata achieving biological recovery criteria;
- b. **BR1** 13 Independent essential populations attaining low extinction risk criteria (*i.e.*, Bear River, Big River, Garcia River, Humboldt Bay tributaries, Lower Eel River (Van Duzen and Larabee), Lower Eel River (South Fork and Lower Eel), Little River, Mad River, Mattole River, Noyo River, Redwood Creek (Humboldt Co.), Russian River, and Upper Eel River);
- c. **BR2:** Three supporting independent populations attaining moderate extinction risk criteria (*i.e.*, Gualala River, Navarro River and Ten Mile River);
- d. **BR3:** Dependent population contributing to redundancy and occupancy criteria (*i.e.*, Albion River).

Table 21: CC Chinook Salmon ESU Diversity Strata, Populations, Historical Status, Population's Role in Recovery, Current IP-km, and Spawner Density and Abundance Targets for Delisting. The Diversity Stratum recovery targets are only comprised of the essential populations because these are the populations that are expected to be viable. *The Lower Eel River Chinook population is divided between two diversity strata, and as a result has one recovery target for the North Mountain Interior DS (Van Duzen and Larabee) and one for the North Coastal DS (Lower and South Fork Eel River).

| Diversity Strata | CC Chinook salmon Populations | Historical Population Status | Population's Role In Recovery | Current Weighted IP-km | Spawner Density | Spawner Abundance |
|---|---|------------------------------|-------------------------------|------------------------|-----------------|-------------------|
| North Coastal | Bear River | I | Essential | 39.4 | 37.8 | 1,500 |
| | Humboldt Bay Tributaries | I | Essential | 76.0 | 33.7 | 2,600 |
| | Little River (Humboldt Co.) | I | Essential | 17.4 | 40.0 | 700 |
| | Lower Eel River ~ Lower Mainstem/ South Fork Eel River* | I | Essential | 364.8 | 20 | 7,400 |
| | Mad River | I | Essential | 94.0 | 31.8 | 3,000 |
| | Mattole River | I | Essential | 177.5 | 22.5 | 4,000 |
| | Redwood Creek (Humboldt Co) | I | Essential | 116.1 | 29.3 | 3,400 |
| North Coastal Diversity Stratum Recovery Target | | | | | | 22,600 |
| North Mountain Interior | Lower Eel River ~ Larabee Creek/ Van Duzen River* | I | Essential | 143.7 | 20.0 | 2,900 |
| | Upper Eel River | I | Essential | 521.4 | 20.0 | 10,400 |
| North Mountain Interior Diversity Stratum Recovery Target | | | | | | 13,300 |
| North-Central Coastal | Albion River | D | Supporting | 17.6 | 6-12 | 104-209 |
| | Big River | I | Essential | 104.3 | 30.6 | 3,200 |
| | Noyo River | I | Essential | 62.2 | 35.3 | 2,200 |
| | Ten Mile River | I | Supporting | 67.2 | 6-12 | 401-804 |
| North-Central Coastal Diversity Stratum Recovery Target | | | | | | 5400 |

| | | | | | | |
|---|---------------|---|------------|-------|------|-------------|
| Central Coastal | Garcia River | I | Essential | 56.2 | 36.0 | 2,000 |
| | Gualala River | I | Supporting | 175.6 | 6-12 | 1,052-2,105 |
| | Navarro River | I | Supporting | 131.5 | 6-12 | 787-1,576 |
| | Russian River | I | Essential | 466.1 | 20.0 | 9,300 |
| Central Coastal Diversity Stratum Recovery Target | | | | | | 11,300 |

The selected populations and associated recovery criteria for NC Steelhead DPS (Also see Table 22 and Table 23).

Selected populations in all five Diversity Strata achieving biological recovery criteria;

- a. **BR-1:** 27 essential independent populations attaining low extinction risk criteria (*i.e.*, Garcia River, Gualala River, Navarro River, Chamise Creek, Outlet Creek, Tomki Creek, Woodman Creek, Larabee Creek, Middle Fork Eel River, North Fork Eel River, Upper Mainstem Eel River, Van Duzen River, Big River, Noyo River, Ten Mile River, Usal Creek, Wages Creek, Maple Creek/Big Lagoon, Bear River, Humboldt Bay Tributaries, Little River (Humboldt County), Mattole River, South Fork Eel River, Mad River (Upper), Mad River (Lower), and Redwood Creek (Upper) and Redwood (Lower) (Humboldt County));
- b. **BR-2:** Ten supporting independent populations attaining moderate extinction risk criteria (*i.e.*, Brush Creek, Elk Creek, Bell Springs, Bucknell Creek, Dobbyn Creek, Garcia Creek, Jewett River, Albion River, Cottaneva Creek and Pudding Creek; and
- c. **BR-3:** 14 dependent populations contributing to redundancy and occupancy criteria (*i.e.*, Schooner Gulch, Soda Creek, Caspar Creek, Guthrie Creek, Oil Creek, Big Creek, Big Flat Creek, Howe Creek, Jackass Creek, Lower Mainstem Eel River, McNutt Gulch, Shipman Creek, Spanish Creek, and Telegraph Creek.
- d. **BR-5:** 10 independent summer-run steelhead populations expected to meet effective population size criteria (Table 2) (*i.e.*, Redwood Creek, Mad River, South Fork Eel River, Mattole River, Van Duzen River, Larabee Creek, North Fork Eel River, Upper Middle Mainstem Eel River, Middle Fork Eel River, and Upper Mainstem Eel River.

Table 22: NC winter-run steelhead: Diversity Strata, Populations, Historical Status, Population's Role in Recovery, Current IP-km, and Spawner Density and Abundance Targets for Delisting. Redwood Creek and Mad River cross two diversity strata and were broken into an upper and lower to reflect this.

| Diversity Strata | NC winter-run steelhead populations | Historical Population Status | Population's Role In Recovery | Current Weighted IP-km | Spawner Density | Spawner Abundance |
|--|--------------------------------------|------------------------------|-------------------------------|------------------------|-----------------|-------------------|
| Northern Coastal | Bear River | I | Essential | 107.8 | 27.2 | 2,900 |
| | Big Creek | D | Supporting | 3.8 | 6-12 | 21-44 |
| | Big Flat Creek | D | Supporting | 5.9 | 6-12 | 33-69 |
| | Guthrie Creek | D | Supporting | 9.2 | 6-12 | 53-108 |
| | Howe Creek | D | Supporting | 13.9 | 6-12 | 81-165 |
| | Humboldt Bay Tributaries | I | Essential | 203.4 | 20.0 | 4,100 |
| | Jackass Creek | D | Supporting | 6.9 | 6-12 | 39-81 |
| | Little River (Humboldt Co.) | I | Essential | 50.0 | 35.3 | 1,800 |
| | Lower Mainstem Eel River Tributaries | D | Supporting | 166.9 | 6-12 | 999-2,001 |
| | Mad River (Lower)* | I | Essential | 145.7 | 22.0 | 3,200 |
| | Maple Creek/Big Lagoon | I | Essential | 71.7 | 32.3 | 2,300 |
| | Mattole River | I | Essential | 534.5 | 20.0 | 10,700 |
| | McNutt Gulch | D | Supporting | 11.3 | 6-12 | 66-134 |
| | Oil Creek | D | Supporting | 10.6 | 6-12 | 62-125 |
| | Redwood Creek (Humboldt Co) (Lower)* | I | Essential | 161.5 | 20.0 | 3,200 |
| | Shipman Creek | D | Supporting | 2.3 | 6-12 | 12-26 |
| | South Fork Eel River | I | Essential | 951.8 | 20.0 | 19,000 |
| | Spanish Creek | D | Supporting | 1.9 | 6-12 | 9-21 |
| | Telegraph Creek | D | Supporting | 5.3 | 6-12 | 30-62 |
| Northern Coastal Diversity Stratum Recovery Target | | | | | | 47,200 |
| North Mountain Interior | Dobbyn Creek | I | Supporting | 47.0 | 6-12 | 280-562 |

| | | | | | | |
|--|---|---|------------|-------|------|---------------|
| | Larabee Creek | I | Essential | 86.6 | 30.2 | 2,600 |
| | Mad River (Upper)* | I | Essential | 303.8 | 20.0 | 6,100 |
| | Middle Fork Eel River | I | Essential | 472.4 | 20.0 | 9,400 |
| | North Fork Eel River | I | Essential | 317.0 | 20.0 | 6,300 |
| | Redwood Creek (Humboldt Co) (Upper)* | I | Essential | 85.7 | 30.3 | 2,600 |
| | Upper Mainstem Eel River | I | Essential | 209.2 | 20.0 | 4,200 |
| | Van Duzen River | I | Essential | 312.2 | 20.0 | 6,200 |
| North Mountain Interior Diversity Stratum Recovery Target | | | | | | 37,400 |
| Lower Interior | Bell Springs Creek | I | Supporting | 18.1 | 6-12 | 107-215 |
| | Bucknell Creek | I | Supporting | 9.0 | 6-12 | 52-106 |
| | Chamise Creek | I | Essential | 36.2 | 37.2 | 1,300 |
| | Jewett Creek | I | Supporting | 16.8 | 6-12 | 99-200 |
| | Garcia Creek | D | Supporting | 14.1 | 6-12 | 83-167 |
| | Outlet Creek | I | Essential | 188.8 | 20.0 | 3,800 |
| | Soda Creek | D | Supporting | 15.7 | 6-12 | 92-186 |
| | Tomki Creek | I | Essential | 89.5 | 29.8 | 2,700 |
| | Woodman Creek | I | Essential | 35.0 | 37.4 | 1,300 |
| Lower Interior Diversity Stratum Recovery Target | | | | | | 9,100 |
| North-Central Coastal | Albion River | I | Supporting | 48.6 | 6-12 | 290-581 |
| | Big River | I | Essential | 255 | 20 | 5,100 |
| | Caspar Creek | D | Essential | 12.9 | 40.4 | 500 |
| | Cottaneva Creek | I | Supporting | 21.9 | 6-12 | 129-261 |
| | Noyo River | I | Essential | 152.8 | 21.0 | 3,200 |
| | Pudding Creek | I | Supporting | 24.1 | 6-12 | 143-287 |
| | Ten Mile River | I | Essential | 171.0 | 20 | 3,400 |
| | Usal Creek | I | Essential | 27.5 | 38.4 | 1,100 |

| | | | | | | |
|--|----------------|---|------------|-------|------|---------|
| | Wages Creek | I | Essential | 17.3 | 39.8 | 700 |
| North-Central Coastal Diversity Stratum Recovery Target | | | | | | 14,000 |
| Central Coastal | Brush Creek | I | Supporting | 23.8 | 6-12 | 141-284 |
| | Elk Creek | I | Supporting | 21.5 | 6-12 | 127-256 |
| | Garcia River | I | Essential | 135.4 | 23.4 | 3,200 |
| | Gualala River | I | Essential | 397.1 | 20.0 | 7,900 |
| | Navarro River | I | Essential | 387.5 | 20.0 | 7,800 |
| | Schooner Gulch | D | Supporting | 7.7 | 6-12 | 44-90 |
| Central Coastal Diversity Stratum Recovery Target | | | | | | 18,900 |
| NC Steelhead DPS Recovery Target | | | | | | 128,700 |

Table 23: NC summer-run steelhead: Diversity Strata, Populations, Historical Population Status, and Effective Population Size (N_e). *The Redwood Creek and Mad River populations each occur in two diversity strata (Spence *et al.* 2008). In both watersheds, the location of actual spawning grounds is poorly understood and therefore each will be treated as one population until more information is obtained from monitoring.

| Diversity Strata | NC summer-run steelhead populations | Historical Population Status | Effective Population Size |
|--|-------------------------------------|------------------------------|---------------------------|
| Northern Coastal/ North Mountain Interior | Redwood Creek* | I | $N_e \geq 500$ |
| Northern Coastal/ North Mountain Interior | Mad River* | I | $N_e \geq 500$ |
| Northern Coastal | South Fork Eel River | I | $N_e \geq 500$ |
| Northern Coastal | Mattole River | I | $N_e \geq 500$ |
| North Mountain Interior | Van Duzen River | I | $N_e \geq 500$ |
| North Mountain Interior | Larabee Creek | I | $N_e \geq 500$ |
| North Mountain Interior | North Fork Eel River | I | $N_e \geq 500$ |
| North Mountain Interior | Upper Middle Mainstem Eel River | I | $N_e \geq 500$ |
| North Mountain Interior | Middle Fork Eel River | I | $N_e \geq 500$ |
| North Mountain Interior | Upper Mainstem Eel River | I | $N_e \geq 500$ |

The selected populations and associated recovery criteria for the CCC Steelhead DPS (See also Table 24).

Selected populations in all five Diversity Strata achieving biological recovery criteria;

- a. **BR-1** 28 essential independent populations attaining a low extinction risk (*i.e.*, Corte Madera Creek, Guadalupe River, Novato Creek, San Francisquito Creek, Stevens Creek, Dry Creek, Maacama Creek, Mark West Creek, Upper Russian River, Alameda Creek, Coyote Creek, Green Valley/Suisun Creek, Napa River, Petaluma River, Sonoma Creek, Austin Creek, Green Valley Creek, Lagunitas Creek, Salmon Creek, Walker Creek, Aptos Creek, Pescadero Creek, Pilarcitos Creek, San Gregorio Creek, San Lorenzo River, Scott Creek, Soquel Creek and Waddell Creek);
- b. **BR-2:** Five supporting independent populations attaining moderate extinction risk criteria (*i.e.*, San Mateo Creek, San Leandro Creek, San Lorenzo Creek, Americano Creek and Laguna Creek); and
- c. **BR-3:** 18 supporting dependent populations contributing to redundancy and occupancy criteria (*i.e.*, Miller Creek (Marin Co.), Arroyo Corte de Madera Creek; Crocker Creek, Gill Creek, Miller Creek (Russian), Sausal Creek, San Pablo Creek, Dutch Bill Creek (Russian), Freezeout Creek (Russian), Hulbert Creek (Russian), Pine Gulch, Porter Creek (Russian), Redwood Creek (Marin Co.), Sheephouse Creek (Russian), Willow Creek (Russian), Gazos Creek, San Vicente Creek, and Tunitas Creek).
- d. **BR-4:** Five supporting dependent populations that did not have IP developed for them by the SWFSC, contribute to the redundancy and occupancy criteria; Codornices Creek, Pinole Creek, Wildcat Creek, Drakes Bay tributaries, and San Pedro Creek

Table 24: CCC steelhead DPS Diversity Strata, Populations, Historical Status, Population's Role in Recovery, Current IP-km, and Spawner Density and Abundance Targets for Delisting. *IP was not developed for these populations by the SWFSC.

| Diversity Strata | CCC Steelhead Population | Historical Population Status | Population's Role In Recovery | Current Weighted IP-km | Spawner Density | Spawner Abundance |
|---|---------------------------|------------------------------|-------------------------------|------------------------|-----------------|-------------------|
| North Coastal | Austin Creek | I | Essential | 95.1 | 29.0 | 2,800 |
| | Drakes Bay Tributaries* | D | Supporting | N/A | N/A | N/A |
| | Dutch Bill Creek | D | Supporting | 13.2 | 6-12 | 77-156 |
| | Estero Americano Creek | I | Supporting | 35.4 | 6-12 | 210-423 |
| | Freezeout Creek | D | Supporting | 1.2 | 6-12 | 5-12 |
| | Green Valley Creek | I | Essential | 37.1 | 38.8 | 1,400 |
| | Hulbert Creek | D | Supporting | 10.2 | 6-12 | 59-120 |
| | Lagunitas Creek | I | Essential | 85.0 | 30.4 | 2,600 |
| | Pine Gulch | D | Supporting | 9.7 | 6-12 | 56-114 |
| | Porter Creek | D | Supporting | 10.3 | 6-12 | 60-122 |
| | Redwood Creek (Marin Co.) | D | Supporting | 6.7 | 6-12 | 38-78 |
| | Salmon Creek | I | Essential | 33.6 | 37.6 | 1,300 |
| | Sheephouse Creek | D | Supporting | 3.7 | 6-12 | 20-42 |
| | Walker Creek | I | Essential | 73.3 | 32 | 2,300 |
| | Willow Creek | D | Supporting | 8.2 | 6-12 | 47-96 |
| North Coastal Diversity Stratum Recovery Target | | | | 422.7 | 24.6 | 10,400 |
| Interior | Crocker Creek | D | Supporting | 4.5 | 6-12 | 25-52 |
| | Dry Creek | I | Essential | 115.9 | 26.1 | 3,000 |
| | Gill Creek | D | Supporting | 8.1 | 6-12 | 47-95 |
| | Maacama Creek | I | Essential | 76.2 | 31.6 | 2,400 |
| | Mark West Creek | I | Essential | 164.2 | 20 | 3,300 |
| | Miller Creek (Russian) | D | Supporting | 3.1 | 6-12 | 17-35 |
| | Sausal Creek | D | Supporting | 11.1 | 6-12 | 65-131 |

| | | | | | | | |
|----------------------|------|--|---|------------|-------|-------|---------|
| | | Upper Russian River | I | Essential | 422.9 | 20 | 8,500 |
| | | Interior Diversity Stratum Recovery Target | | | 806 | 21.34 | 17,200 |
| Coastal Bay | S.F. | Arroyo Corte Madera del Presidio | D | Supporting | 6.8 | 6-12 | 39-80 |
| | | Corte Madera Creek | I | Essential | 19.8 | 39.5 | 800 |
| | | Guadalupe River | I | Essential | 50.8 | 35.2 | 1,800 |
| | | Miller Creek (Marin Co.) | D | Supporting | 9.1 | 6-12 | 53-107 |
| | | Novato Creek | I | Essential | 28.7 | 38.2 | 1,100 |
| | | San Francisquito Creek | I | Essential | 35.6 | 37.3 | 1,300 |
| | | San Mateo Creek | I | Supporting | 6.7 | 6-12 | 38-78 |
| | | Stevens Creek | I | Essential | 22.7 | 39.1 | 900 |
| | | Coastal San Francisco Bay Diversity Stratum Recovery Target | | | 180.2 | 32.74 | 5,900 |
| Interior Bay | S.F. | Alameda Creek | I | Essential | 97.1 | 28.7 | 2,800 |
| | | Codornices Creek* | D | Supporting | N/A | N/A | N/A |
| | | Coyote Creek | I | Essential | 109.3 | 27.0 | 3,000 |
| | | Green Valley/Suisun Creek | I | Essential | 64.3 | 33.3 | 2,100 |
| | | Napa River | I | Essential | 233.2 | 20 | 4,700 |
| | | Petaluma River | I | Essential | 64.9 | 33.2 | 2,200 |
| | | Pinole Creek* | D | Supporting | N/A | N/A | N/A |
| | | San Leandro Creek | I | Supporting | 5.4 | 6-12 | 30-63 |
| | | San Lorenzo Creek | I | Supporting | 18.6 | 6-12 | 110-221 |
| | | San Pablo Creek | I | Supporting | 8.6 | 6-12 | 50-101 |
| | | Sonoma Creek | I | Essential | 128.7 | 24.3 | 3,100 |
| | | Wildcat Creek* | D | Supporting | N/A | N/A | N/A |
| | | Interior San Francisco Bay Diversity Stratum Recovery Target | | | 730.1 | 24.52 | 17,900 |
| Santa Cruz Mountains | | Aptos Creek | I | Essential | 25.1 | 38.7 | 1,000 |
| | | Gazos Creek | D | Supporting | 12.5 | 6-12 | 73-148 |

| | | | | | |
|--|---|------------|-------|------|--------|
| Laguna Creek | I | Supporting | 4.5 | 6-12 | 25-52 |
| Pescadero Creek | I | Essential | 66.1 | 33.0 | 2,200 |
| Pilarcitos Creek | I | Essential | 28.5 | 38.3 | 1,100 |
| San Gregorio Creek | I | Essential | 46.6 | 35.7 | 1,700 |
| San Lorenzo River | I | Essential | 146.2 | 21.9 | 3,200 |
| San Pedro Creek* | D | Supporting | N/A | N/A | N/A |
| San Vicente Creek | D | Supporting | 5.7 | 6-12 | 32-66 |
| Scott Creek | I | Essential | 16.4 | 39.9 | 700 |
| Soquel Creek | I | Essential | 52.0 | 35 | 1,800 |
| Tunitas Creek | D | Supporting | 10.7 | 6-12 | 62-126 |
| Waddell Creek | I | Essential | 10.8 | 40 | 500 |
| Santa Cruz Mountains Diversity Stratum Recovery Target | | | 425.1 | 28.7 | 12,200 |
| CCC Steelhead DPS Recovery Target | | | | | 63,600 |

5.3.3 ESA § 4(a)(1) FACTORS RECOVERY CRITERIA

The following are the recovery criteria for the section ESA 4(a)(1) listing factors. The primary metrics for assessing whether each of the listing factor criteria have been achieved will be to utilize the CAP analyses to reassess habitat attribute and threat conditions in the future, and track the implementation of identified recovery actions unless otherwise found unnecessary.

All recovery actions were assigned to a specific section 4(a)(1) listing factor in order to track progress of implementation of actions for each factor. Recovery Action Priorities are assigned to each action step in the implementation table in accordance with NMFS' Interim Recovery Planning Guidance (NMFS 2010a) and the NMFS Endangered and Threatened Species Listing and Recovery Priority Guidelines (55 FR 24296) (See Chapter 4 for more information).

Listing Factor A: Present or threatened destruction, modification or curtailment of habitat or range

- A1 CAP/Rapid Assessment attribute ratings for:
- Essential Populations found Good or better for all attributes in each Stratum.
 - Supporting Populations found Good or better for 50 percent²⁵ and the remaining rated Fair throughout the DPS/ESU.
- A2 All recovery actions have been implemented under Listing Factor A, or the actions are deemed no longer necessary for recovery.

Listing Factor B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

- B1 CAP/Rapid Assessment threat ratings for Fishing and Collecting:
- Essential and Supporting Populations found Medium or Low.
- B2 All recovery actions have been implemented under Listing Factor B, or the actions are deemed no longer necessary for recovery.

Listing Factor C: Disease, Predation and Competition

- C1 CAP/Rapid Assessment threat ratings for Disease, Predation and Competition:
- Essential and Supporting Populations found Medium or Low.
- C2 All recovery actions have been implemented under Listing Factor C, or the actions are deemed no longer necessary for recovery.

Listing Factor D: The Inadequacy of Existing Regulatory Mechanisms

- D1 CAP/Rapid Assessment threat ratings related to Listing Factor D (see list below):
- Essential and Supporting Populations found Medium or Low.

Listing Factor D Threats

- Agriculture

²⁵ The role of supporting populations within the recovery scenario is to provide for redundancy and occupancy across Diversity Stratum. Because of their role, we use lower criteria for Factor A (*i.e.*, 50 percent as Good or better and the remaining as Fair). A "Fair" CAP/rapid assessment rating means that habitat conditions, while impaired to some degree, are functioning. Therefore, at least all habitat conditions are expected to function within these populations, and at least half are expected to be in proper condition (*i.e.*, Good), which NMFS expects will be sufficient for these populations to fulfill their role within the recovery scenario.

- Channel Modification
- Fire, Fuel Management and Fire Suppression
- Livestock Farming and Ranching
- Logging and Wood Harvesting
- Mining
- Residential and Commercial Development
- Roads and Railroads
- Water Diversions and Impoundments

D2 All recovery actions have been implemented under Listing Factor D, or the actions are deemed no longer necessary for recovery.

Listing Factor E: Other Natural and Manmade Factors Affecting the Species' Continued Decline

E1 CAP/Rapid Assessment threat ratings for Hatcheries and Aquaculture, Recreational Areas and Activities, and Severe Weather Patterns:
a. Essential and Supporting Populations found Medium or Low.

E2 All recovery actions have been implemented under Listing Factor E, or the actions are deemed no longer necessary for recovery.

5.3.4 CONSERVATION EFFORTS

CE1 Formalized conservation efforts applicable to the ESU or DPS have been implemented and are effective in ameliorating any remaining threats associated with the five section 4(a)(1) factors.

6.0 MONITORING AND ADAPTIVE MANAGEMENT

"It is imperative that California, which is well behind other states in the Pacific Northwest, begin conducting monitoring at spatial scales relevant to recovery planning if we are to have any hope of accurately evaluating status and progress towards recovery."

Spence et al. 2008

6.1 INTRODUCTION

Monitoring that addresses biological viability criteria and listing factors is needed to inform federal recovery criteria provided in Chapter 5. This chapter describes specific monitoring and adaptive management strategies needed to measure progress toward meeting recovery criteria and determine whether any revisions to those recovery criteria should be made in the 5-year reviews of the recovery plan. The purpose of this chapter is to better assist those interested or involved in salmon and steelhead monitoring along California's central coast.

In addition to recommendations in this recovery plan, NOAA has several documents outlining federal ESA needs for monitoring:

- Recommendations to federal and state agencies, tribes, local governments and watershed organizations on monitoring priorities can be found in the *Guidance for Monitoring Recovery of Pacific Northwest Salmon and Steelhead listed under the Federal Endangered Species Act* (Crawford and Rumsey 2011).
- Guidance directed toward habitat restoration monitoring has been provided to states and tribes through the Pacific Coastal Salmon Recovery Fund's *Performance Goals, Measures, and Reporting Framework* (NMFS 2006)

We specifically refer readers to Crawford and Rumsey (2011) when designing monitoring programs. Monitoring conducted specifically to inform federal recovery criteria should include, for each Diversity Stratum, the following for all ESU's and DPS': (1) estimates of adult abundances from one to two populations, (2) habitat status and trends, and (3) the status of the five federal listing factors and associated threats (including the adequacy or inadequacy of regulatory mechanisms). The following tables show what is most important for state, tribal, and local governments to monitor to determine recovery. For Table 25 and Table 26, each type of monitoring effort for populations and listing factors has been ranked. Those with higher priorities should be the focus for distribution of funds and developing additional or new monitoring programs.

Table 25. NMFS recommended biological monitoring priorities (adapted from Crawford and Rumsey 2011).

| Criteria | Monitoring Priority | Confounding Effects of Sources of Error | Comments |
|----------------------|---------------------|---|--|
| VSP CRITERIA | | | |
| Adult Abundance | Highest | <ul style="list-style-type: none"> • Estimation methods • Inaccurate harvest or abundance estimates • Conversion and confusion between spawners and escapement • Unidentified hatchery spawners (steelhead only) • Estimates without accuracy and precision • Exclusion or inclusion of jacks • Confusion about conversion of escapement to spawners | <ul style="list-style-type: none"> • It must be recognized that tracking spawning populations is at the heart of VSP criteria. • Measuring adult abundance for the populations within the ESU/DPS could be sufficient to determine recovery but may take a considerable number of years to be confident that the listing factors are apparently no longer threats to the continued existence of the species. |
| Juvenile Abundance | Very High | <ul style="list-style-type: none"> • Trapping efficiencies (migrant abundance and timing) • Variable age at migration • Migrating hatchery releases (steelhead only) • Rainbow trout / steelhead interfaces • Supplementation programs (steelhead only) | <ul style="list-style-type: none"> • Juvenile migrant abundance estimates are critical in order to estimate freshwater production and survival. • Juvenile parr estimates provide spatial distribution and correlate habitat quality to fish abundance. |
| Productivity | Very High | <ul style="list-style-type: none"> • Juvenile and adult supplementation • Age class structure • Hatchery spawners (steelhead only) • Hatchery density dependent impacts in the estuary and marine environment (steelhead only) | <ul style="list-style-type: none"> • Productivity is only accurate if the estimates of adult abundance and (where employed) juvenile abundance are accurate. As used by the TRT, productivity is defined in terms of spawner to redd ratios. Juvenile info is valuable where available, but it is not available for many populations. |
| Spatial Distribution | High | <ul style="list-style-type: none"> • Lack of a periodic census or valid spatially balanced sampling program (<i>i.e.</i>, CMP not implemented throughout the ESU/DPS) • Low abundance can lead to risky conclusions regarding spatial structure. | <ul style="list-style-type: none"> • Spatial distribution tends to be a collection of individual site records developed over time. NMFS will utilize spatially balanced data derived from the CMP as well as other data sources to determine annual spatial distribution of Chinook salmon and steelhead throughout the ESU/DPS. |

| | | | |
|-----------|------|--|--|
| Diversity | High | <ul style="list-style-type: none"> • Inadequate baseline information for phenotype and genotype diversity • Hatchery effects (steelhead only) • Harvest effects • Changes to habitat | <ul style="list-style-type: none"> • Many diversity traits can be tracked through the various sampling elements of the CMP including juvenile migrant sampling, juvenile abundance sampling, and juvenile estuary sampling and spawner surveys. • A standardized protocol for appropriate reference conditions for phenotype and genotype diversity is needed. |
|-----------|------|--|--|

Table 26. NMFS recommended listing factor monitoring priorities (adapted from Crawford and Rumsey 2011).

| Criteria | Monitoring | Confounding Effects or Sources of Error | Comments |
|---|------------|--|---|
| LISTING FACTORS | | | |
| A. Present or threatened destruction, modification or curtailment of habitat or range | High | <ul style="list-style-type: none"> • Lack of adequate habitat sampling program. Need to know the status/trends of multiple key habitat attributes. • Only tracking the number of restoration projects completed does not necessarily indicate net improvement in salmon habitat | <ul style="list-style-type: none"> • The loss of freshwater and estuarine habitat is of major importance in the decline of salmon and steelhead. • Quantifying status/trends of habitat conditions continues to be underfunded and sparsely applied. • Funding to develop and implement a comprehensive monitoring protocol for habitat conditions is needed. |
| B. Overutilization for commercial, recreational, scientific, or educational purposes | Very High | <ul style="list-style-type: none"> • Poor stock identification techniques for naturally produced adults in the fisheries including lack of Genetic Stock Index (GSI) measurements • Unmarked hatchery adults in the fisheries • Unknown compliance with harvest regulations (unaccounted losses) • Assumptions regarding long term survival of marked fish | <ul style="list-style-type: none"> • Although harvest is considered a threat, it is integral to calculating productivity and potential spawner abundance. • Since it is probably the threat that can be controlled to the greatest extent, estimating accurately its impact to recovery is crucial. • Development and finalization of Fisheries Management and Evaluation Plans is needed. |

| | | | |
|---|--------|---|---|
| C. Disease, predation and competition | Medium | <ul style="list-style-type: none"> • Salmonid mortality due to predators is not well documented • Hatchery contributions to disease | <ul style="list-style-type: none"> • Development and implementation of monitoring to assess the extent and impact of diseases is needed (at least in areas where disease is of concern). • Development and implementation of monitoring to assess predation rates is needed (at least in populations where predation is of concern). |
| D. Inadequacy of existing regulatory mechanisms | Medium | <ul style="list-style-type: none"> • Unknown compliance with zoning and other land use regulations | <ul style="list-style-type: none"> • An audit of compliance with state and local land use and environmental laws and regulations should be completed periodically to test for effectiveness. |
| E. Other natural and manmade factors affecting the species' continued decline | Medium | <ul style="list-style-type: none"> • Spatial and temporal patterns difficult to discern • Lack of spawning ground survey data on hatchery straying into natural production areas • Lack of GSI measurements • Lack of marking of all hatchery fish • Competition | <ul style="list-style-type: none"> • This factor is already monitored by the NWFSC and SWFSC and universities, with several models in development. • Marine survival of salmon and steelhead is a direct measure of ocean and climate conditions and is essential for determining viability of salmon. More focused information is needed at the ESU/DPS scale. • Development and finalization of Hatchery and Genetic Management Plans is needed. |

6.2 CALIFORNIA COASTAL MONITORING PROGRAM

CDFW and NMFS are implementing a statewide plan, the California Coastal Monitoring Program (CMP), to standardize monitoring of coastal populations of anadromous native salmonids and inform recovery, conservation, and management. The CMP is being guided by *Fish Bulletin 180 California Coastal Salmonid Monitoring: Strategy, Design and Methods* (Adams *et al.* 2011).

While the current CMP process focuses on coastal streams, it is the ultimate goal of CDFW and NMFS to have a robust and adaptive monitoring program that includes all salmon and steelhead populations in California. The CMP Management and Technical Teams are developing a plan intended to:

- provide regional (ESU/DPS-level) and population abundance estimates for both status and trend of salmonid populations that will provide the basis for recovery criteria;
- estimate productivity trends from status abundance data;
- provide estimates of regional and population level spatial structure of coastal salmonids;
- include spatially balanced spawner/redd surveys;
- consider the diversity of life history and ecological differences in the three species of interest (steelhead, Chinook salmon, and coho salmon);
- create permanent life cycle monitoring (LCM) stations to calibrate redd survey estimates and provide in-depth evaluations of both freshwater and marine fish-habitat relationships and provide long-term population status and trend monitoring;
- include juvenile spatial distribution, diversity and abundance; and
- assess freshwater and estuarine habitat conditions.

Currently, only a few organizations have implemented population-level monitoring programs for adult returns outlined in the CMP (*e.g.*, CDFW and NMFS' SWFSC). These efforts provide a critical first step for building experience and collecting data that can ultimately be used to determine the status toward our recovery goals. Several other organizations (*e.g.*, Sonoma County Water Agency, Marin Municipal Water District and National Park Service) also have

extensive population level monitoring programs in other coastal populations and progress is being made towards adapting these ongoing monitoring programs into the CMP.

NMFS and CDFW acknowledge the CMP must be built overtime as methods are tested and refined and funding secured. While the fundamental principles of the CMP (*i.e.*, the need for random, spatially balanced sampling and robust population estimates) will remain more or less the same, the specific metrics and procedures used to evaluate recovery will likely evolve as we learn from early implementation of the plan. To track Chinook salmon and steelhead abundance trends, however, we must expand upon our existing monitoring efforts immediately throughout each ESU and DPS using the existing CMP framework. Data collected over a broad geographic scope will assist with the refinement of methods, experimentation of other methods, and highlight additional data needs. To do this, we must prioritize and secure additional funding sources.

The CMP, if adequately funded and implemented, could serve as the State's leading program to communicate the type of monitoring needed to inform ESA 5-year status reviews and recovery progress of California's salmon and steelhead. Currently, the CMP is limited in scope and funding; thus, obtaining data from other monitoring and research activities may be used to augment NOAA's required 5-year status reviews and assessment on the status and trends of populations, habitats, recovery action implementation, and the federal listing factors and threats.

6.3 MONITORING ABUNDANCE, PRODUCTIVITY, STRUCTURE AND DIVERSITY

The most fundamental population viability metric is spawner abundance measured over time (*e.g.*, abundance over multiple generations). Spawner abundance will be assessed using a two-staged sampling approach (Adams *et al.* 2011). First-stage sampling is comprised of extensive regional and spatially- balanced spawning (redd) surveys to estimate escapement in stream reaches selected under a Generalized Random Tessellation Sampling (GRTS; Gallagher *et al.* 2010) design. The GRTS is a rotating panel design at a survey level of a minimum of ten percent of

available habitat each year (some streams, or reaches of interest, may require greater levels). For populations, or specific reaches where traditional spawner surveys are not physically possible, the use of methods such as drift surveys or aerial counts from helicopters (DeHaven 2008) or Unmanned Aerial Systems (UAS, or drones) may be employed (Arnsberg *et al.* 2014). Protocols for these methods will be developed by the CMP Technical Teams as needed.

Second-stage sampling consists of producing escapement estimates in intensively monitored streams (*e.g.*, LCM stations) through either total counts of returning adults or mark-recapture based estimates. The second-stage estimates are considered to represent true adult escapement and resulting spawner to redd ratios are used to calibrate first-stage estimates of regional adult abundance (Crawford and Rumsey 2011).

The LCM stations consist of either fixed counting facilities, or portable, seasonally installed facilities where fish are either trapped and marked, or directed through a viewing chamber and counted. Another method, makes use of Dual Frequency Identification Sonar (DIDSON) technology. DIDSON has been shown to provide reliable adult escapement estimates in a variety of riverine environments throughout California (Holmes *et al.* 2006; Pipal *et al.* 2010; Metheny 2012; Pipal *et al.* 2012; Larson 2013; Atencio and Reichmuth 2014). For watersheds with more than one salmonid species, the date of image capture and size of fish can be used to help differentiate between species when incorporated with auxiliary data (*e.g.*, spawning surveys, direct sampling). The newest technology is the use of Adaptive Resolution Imaging Sonar (ARIS) imaging which provides even higher resolution images of fish. The CMP Technical Team and researchers in California are developing protocols and methods to improve species assignment using sonar imaging technologies. Other methods that could be used at counting stations may include Vaki Riverwatcher technology and fish wheels.

Estimates of freshwater and marine survival as well as life history information inferred from adult, smolt and summer rearing abundance monitoring gathered at LCM stations are used to inform regional status and trend information. These LCM populations (watersheds) are also

intended to be focal points for evaluating restoration and encouraging further research. The monitoring needs and recommendations presented below rely heavily on the CMP discussions ongoing between NMFS and CDFW (CMP Technical, Management and Policy teams) along with guidelines presented in Crawford and Rumsey (2011).

6.3.1 ADULT SPAWNER ABUNDANCE

Recommendations for monitoring adult spawner abundance include:

1. Implementation of an unbiased two-stage GRTS-based ESU/DPS-wide monitoring program (*i.e.*, the CMP) for adult Chinook salmon and steelhead that has known precision and accuracy. The monitoring plan should:
 - a. Provide yearly adult spawner abundance estimates at the ESU/DPS, diversity stratum, and, population level. Establish a minimum of one (or preferably two) LCM stations within each diversity stratum to estimate spawner: redd ratios. These stations will be used for calibrating regional redd counts, and smolt/adult ratios for marine/freshwater survival estimations.
 - b. Prioritize monitoring in locations that inform the biological criteria of this recovery plan and NOAA's 5-Year Status Reviews. Locations of greatest preference for monitoring are those identified as a Priority²⁶ A or B in Table 26, Table 27 and Table 28;
 - c. Maintain current LCM stations in Humboldt, Mendocino, and Santa Cruz counties and seek to incorporate other existing monitoring programs into the master sample GRTS design;

²⁶ Table 27, Table 28 and Table 29 identify priority monitoring locations for each ESU and DPS from highest to lowest (A to D). While monitoring of all salmonid populations would be preferable, the cost of such an effort is prohibitive. Preferred locations listed are based on the need to conduct monitoring that informs the viability of one or two representative populations for each Diversity Strata, across all Strata. They are also based on extant populations, existing datasets, opportunities of sampling multiple species, likelihood of recovery, access, potential partners, etc. Thus, Priority A and B locations are preferred areas for life cycle station monitoring to inform progress toward meeting recovery plan biological viability criteria. Adult monitoring in Priority C and D areas would inform progress toward meeting viability criteria for essential populations and adult or juvenile monitoring in supporting populations would inform progress toward meeting recovery plan occupancy and connectivity criteria.

- d. Over time and as populations approach recovery, strive to have ESU/DPS-level adult spawner data with a coefficient of variation (CV) on average of 15 percent or less (Crawford and Rumsey 2011);
- e. Regional (*i.e.*, ESU/DPS) spawner data should have the statistical power to detect a change of ± 30 percent with 80 percent certainty within 10 years (Crawford and Rumsey 2011);
- f. Strive to have abundance estimates at the LCM stations with a CV on average of 15 percent or less; and
- g. In time, develop and implement an element within the CMP that will evaluate steelhead hatchery impacts and hatchery-to-wild ratios (that should cover a range of issues from genetic changes to brood stock mining) and implement hatchery recommendations per Spence *et al.* (2008).

Table 27. Priorities for monitoring populations throughout the CC Chinook salmon ESU.

| Diversity Strata | CC Chinook Populations | Independent /Dependent | Priorities | Other ESUs/DPSs |
|-------------------------|--|------------------------|----------------------------|--------------------------|
| North Coastal | Bear River | I | Priority C | SONCC coho; NC steelhead |
| North Coastal | Humboldt Bay | I | Priority A | SONCC coho; NC steelhead |
| North Coastal | Little River (Humboldt Co) | I | Priority C | SONCC coho; NC steelhead |
| North Coastal | Lower Eel River/South Fork Eel River | I | Priority A | SONCC coho; NC steelhead |
| North Coastal | Mad River | I | HGMP; Fisheries Mgt. | SONCC coho; NC steelhead |
| North Coastal | Mattole River | I | Priority C | SONCC coho; NC steelhead |
| North Coastal | Redwood Creek (Humboldt Co) | I | Priority A | SONCC coho; NC steelhead |
| North Mountain Interior | Lower Eel River (<i>Larabee Creek and Van Duzen River</i>) | I | Priority B | SONCC coho; NC steelhead |

| | | | | |
|-------------------------|-----------------|---|------------|--------------------------|
| North Mountain Interior | Upper Eel River | I | Priority A | SONCC coho; NC steelhead |
| North-Central Coastal | Albion River | D | Priority D | CCC coho; NC steelhead |
| North-Central Coastal | Big River | I | Priority C | CCC coho; NC steelhead |
| North-Central Coastal | Noyo River | I | Priority A | CCC coho; NC steelhead |
| North-Central Coastal | Ten Mile River | I | Priority B | CCC coho; NC steelhead |
| Central Coastal | Garcia River | I | Priority A | CCC coho; NC steelhead |
| Central Coastal | Gualala River | I | Priority D | CCC coho; NC steelhead |
| Central Coastal | Navarro River | I | Priority D | CCC coho; NC steelhead |
| Central Coastal | Russian River | I | Priority A | CCC coho; CCC steelhead |

Table 28. Priorities for monitoring populations throughout the NC steelhead DPS.

| Diversity Strata | NC Steelhead Populations | Independent /Dependent | Priorities | Other ESUs/DPSs |
|-----------------------------------|-----------------------------|------------------------|------------|------------------------|
| Northern Coastal/No. Mt. Interior | Mad River | I | Priority C | SONCC coho; CC Chinook |
| Northern Coastal/No. Mt. Interior | Redwood Creek (Humboldt Co) | I | Priority A | SONCC coho; CC Chinook |
| Northern Coastal | Guthrie Creek | D | Priority D | SONCC coho |
| Northern Coastal | Maple Creek/Big Lagoon | I | Priority D | SONCC coho |
| Northern Coastal | Oil Creek | D | Priority D | |
| Northern Coastal | Bear River | I | Priority C | SONCC coho |
| Northern Coastal | Big Creek | D | Priority D | |
| Northern Coastal | Big Flat Creek | D | Priority D | |
| Northern Coastal | Howe Creek | D | Priority D | |

| | | | | |
|-------------------------|--|---|------------|------------------------|
| Northern Coastal | Humboldt Bay | I | Priority A | SONCC coho; CC Chinook |
| Northern Coastal | Jackass Creek | D | Priority D | |
| Northern Coastal | Little River (Humboldt County) | I | Priority C | SONCC coho; CC Chinook |
| Northern Coastal | Lower Mainstem Eel River | D | Priority C | SONCC coho; CC Chinook |
| Northern Coastal | Mattole River | I | Priority B | SONCC coho; CC Chinook |
| Northern Coastal | McNutt Gulch | D | Priority D | SONCC coho |
| Northern Coastal | Shipman Creek | D | Priority D | |
| Northern Coastal | South Fork Eel River | I | Priority A | SONCC coho; CC Chinook |
| Northern Coastal | Spanish Creek | D | Priority D | |
| Lower Interior | Bell Springs Creek | I | Priority D | SONCC coho |
| Lower Interior | Bucknell Creek | I | Priority D | SONCC coho |
| Lower Interior | Chamise Creek | I | Priority C | SONCC coho |
| Lower Interior | Outlet Creek | I | Priority A | SONCC coho |
| Lower Interior | Soda Creek | D | Priority D | SONCC coho |
| Lower Interior | Tomki Creek | I | Priority B | SONCC coho; CC Chinook |
| Lower Interior | Woodman Creek | I | Priority C | SONCC coho |
| North Mountain Interior | Dobbyn Creek | I | Priority D | |
| North Mountain Interior | Larabee Creek | I | Priority A | SONCC coho; CC Chinook |
| North Mountain Interior | Middle Fork Eel River | I | Priority C | |
| North Mountain Interior | North Fork Eel River | I | Priority C | |
| North Mountain Interior | Up. Main Eel River/ Up. Middle Main Eel River (Summer) | I | Priority B | SONCC coho; CC Chinook |
| North Mountain Interior | Van Duzen River | I | Priority B | CC Chinook |
| North-Central Coastal | Albion River | I | Priority D | CCC coho; CC Chinook |

| | | | | |
|-----------------------|-----------------|---|------------|----------------------|
| North-Central Coastal | Big River | I | Priority B | CCC coho; CC Chinook |
| North-Central Coastal | Caspar Creek | D | Priority C | CCC coho |
| North-Central Coastal | Cottaneva Creek | I | Priority D | CCC coho |
| North-Central Coastal | Noyo River | I | Priority A | CCC coho; CC Chinook |
| North-Central Coastal | Pudding Creek | I | Priority A | CCC coho |
| North-Central Coastal | Ten Mile River | I | Priority B | CCC coho; CC Chinook |
| North-Central Coastal | Usal Creek | I | Priority C | CCC coho |
| North-Central Coastal | Wages Creek | I | Priority C | CCC coho |
| Central Coastal | Brush Creek | I | Priority D | |
| Central Coastal | Elk Creek | I | Priority D | |
| Central Coastal | Garcia River | I | Priority A | CCC coho; CC Chinook |
| Central Coastal | Gualala River | I | Priority C | CCC coho; CC Chinook |
| Central Coastal | Navarro River | I | Priority B | CCC coho; CC Chinook |
| Central Coastal | Schooner Gulch | D | Priority D | |

Table 29. Priorities for monitoring populations throughout the CCC steelhead DPS

| Diversity Strata | CCC Steelhead Populations | Independent /Dependent | Priorities | Other ESUs/DPSs |
|------------------|---------------------------|------------------------|------------|-----------------|
| North Coastal | Austin Creek | I | Priority A | CCC coho |
| North Coastal | Lagunitas Creek | I | Priority A | CCC coho |
| North Coastal | Green Valley Creek | I | Priority B | CCC coho |
| North Coastal | Salmon Creek | I | Priority C | CCC coho |

| | | | | |
|----------------------|---------------------------|---|------------|----------------------|
| North Coastal | Walker Creek | I | Priority C | CCC coho |
| North Coastal | Sheephouse Creek | D | Priority D | |
| North Coastal | Redwood Creek (Marin Co.) | D | Priority D | CCC coho |
| North Coastal | Willow Creek | D | Priority D | CCC coho |
| North Coastal | Freezeout Creek | D | Priority D | |
| North Coastal | Pine Gulch | D | Priority D | CCC coho |
| North Coastal | Hulbert Creek | D | Priority D | |
| North Coastal | Porter Creek | D | Priority D | CCC coho |
| North Coastal | Dutch Bill Creek | D | Priority D | CCC coho |
| North Coastal | Drakes Bay | D | Priority D | |
| North Coastal | Americano Creek | I | Priority D | |
| Interior | Upper Russian River | I | Priority A | CC Chinook |
| Interior | Maacama Creek | I | Priority B | CCC coho |
| Interior | Dry Creek | I | Priority B | CCC coho; CC Chinook |
| Interior | Mark West Creek | I | Priority C | CCC coho |
| Interior | Miller Creek (Russian) | D | Priority D | |
| Interior | Crocker Creek | D | Priority D | |
| Interior | Gill Creek | D | Priority D | |
| Interior | Sausal Creek | D | Priority D | |
| Santa Cruz Mountains | San Pedro Creek | D | Priority D | |
| Santa Cruz Mountains | Scott Creek | I | Priority A | CCC coho |
| Santa Cruz Mountains | Pescadero Creek | I | Priority B | CCC coho |
| Santa Cruz Mountains | San Lorenzo River | I | Priority B | CCC coho |
| Santa Cruz Mountains | Aptos Creek | I | Priority C | CCC coho |

| | | | | |
|----------------------|--------------------------|---|------------|----------|
| Santa Cruz Mountains | Pilarcitos Creek | I | Priority C | |
| Santa Cruz Mountains | San Gregorio Creek | I | Priority C | CCC coho |
| Santa Cruz Mountains | Soquel Creek | I | Priority C | CCC coho |
| Santa Cruz Mountains | Waddell Creek | I | Priority C | CCC coho |
| Santa Cruz Mountains | San Vicente Creek | D | Priority D | CCC coho |
| Santa Cruz Mountains | Tunitas Creek | D | Priority D | |
| Santa Cruz Mountains | Gazos Creek | D | Priority D | CCC coho |
| Santa Cruz Mountains | Laguna Creek | I | Priority D | |
| Coastal S.F. Bay | Guadalupe River | I | Priority A | |
| Coastal S.F. Bay | San Francisquito Creek | I | Priority B | |
| Coastal S.F. Bay | Corte Madera Creek | I | Priority C | |
| Coastal S.F. Bay | Stevens Creek | I | Priority B | |
| Coastal S.F. Bay | Miller Creek (Marin Co.) | D | Priority D | |
| Coastal S.F. Bay | San Mateo Creek | I | Priority D | |
| Coastal S.F. Bay | Novato Creek | I | Priority D | |
| Interior S.F. Bay | Codornices Creek | D | Priority D | |
| Interior S.F. Bay | Pinole Creek | D | Priority D | |
| Interior S.F. Bay | Wildcat Creek | D | Priority D | |
| Interior S.F. Bay | Alameda Creek | I | Priority A | |
| Interior S.F. Bay | Napa River | I | Priority A | |
| Interior S.F. Bay | Coyote Creek | I | Priority B | |
| Interior S.F. Bay | Petaluma River | I | Priority C | |

IPM *Spawner Abundance*

| | |
|------|--------|
| 56.8 | 1800 |
| 39.6 | 1300 |
| 19.8 | 800 |
| 22.7 | 900 |
| 9.1 | 53-107 |
| 6.7 | 38-78 |
| 28.7 | 1100 |

| | | | |
|-------------------|---------------------------|---|------------|
| Interior S.F. Bay | Green Valley/Suisun Creek | I | Priority C |
| Interior S.F. Bay | Sonoma Creek | I | Priority B |
| Interior S.F. Bay | San Lorenzo Creek | I | Priority D |
| Interior S.F. Bay | San Leandro Creek | I | Priority D |
| Interior S.F. Bay | San Pablo Creek | I | Priority D |

6.3.2 PRODUCTIVITY

Recommendations for monitoring population productivity²⁷ include:

1. Since productivity is calculated as the trend in abundance over time, develop a 16 year²⁸ or greater data set of accurate spawner information to estimate geometric mean recruits per spawner and evaluate population trends.
2. Using the LCM stations, conduct annual smolt abundance/trend monitoring.
 - a. Juvenile monitoring should strive to have data with a CV on average of 15 percent or less (Crawford and Rumsey 2011);
 - b. Power analysis for each monitored juvenile population should be conducted to determine the statistical power of the data to detect significant changes in abundance; and
 - c. Estimate apparent marine and fresh water survival (couple adult data with the smolt abundance estimates and/or conduct mark-recapture of smolt to adult studies).

²⁷ Productivity is generally defined as a population's growth rate over time. The CMP Technical Team have proposed using the cohort replacement rate.

²⁸ Approximately four generations as required in Spence *et al.* 2008.

6.3.3 SPATIAL DISTRIBUTION AND OCCUPANCY

Recommendations for monitoring spatial distribution and occupancy include:

1. Develop and implement a spatially balanced GRTS-based summer and fall sampling strategy for juvenile salmonids. Juvenile Chinook salmon generally migrate out of their natal streams²⁹ during spring and early summer and therefore are unlikely to be observed during summer and fall snorkel or electrofishing surveys. Instead, spawner/redd surveys will provide the primary information on spatial distribution of spawners and out-migrant trapping may provide some watershed-level information on spatial structure. In addition to juvenile sampling, steelhead adult spawner/redd surveys may also provide information on spatial distribution and out-migrant trapping may provide some watershed-level information on spatial structure.
2. Evaluate changes in adult spawning distribution (stage one sampling) using probabilistic sampling. Environmental conditions, such as precipitation and stream flow, will influence the distribution of spawners by expanding (wet years) or shrinking (dry years) the amount of habitat available to returning adults. Therefore, analysis of annual spawner distribution must consider both biological (small population) and environmental (weather patterns) factors.
3. Determine spatial distribution of CC Chinook salmon (primarily spawning/redd surveys) and steelhead (juvenile distribution and spawning/redd surveys) with the ability to detect a change in distribution of ± 15 percent with 80 percent certainty (Crawford and Rumsey 2011).
4. As discussed above, the relationship between environmental factors (particularly stream flow and water temperature) can influence the likelihood of salmon and steelhead presence and spatial distribution. Where necessary and applicable, develop and implement stream flow and water temperature monitoring programs to assess their implications on occupancy during the adult (stream flow) and juvenile (stream flow and water temperature) life stages.

²⁹ Although spring-early summer emigration is the general trend, in 2013, juvenile Chinook salmon were collected later in summer in Redwood Creek, Lower Eel, Van Duzen, Mattole, and South Fork Eel Rivers. It is unknown whether this recent finding is a characteristic of their life history strategy or if it is reflection of the unusual year (2012-13) of high adult Chinook salmon escapement and low winter flows.

5. As part of the CMP, develop a biological monitoring program for estuaries and seasonal, bar-built lagoons, particularly in LCM populations, that will track salmonid abundance and use of these habitats over time. These data can be used to document potential limiting factors (e.g., stresses) affecting salmonid rearing in these habitats and highlight emerging threats over time. As noted above, the CMP Technical Teams have begun early planning for the development of an Estuary monitoring protocol that would include habitat and biological monitoring.

6.3.4 DIVERSITY

"Diversity traits are strongly adaptive for local areas and populations, and these traits allow salmonids to survive in the face of unique local natural and anthropogenic challenges. Higher level diversity traits have been considered in the creation of the listing and stratification units; however, population level diversity traits may be very different from one geographical or population unit to another. Therefore, local diversity traits will need to be surveyed, eventually leading to local diversity monitoring plans. Specific projects targeting both broad and focused levels and patterns of genetic diversity will be developed." Adams et al. (2011).

Recommendations for monitoring diversity traits include:

1. Monitor status and trends of spawn timing, sex ratio, age distribution, fecundity, etc. (see Adams et al. 2011) across populations, Diversity Strata, and the ESU/DPS. Spawn timing, sex ratio, and age distribution should be assessed during both stage-one (redd surveys) and stage-two (LCM station) adult monitoring. Age distributions for juvenile steelhead should be assessed during spatial distribution monitoring using length frequencies, analysis of scales, and by mark-recapture PIT-tagging programs.
2. The CMP Technical Teams should develop monitoring components that will track the status of the following life history pathways for Chinook salmon and steelhead: (1) yearling vs. sub-yearling ocean entry (ocean vs stream type) of juvenile Chinook salmon; (2) the "1/2 pounder" steelhead (e.g., Eel River watershed); and (3) the degree of estuarine-rearing by Chinook

salmon and steelhead, as well as bar-built lagoon rearing of steelhead (see also #5 under Spatial Distribution and Occupancy above).

3. Develop a genetic baseline of DNA markers, or single nucleotide polymorphisms (SNPs), for the CC Chinook salmon ESU and both the NC and CCC steelhead DPSs. Tissue sample collection required for the development of this baseline can be conducted during spawner/redd surveys (*i.e.*, from carcasses encountered during spawner/redd surveys), LCM stations (live adult and juvenile fish), and during spatial distribution surveys (live juvenile fish).
4. Assess the percent of hatchery origin spawners (pHOS) in populations.
5. Over time, compare differences and trends in population abundance, growth rates, habitat use, and juvenile migration timing with overall watershed and in-stream habitat conditions (*i.e.*, water temperature, canopy closure, substrate conditions, escape shelter, and summer base stream flow volumes).

6.4 COSTS FOR MONITORING BIOLOGICAL VIABILITY

Cost estimates for implementing the CMP have not been developed (Adams *et al.* 2011). However, some cost estimates are available for ongoing monitoring conducted in the Pudding Creek watershed in coastal Mendocino County, California (Gallagher *et al.* 2010) as well as Redwood Creek and tributaries to Humboldt Bay in Humboldt County, California (S. Ricker, CDFW personal communication, September 2013). These values were used to form preliminary costs estimates (Table 30, Table 31, Table 32) for the monitoring needed for informing progress toward meeting recovery criteria and trends for CC Chinook salmon, NC steelhead, and CCC steelhead populations. Monitoring actions are provided in Table 34. Determining actual costs of all monitoring will also need to include cost estimates for evaluating habitat conditions as part of the CMP and for developing and maintaining a coordinated data management system. Populations selected for LCM station placement will also affect totals costs due to watershed size differences and potential for multiple species. Finally, monitoring the recovery of CC Chinook salmon, NC steelhead, and CCC steelhead will require continuing evaluation of costs, dedicated funding, and

a long-term commitment of resources by all involved parties. Costs associated with data analysis, storage, and report production will vary as CMP methods and protocols are modified and streamlined in the future. Costs for components of the CMP that are not yet developed (*e.g.*, estuarine monitoring and stream/watershed habitat monitoring) will be estimated once these programs are in place.

6.4.1 SPAWNER GROUND SURVEYS

For streams on the Mendocino Coast, regional spawning ground surveys cost between approximately \$3,800 and \$4,000 to survey one reach a sufficient number of times each season to generate reliable redd counts. Sample units, or reach lengths, for both spawner distribution/abundance and juvenile spatial distribution described in Adams *et al.* (2011) range from approximately 1.6 to 3.2 km. A sample draw of 30 or 40 percent will be necessary to sufficiently assess population level trends of adult escapement (S. Ricker, CDFW, personal communication). Using the total number of kilometers of potential habitat for each population and a minimum 30 percent sample of 3 km reaches, the estimated annual cost to conduct first-stage, GRTS spawning ground surveys for CC Chinook salmon (\$1,187,240), NC steelhead (\$2,151,533), and CCC steelhead (\$1,806,960) populations would total approximately \$5,145,733 annually (Table 30, Table 31, Table 32). The above estimates do not include data storage and report preparation. For watersheds with more than one salmonid species (including coho salmon), there will be some degree of overlap of species monitoring due to differences in run times and life history strategies. Depending on the degree of overlap, total costs for monitoring spawner abundance may be reduced considerably as these costs estimates will be shared across species.

Table 30: CC Chinook salmon ESU annual spawning ground survey cost estimates. *Includes IP-km currently inaccessible to Chinook salmon due to dams; assumes passage in the future.

| Diversity Strata / populations | IP (km) | 30% IP (km) | # of 3 km reaches | Annual Cost |
|---|--------------|-------------|-------------------|------------------|
| North Coastal | | | | |
| Redwood Cr. | 116.1 | 35 | 12 | \$46,440 |
| Little R. | 17.4 | 5 | 2 | \$6,960 |
| Mad R. | 94.0 | 28 | 9 | \$37,600 |
| Humboldt Bay | 76.0 | 23 | 8 | \$30,400 |
| South Fork Eel R. | 337.1 | 101 | 34 | \$134,840 |
| L. Eel R. | 364.8 | 109 | 36 | \$145,920 |
| Bear R. | 39.4 | 12 | 4 | \$15,760 |
| Mattole R. | 177.5 | 53 | 18 | \$71,000 |
| <i>sub-total</i> | 1,222 | 367 | 122 | \$488,920 |
| North Mountain Interior | | | | |
| U. Eel River* | 521.4 | 156 | 52 | \$208,560 |
| L. Eel River (<i>Larabee and Van Duzen</i>) | 143.7 | 43 | 14 | \$57,480 |
| <i>sub-total</i> | 665 | 200 | 67 | \$266,040 |
| North-Central Coastal | | | | |
| Ten Mile R. | 67.2 | 20 | 7 | \$26,880 |
| Noyo R. | 62.2 | 19 | 6 | \$24,880 |
| Big R. | 104.3 | 31 | 10 | \$41,720 |
| Albion R. | 17.6 | 5 | 2 | \$7,040 |
| <i>sub-total</i> | 251 | 75 | 25 | \$100,520 |
| Central Coastal | | | | |
| Navarro R. | 131.5 | 39 | 13 | \$52,600 |

| | | | | |
|---|------------|------------|-----------|--------------------|
| Garcia R. | 56.2 | 17 | 6 | \$22,480 |
| Gualala R. | 175.6 | 53 | 18 | \$70,240 |
| Russian R. | 466.1 | 140 | 47 | \$186,440 |
| <i>sub-total</i> | 829 | 249 | 83 | \$331,760 |
| GRTS SGS Estimated Annual Cost (30%) | | | | \$1,187,240 |
| GRTS SGS Estimated Annual Cost (40%) | | | | \$1,582,987 |

Table 31: NC Steelhead DPS annual spawning ground survey cost estimates. Populations with less than 10 IP-km were assigned a value of 1 for the number of reaches to survey. *Includes IP-km currently inaccessible to steelhead due to dams; assumes passage in the future.

| Diversity Strata / populations | IP (km) | 30% IP (km) | # of 3 km reaches | Annual Cost |
|--------------------------------|---------|-------------|-------------------|-------------|
| Northern Coastal | | | | |
| Redwood Cr. (Lower) | 161.5 | 48.5 | 16 | \$64,600 |
| Maple Cr. / Big Lagoon | 71.7 | 21.5 | 7 | \$28,680 |
| Little R. | 50.0 | 15.0 | 5 | \$20,000 |
| Mad R. | 145.7 | 43.7 | 15 | \$58,280 |
| Humboldt Bay | 203.4 | 61.0 | 20 | \$81,360 |
| Lower Main. Eel R. | 166.9 | 50.1 | 17 | \$66,760 |
| Howe Cr. | 13.9 | 4.2 | 1 | \$5,560 |
| South Fork Eel R. | 951.8 | 285.5 | 95 | \$380,720 |
| Guthrie Cr. | 9.2 | 2.8 | 1 | \$3,680 |
| Oil Cr. | 10.6 | 3.2 | 1 | \$4,240 |
| Bear R. | 107.8 | 32.3 | 11 | \$43,120 |
| McNutt Gulch | 11.3 | 3.4 | 1 | \$4,520 |
| Mattole R. | 534.5 | 160.4 | 53 | \$213,800 |

| | | | | |
|------------------|--------------|--------------|------------|------------------|
| Spanish Creek | 1.9 | 0.6 | 1 | \$4,000 |
| Big Cr. | 3.8 | 1.1 | 1 | \$4,000 |
| Big Flat Cr. | 5.9 | 1.8 | 1 | \$2,360 |
| Shipman Cr. | 2.3 | 0.7 | 1 | \$4,000 |
| Telegraph Cr. | 5.3 | 1.6 | 1 | \$2,120 |
| Jackass Cr. | 6.9 | 2.1 | 1 | \$2,760 |
| sub-total | 2,464 | 739.3 | 246 | \$985,760 |

| | | | | |
|-----------------------|------------|--------------|-----------|------------------|
| Lower Interior | | | | |
| Chamise Cr. | 36.1 | 10.9 | 4 | \$14,480 |
| Bell Springs Cr. | 18.1 | 5.4 | 2 | \$7,240 |
| Woodman Cr. | 35.0 | 10.5 | 4 | \$14,000 |
| Outlet Cr. ** | 188.8 | 56.6 | 19 | \$75,520 |
| Tomki Cr. | 89.5 | 26.9 | 9 | \$35,800 |
| Dobbyn Cr. | 47.0 | 14.1 | 5 | \$18,800 |
| Jewett Cr. | 16.8 | 5.0 | 2 | \$6,720 |
| Garcia Cr. | 14.1 | 4.2 | 1 | \$5,640 |
| Soda Cr. | 15.7 | 4.7 | 2 | \$6,280 |
| Bucknell Cr. | 9.0 | 2.7 | 1 | \$3,600 |
| sub-total | 470 | 141.1 | 47 | \$188,080 |

North Mountain Interior

| | | | | |
|---------------------|-----------|------|----|-----------|
| Redwood Cr. (Upper) | see above | | | |
| Mad R. | see above | | | |
| Larabee Cr. | 86.6 | 26.0 | 9 | \$34,640 |
| Van Duzen R. | 312.2 | 93.7 | 31 | \$124,880 |
| North Fork Eel R. | 317.0 | 95.1 | 32 | \$126,800 |

| | | | | |
|---------------------|--------------|--------------|------------|------------------|
| Middle Fork Eel R. | 472.4 | 141.7 | 47 | \$188,960 |
| Upper Main. Eel R.* | 209.2 | 62.8 | 21 | \$83,680 |
| <i>sub-total</i> | 1,397 | 419.2 | 140 | \$558,960 |

| | | | | |
|------------------------------|------------|------------|-----------|------------------|
| North-Central Coastal | | | | |
| Usal Cr. | 17.6 | 5.3 | 2 | \$7,040 |
| Cottaneva Cr. | 23.2 | 7.0 | 2 | \$9,280 |
| Wages Cr. | 17.3 | 5.2 | 2 | \$6,920 |
| Ten Mile R. | 171.0 | 51.3 | 17 | \$68,400 |
| Pudding Cr. | 24.1 | 7.2 | 2 | \$9,640 |
| Noyo R. | 152.8 | 45.8 | 15 | \$61,120 |
| Caspar Cr. | 12.9 | 3.9 | 1 | \$5,160 |
| Big R. | 255 | 76.5 | 26 | \$102,000 |
| Albion R. | 48.6 | 14.6 | 5 | \$19,440 |
| <i>sub-total</i> | 723 | 217 | 72 | \$289,000 |

Central Coastal

| | | | | |
|------------------|------------|-----------|-----------|------------------|
| Navarro R. | 387.5 | 116.3 | 39 | \$155,000 |
| Elk Cr. | 21.5 | 6.5 | 2 | \$8,600 |
| Brush Cr. | 23.8 | 7.1 | 2 | \$9,520 |
| Garcia R. | 135.4 | 40.6 | 14 | \$54,160 |
| Schooner Gulch | 7.7 | 2.3 | 1 | \$3,080 |
| Gualala R. | 397.1 | 119.1 | 40 | \$158,840 |
| <i>sub-total</i> | 973 | 97 | 32 | \$129,733 |

| | |
|---|--------------------|
| GRTS SGS Estimated Annual Cost (30%) | \$2,151,533 |
| GRTS SGS Estimated Annual Cost (40%) | \$2,868,711 |

Table 32: CCC steelhead DPS annual spawning ground survey cost estimates. Populations with less than 10 IP-km were assigned a value of 1 for the number of reaches to survey.

*Includes IP-km currently inaccessible to steelhead due to dams; assumes passage in the future.

** IP-km were not g for San Pedro Creek (Bjorkstedt *et al.* 2005), however CMP spawner surveys have been conducted in recent years and therefore an estimate of accessible habitat to steelhead is provided.

| Diversity Strata / populations | IP (km) | 30% IP (km) | # of 3 km reaches | Annual Cost |
|--------------------------------|------------|-------------|-------------------|------------------|
| North Coastal | | | | |
| Willow Cr. | 8.2 | 2 | 1 | \$4,000 |
| Sheephouse Cr. | 3.7 | 1 | 1 | \$4,000 |
| Freezeout Cr. | 1.2 | 0 | 1 | \$4,000 |
| Austin Cr. | 95.1 | 29 | 10 | \$38,040 |
| Dutch Bill Cr. | 13.2 | 4 | 1 | \$4,000 |
| Green Valley | 37.1 | 11 | 4 | \$14,840 |
| Hulbert Cr. | 10.2 | 3 | 1 | \$4,000 |
| Porter Cr. | 10.3 | 3 | 1 | \$4,000 |
| Salmon Cr. | 33.6 | 10 | 3 | \$13,440 |
| Estero Americano Cr. | 35.4 | 11 | 4 | \$14,160 |
| Walker Cr.* | 73.3 | 22 | 7 | \$29,320 |
| Lagunitas Cr.* | 85.0 | 26 | 9 | \$34,000 |
| Pine Gulch | 9.7 | 3 | 1 | \$4,000 |
| Redwood Creek | 6.7 | 2 | 1 | \$4,000 |
| sub-total | 423 | 127 | 42 | \$169,080 |
| Interior | | | | |
| Mark West Cr. | 164.2 | 49 | 16 | \$65,680 |
| Dry Cr. | 115.9 | 35 | 12 | \$46,360 |

| | | | | |
|------------------|-------|-----|----|-----------|
| Maacama Cr. | 76.2 | 23 | 8 | \$30,480 |
| Sausal Cr. | 11.1 | 3 | 1 | \$4,000 |
| Miller Cr. | 3.1 | 1 | 1 | \$4,000 |
| Gill Cr. | 8.1 | 2 | 1 | \$4,000 |
| Crocker Cr. | 4.5 | 1 | 1 | \$4,000 |
| Upper Russian R. | 422.9 | 127 | 42 | \$169,160 |
| <i>sub-total</i> | 806 | 242 | 81 | \$322,400 |

Santa Cruz Mountains

| | | | | |
|------------------|-------|------|----|-----------|
| San Pedro Cr.** | 6.7 | 2.0 | 1 | \$4,000 |
| Pilarcitos Cr. | 28.5 | 8.6 | 3 | \$11,400 |
| Tunitas Cr. | 10.7 | 3.2 | 1 | \$4,000 |
| San Gregorio Cr. | 46.6 | 14.0 | 5 | \$18,640 |
| Pescadero Cr. | 66.1 | 19.8 | 7 | \$26,440 |
| Gazos Cr. | 12.5 | 3.8 | 1 | \$4,000 |
| Waddell Cr. | 10.8 | 3.2 | 1 | \$4,000 |
| Scott Cr. | 16.4 | 4.9 | 2 | \$6,560 |
| San Vicente Cr. | 5.7 | 1.7 | 1 | \$4,000 |
| Laguna Cr. | 4.5 | 1.4 | 1 | \$4,000 |
| San Lorenzo R. | 146.2 | 43.9 | 15 | \$58,480 |
| Soquel Cr. | 52.0 | 15.6 | 5 | \$20,800 |
| Aptos Cr. | 25.1 | 7.5 | 3 | \$10,040 |
| <i>sub-total</i> | 432 | 130 | 43 | \$172,720 |

Coastal San Francisco Bay

| | | | | |
|----------------------------------|------|-----|---|---------|
| Arroyo Corte Madera del Presidio | 6.8 | 2.0 | 1 | \$4,000 |
| Corte Madera Cr. | 19.8 | 5.9 | 2 | \$7,920 |

| | | | | |
|-----------------------|------|------|----|----------|
| Miller Cr. | 9.1 | 2.7 | 1 | \$4,000 |
| Novato Cr.* | 28.7 | 8.6 | 3 | \$11,480 |
| San Mateo Cr. | 6.7 | 2.0 | 1 | \$4,000 |
| San Francisquito Cr.* | 35.6 | 10.7 | 4 | \$14,240 |
| Stevens Cr.* | 22.7 | 6.8 | 1 | \$4,000 |
| Guadalupe R.* | 50.8 | 15.2 | 5 | \$20,320 |
| <i>sub-total</i> | 180 | 54 | 18 | \$72,080 |

Interior San Francisco Bay

| | | | | |
|---|-------|------|----|--------------------|
| Petaluma R. | 64.9 | 19.5 | 6 | \$25,960 |
| Sonoma Cr. | 128.7 | 38.6 | 13 | \$51,480 |
| Napa R.* | 233.2 | 70.0 | 23 | \$93,280 |
| Green Valley / Suisun Cr. | 64.3 | 19.3 | 6 | \$25,720 |
| San Pablo Cr. | 8.6 | 2.6 | 1 | \$4,000 |
| San Leandro Cr. | 5.4 | 1.6 | 1 | \$4,000 |
| San Lorenzo Cr. | 18.6 | 5.6 | 2 | \$7,440 |
| Alameda Cr.* | 108.3 | 32.5 | 11 | \$43,320 |
| Coyote Cr.* | 109.3 | 32.8 | 11 | \$43,720 |
| <i>sub-total</i> | 729 | 73 | 24 | \$97,227 |
| GRTS SGS Estimated Annual Cost (30%) | | | | \$1,806,960 |
| GRTS SGS Estimated Annual Cost (40%) | | | | \$2,409,280 |

6.4.2 LIFE CYCLE MONITORING STATIONS

In this Plan, a minimum of one LCM station was recommended for each diversity stratum. In this chapter, NMFS provides cost estimates for one and two LCM station per diversity stratum. Although some LCM stations have already been established, others will be necessary across the

recovery domain. Table 27, Table 28, and Table 29 prioritize populations for monitoring. Fixed station adult monitoring at the Pudding Creek LCM station (a small watershed) costs about \$40,000 per year (Gallagher and Wright 2008; Gallagher *et al.* 2010) for monitoring adult escapement. This estimate does not include smolt or summer rearing abundance estimates, nor does it include data analysis and reporting. Operation of a LCM station in larger watersheds may cost twice as much (\$80,000). Operating costs for an LCM in an urban watershed are also likely to be much higher than those in Pudding Creek. Based on the above values, annual cost estimates for adult monitoring counts at LCM stations within each diversity stratum will range between \$504,000 to \$1,008,000 (for 1 station per Diversity Stratum for small and large populations) and \$1,008,000 to \$2,016,000 (for 2 stations per Diversity Stratum for small and large populations) (Table 33). There are some initial “start-up” costs associated with LCMs that include purchase of equipment (weirs, traps, DIDSON), necessary facility installation/construction and testing. These costs are not provided as they will vary depending on the wide range of environmental settings and methods used to estimate fish abundance.

At Pudding Creek, the costs of conducting juvenile (smolt) steelhead and coho salmon monitoring (down-migrant counts) at the LCM stations range from approximately \$15,000 to \$30,000 per year. For larger populations, such as Redwood Creek in Humboldt County, annual costs for out-migrant trapping focused on CC Chinook salmon have been approximately \$60,000 (S. Ricker, CDFW personal communication, September 2013). Based on these values, total annual cost estimates for juvenile (smolt) steelhead and Chinook salmon monitoring at the LCM stations may range between \$315,000 and \$840,000 (one station per diversity stratum for small and large populations) and between \$630,000 to \$1,680,000 (two stations per diversity stratum for small and large populations) (Table 33). The annual cost estimates (see bottom row of Table 33) for both adult and juvenile monitoring at LCM stations may be reduced substantially by selecting drainages with more than one listed salmonid species.

Table 33: Annual cost estimates for operating LCM stations in each diversity stratum (2 stations and 1 station per diversity stratum) and based on relative population/watershed size (large and small).

LCM Station - Adult

| ESU/DPS | # of Diversity Strata | Adult Monitoring (Large, 2 stations) | Adult Monitoring (Small, 2 stations) | Adult Monitoring (Large, 1 station) | Adult Monitoring (Small, 1 station) |
|-------------------|-----------------------------|---|---|--|--|
| CC Chinook salmon | 4 | \$576,000 | \$288,000 | \$288,000 | \$144,000 |
| NC steelhead | 5 | \$720,000 | \$360,000 | \$360,000 | \$180,000 |
| CCC steelhead | 5 | \$720,000 | \$360,000 | \$360,000 | \$180,000 |
| Sub-Total | | \$2,016,000 | \$1,008,000 | \$1,008,000 | \$504,000 |

LCM Station - Juvenile

| ESU/DPS | # of Diversity Strata | Juvenile Monitoring (Large, 2 stations) | Juvenile Monitoring (Small, 2 stations) | Juvenile Monitoring (Large, 1 station) | Juvenile Monitoring (Small, 1 station) |
|-------------------|-----------------------------|--|--|---|---|
| CC Chinook salmon | 4 | \$480,000 | \$180,000 | \$240,000 | \$90,000 |
| NC steelhead | 5 | \$600,000 | \$225,000 | \$300,000 | \$112,500 |
| CCC steelhead | 5 | \$600,000 | \$225,000 | \$300,000 | \$112,500 |
| Sub-Total | | \$1,680,000 | \$630,000 | \$840,000 | \$315,000 |
| TOTAL | | \$3,696,000 | \$1,638,000 | \$1,848,000 | \$819,000 |

6.4.3 JUVENILE SPATIAL DISTRIBUTION AND ABUNDANCE

In populations with both steelhead and Chinook salmon, the distribution of juvenile steelhead would cover and exceed the distribution of CC Chinook (if present during summer and fall surveys). Therefore, the estimated annual costs for monitoring juvenile spatial distribution and abundance presented below are for NC and CCC steelhead.

Assessing juvenile steelhead spatial distribution, abundance and habitat conditions using a spatially balanced GRTS-based sampling design will likely cost approximately \$1,000 and \$2,000 per reach to survey. Assuming a 10 percent sample effort and the rate of \$2,000 per reach, cost for monitoring juvenile NC steelhead (\$420,000) and CCC steelhead (\$180,000) are approximately \$600,000 annually. These estimates do not include data analysis, storage, or report preparation.

Final sample size and reach variance issues will have to be developed for juvenile spatial structure (and habitat monitoring).

8.0 IMPLEMENTATION

"If anthropogenic changes can be shaped to produce disturbance regimes that more closely mimic (in both space and time) those under which the species evolved, Pacific salmon should be well equipped to deal with future challenges, just as they have throughout their evolutionary history."

Dr. Robin R. Waples, NOAA Fisheries, Research Fish Biologist

8.1 INTEGRATING RECOVERY INTO NMFS' ACTIONS

NMFS is working to incorporate recovery plan information and actions into its programs, policies, and decision-making (*i.e.*, status reviews, critical habitat designations, section 7 consultations, enforcement, permit actions, *etc.*). Implementation of the recovery plan by NMFS will involve exploring opportunities to shift workload priorities and act in a strategic and proactive manner. To promote implementation of the recovery plan NMFS could:

- Prioritize work load allocation and decision-making, including developing mechanisms to promote implementation (*e.g.*, restoration);
- Participate in land use and water planning processes at the Federal, state, and local level to ensure recommendations of the plan are reflected in a wide range of decision making processes;
- Conduct outreach and education programs aimed at stakeholders (*i.e.*, Federal, tribal, state, local, non-governmental organizations, landowners and interested parties);
- Provide a consistent framework for research, monitoring, and adaptive management that directly informs recovery objectives and goals listed in the plan; and
- Establish an implementation tracking system that is adaptive and pertinent for annual reporting for the Government Performance and Results Act, bi-annual recovery reports to Congress and five-year status review up-dates for ESA-listed species.

8.2 REGULATORY MECHANISMS

The ESA provides NMFS with various mechanisms for protecting and recovering listed species. The ESA first focuses on identifying species and ecosystems in danger of immediate or foreseeable extinction or destruction and protecting them as their condition warrants. Once protected, the focus is on the prevention of further declines in a species' condition through the consultation provisions of section 7(a)(2), habitat protection and enhancement provisions of sections 4 and 5, take prohibitions through sections 4(d) and 9, cooperation with the state(s) where these species are found (section 6), and needed research and conservation taken by non-federal actions through section 10. Ultimately, the ESA objectives are to conserve and protect the listed species and their ecosystems.

The following sections describe methods NMFS may use when implementing various sections of the ESA. These methods are intended to explore opportunities to institutionalize recovery planning in daily work and decision-making of NMFS' West Coast Region.

8.2.1 ESA SECTION 4

Section 4 provides a mechanism to list new species as threatened or endangered, designate critical habitat, develop protective regulations for threatened species, and develop recovery plans. Critical habitat is designated in specific geographic areas where physical or biological features essential to the conservation of the species are found and where special management considerations or protections may be needed. Critical habitat for CC Chinook salmon and NC and CCC steelhead was designated at listing and redesignated in 2005.

Unlike endangered species under ESA section 9, which prohibits take of endangered species, ESA section 4(d) gives NMFS authority to tailor take prohibitions and regulatory limits that are deemed necessary and advisable to provide for the recovery of threatened species. NMFS has promulgated such rules for take of threatened salmonids, including CC Chinook salmon and NC and CCC steelhead (50 C.F.R. 223.203).

Section 4(c)(2) of the ESA requires NMFS to conduct a review of listed species at least once every five years. Five year status reviews conducted by the Services consider the status of listed species and identified threats as well as progress towards recovery as outlined in the recovery plan. A determination to change the status is made on the basis of the same five listing factors that resulted in the initial listing of the species [50 C.F.R. 424.11 (d)] and recovery plan criteria.

8.2.2 ESA SECTION 5

Section 5 is a program that applies to land acquisition by the Services, or by the Secretary of Agriculture with respect to the National Forest System. National Forest lands occur in some areas of the CC Chinook salmon ESU and NC steelhead DPS. NMFS does not have any plans for land acquisition with respect to Section 5 of the ESA.

8.2.3 ESA SECTION 6

In 2003, NMFS instituted a grant program for states pursuant to section 6 of the ESA using funding provided by Congress. Species recovery grants to states can support management, research, monitoring, and outreach activities that provide direct conservation benefits to listed species and recently delisted species. However, projects focusing on listed Pacific salmonids are not considered under this grant program because state conservation efforts for these species are supported through PCSRF.

8.2.4 ESA SECTION 7

Section 7(a) (1)

Section 7(a)(1) states all federal agencies shall “in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species....” Section 7(a)(1) allows a Federal agency the discretion to deem the conservation of endangered species a high priority. “Conservation” is defined in the ESA as those measures necessary to delist a species. To aid in the development of conservation programs, NMFS will:

- Prepare and send, after recovery plan approval, a letter to all other appropriate Federal agencies outlining section 7(a)(1) obligations and meet with these agencies to discuss salmon and steelhead conservation and recovery priorities;
- Consider development of a formal agreement, *e.g.*, a Memo of Understanding (MOU), with other Federal agencies to further implementation of recovery priorities.
- Incorporate recovery actions in formal ESA consultations as conservation recommendations;
- Encourage meaningful and focused recommendations, in alignment with recovery goals for restoration and threat abatement, for all actions that incidentally take salmonids or affect their habitat;
- Encourage Federal partners and their constituents to include recovery actions in project proposals;
- Encourage all entities to implement conservation efforts (*i.e.*, restoration and mitigation efforts) in essential and supporting populations that are in alignment with recovery goals and objectives identified in the plan;
- Support the establishment of conservation bank sites that will protect and restore habitat and provide credits as compensation for unavoidable impacts from actions that may affect salmonids; and
- Incorporate conservation actions, as appropriate, into the actions that NMFS authorizes, funds or carries out.

Section 7(a)(2)

The purpose of section 7(a)(2) is to “insure that any action authorized, funded, or carried out by [a Federal agency] is not likely to jeopardize the continued existence of any [listed species] or result in the destruction or adverse modification of [a listed species’ critical habitat].” Federal agencies request interagency consultation with NMFS when they determine an action may affect a listed salmon or steelhead species or its critical habitat. NMFS then conducts an analysis of potential effects of the proposed action and provides a biological opinion on whether an agency’s actions are likely to jeopardize a species continued existence or destroy or adversely modify its

critical habitat. The Services define “jeopardize the continued existence of” as “to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.” Recovery plans generally do not create legally enforceable obligations for action agencies to carry out any particular measure. However, they may be directly relevant and highly informative to the question of whether or not an action agency will appreciably reduce the likelihood of recovery of the species. NMFS currently expends considerable effort to assist agencies in avoiding and minimizing the potential adverse effects of proposed actions and to ensure federal agency actions do not jeopardize a species or destroy or degrade habitat. Whether the action has a negative effect on the likelihood of the species recovering is considered part of the analysis. As a result, these consultations have helped avoid and minimize direct take and have contributed to recovery.

Because section 7(a)(2) applies only to Federal actions, its applications are limited only to those areas and actions with Federal ownership, oversight, or funding. Across the CC Chinook salmon ESU and NC and CCC steelhead DPSs, land ownership varies by watersheds from areas with some portions of publicly owned land to areas entirely privately owned. Most land and water use practices on private lands do not trigger interagency consultation. This lack of Federal review and oversight is due in part to the USACE’s Clean Water Act section 404(f) exemptions for discharges of dredged or fill material into waters of the United States associated with farming, logging, and ranching activities. Although take is prohibited under the ESA, these exemptions hinder Federal oversight including actions that may adversely affect salmonids and their habitat.

In order to devote more resources to recovery action implementation and to ensure section 7(a)(2) consultations are effective, NMFS will utilize its authorities to:

- Use the recovery plan information on conditions and threats and recovery criteria as a reference point to determine effects of proposed actions on the likelihood of species’ recovery;

- Prioritize and streamline consultations for actions that implement the recovery strategy or specific recovery actions;
- Develop and maintain databases to track the amount of incidental take authorized through section 7 consultations and the effectiveness of conservation and mitigation measures;
- Incorporate recovery actions in formal consultations as Reasonable and Prudent Measures (RPMs) and conservation recommendations, as appropriate;
- Focus staff priorities towards sections 7 and 9 compliance in essential and supporting populations for the purposes of minimizing take and preventing extirpation;
- Streamline consultations for actions that will have little or no adverse effects on recovery areas or priorities;
- Develop streamlined programmatic approaches for those actions that do not pose a threat, or are entirely beneficial, to the survival and recovery of the species;
- Consider conducting the jeopardy analysis for each affected Diversity Stratum as well as each affected population since jeopardizing one stratum is more likely to jeopardize the overall ESU or DPS; and
- Apply the VSP framework and recovery priorities to evaluate population and area importance in jeopardy and adverse modification analyses.

In addition, NMFS can utilize its authorities to encourage:

- USACE to re-evaluate Clean Water Act section 404(f) exemptions for farming, logging, and ranching activities;
- FEMA to fund upgrades and modify flood insurance programs for flood-damaged facilities to meet both ESA requirements and facilitate recovery objectives;
- EPA to prioritize actions on pesticides known to be toxic to fish and/or are likely to be found in fish habitat and to develop regulatory mechanisms, such as restrictions on pesticide use near surface waters;
- FHWA and Caltrans to develop pile driving guidelines approved by NMFS for bridge construction projects in essential and supporting populations and other watersheds;

- Development of section 7 conservation recommendations based on recovery actions to help prioritize Federal funding towards recovery actions (NMFS, USFWS, NRCS, EPA, *etc.*) during formal consultations;
- Federal or their designated representatives to coordinate with NMFS prior to the development of a biological assessment (BA); and
- Federal agencies or their designated representatives to conduct field reviews upon completion of projects to determine whether or not they have been implemented as planned and report findings to NMFS.

8.2.5 ESA SECTION 9

Section 9 prohibits any person subject to the jurisdiction of the United States, among several provisions, from taking endangered species. Through section 4(d), NMFS has applied take prohibitions of Section 9 to threatened species with certain limits allowing take under specific circumstances (see, e.g., 50 C.F.R. 223.203 (applicable to threatened anadromous salmonids)). The ESA defines “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 U.S.C. 1532(19)). NMFS defines “harm” as “an act which actually kills or injures fish or wildlife [including] significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering” (50 C.F.R. 222.101). Thus, section 9 prohibitions include direct forms of take, such as killing an individual fish, or indirect forms, such as destroying habitat where fish rear or spawn. NOAA’s Office of Law Enforcement (OLE) is responsible for enforcing laws that conserve and protect our nation’s living marine resources and their natural habitat. Essential and supporting populations should be considered the highest priority areas for oversight and enforcement. NMFS West Coast Region staff will work closely with OLE. NMFS staff will:

- Conduct outreach and provide NOAA’s OLE with a summary document which includes threats, recovery priorities, and high priority focus areas for oversight and enforcement.

- Work with OLE and the CDFW, under the Joint Enforcement Agreement, to inform landowners of outreach opportunities and potential areas for increased patrols in essential and supporting populations;
- Periodically review existing protocols establishing responsibilities between NMFS West Coast Region and OLE to ensure staff support of OLE are focused on the highest recovery priorities;
- When unauthorized take occurs in an essential or supporting population and/or watershed, NMFS West Coast Region will make it a high priority to work closely with OLE to develop a take investigation; and
- Periodically assess and review existing protocols that increase and streamline collaboration between NMFS and OLE in high priority areas to ensure the highest level of protection for ESA-listed species.

8.2.6 ESA SECTION 10

Section 10(a)(1)(A)

Section 10(a)(1)(A) provides NMFS authority to issue permits for the authorization of take of listed salmonids for scientific research, or to enhance the propagation or survival of listed salmonids. NMFS has authorized conservation hatcheries and research activities under section 10(a)(1)(A). Section 10(a)(1)(B) provides NMFS authority to issue permits for the incidental take of listed salmonids while carrying out otherwise lawful non-Federal activities. In order to obtain an incidental take permit, the applicant must develop a Habitat Conservation Plan and demonstrate, among other things, that the activity will minimize and mitigate the impacts of the incidental taking to the maximum extent practicable. To improve the section 10 authorization process, NMFS will utilize its authorities in the following ways.

For section 10(a)(1)(A) permits NMFS will:

- Prioritize staff time to streamline the section 10 permitting process to achieve recovery objectives and goals in the plan;

- Prioritize permit applications and develop streamlined approaches for high priority research, monitoring, and enhancement activities;
- Support implementation of the California Coastal Salmonid Population Monitoring and align permitting with the monitoring protocols; and
- Improve NMFS' tracking of authorized take.

Section 10(a)(1)(A) and (B)

For Habitat Conservation Plans (HCPs) under section 10(a)(1)(B) and Safe Harbor Agreements under section 10(a)(1)(A), NMFS will:

- Promote the use of recovery plan information and actions in developing HCPs;
- Place a high priority on cooperation and assistance to landowners proposing HCPs or Safe Harbor Agreements designed to achieve recovery objectives in essential and supporting populations;
- Develop strategies to identify potential focus areas to increase the number of HCPs and Safe Harbor Agreements (*e.g.*, key watersheds, activities amenable to consolidated landowner application such as forestry, water diverters and target increased participation, *etc.*); and
- Streamline the HCP process for landowners implementing recovery plan priorities.

Section 10(j) Experimental Populations

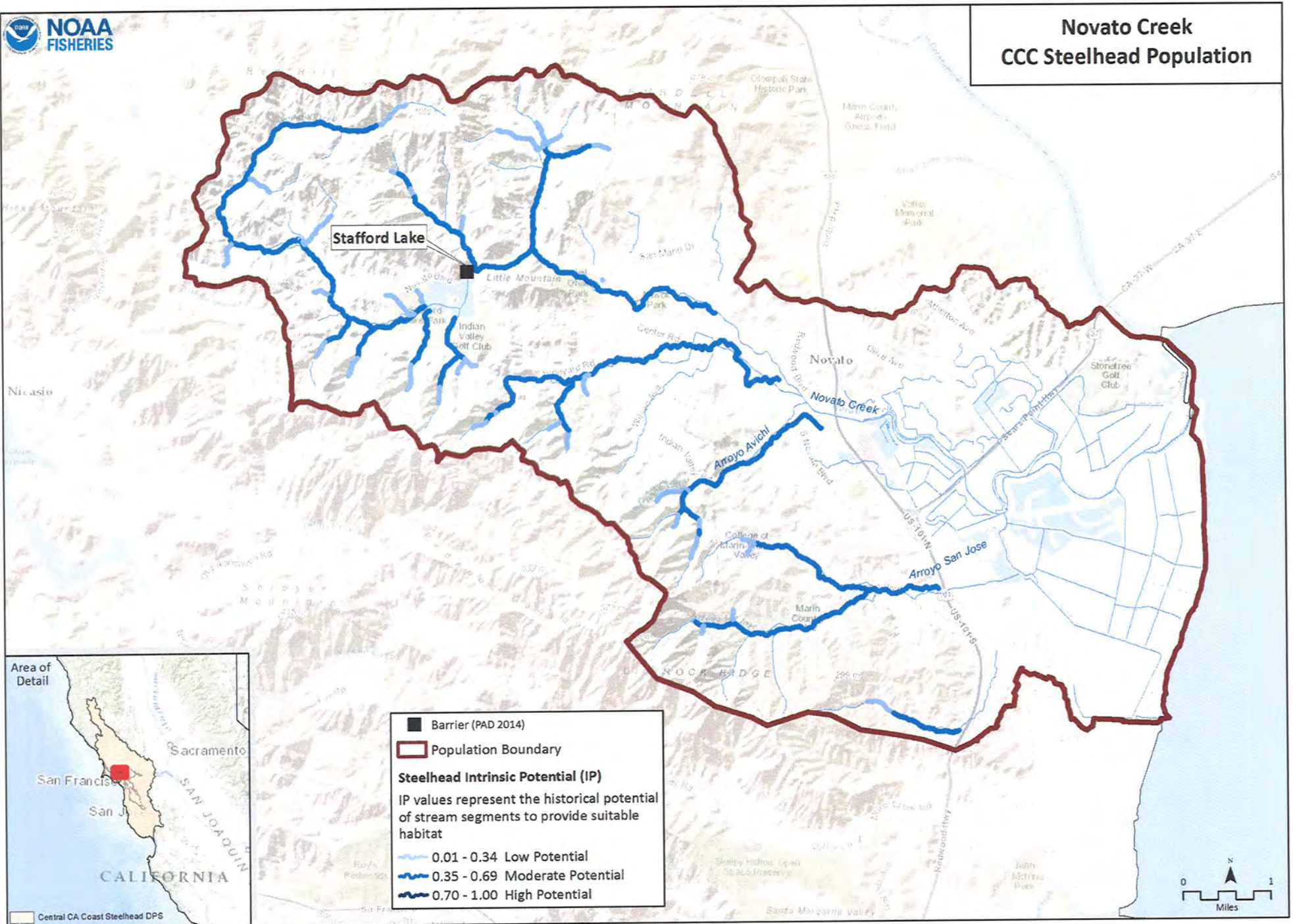
Among changes made in the 1982 amendments to the ESA was the creation of section 10(j), which allows the Services to authorize the release of an "experimental population" of a listed species outside the species' current range if the release would further the conservation of the listed species. Section 10(j) defines an "experimental population" as any population that a Service has authorized for release under that section, but only when, and at such times as, the population is wholly separate geographically from other non-experimental populations. Under section 10(j), individual members of experimental populations are treated as a threatened species, except for limited exceptions. As such, NMFS has flexibility in developing protective regulations under ESA section 4(d) to apply limited take prohibitions to the experimental population. Therefore,

management flexibility is increased, local opposition is reduced, and more re-introductions are possible. Care is taken by NMFS that the experimental populations are phenotypically and genetically similar to the existing populations within the current range and will not upset the reintroduction site's stream ecology. NMFS has designated reintroduced Central Valley spring-run Chinook salmon from Friant Dam to the confluence of the Merced River as a nonessential experimental population under section 10(j). No experimental populations are being considered for CC Chinook salmon, NC steelhead or CCC steelhead.

8.3 FUNDING

The restoration of salmon and steelhead habitats has been a primary focus of Federal, State and local entities. As a means of providing funding to the states, Congress established the Pacific Coastal Salmon Recovery Fund (PCSRF) to contribute to restoration and conservation of Pacific salmon and steelhead populations and their habitats. The states of Washington, Oregon, California, Nevada, Idaho, and Alaska, and the Pacific Coastal and Columbia River tribes receive PCSRF funding from NMFS each year. The fund supplements existing state, tribal, and local programs to foster development of Federal-state-tribal-local partnerships in salmon and steelhead recovery and conservation. In California, NMFS will continue to work with CDFW to ensure the recovery strategies and priorities are considered when funding restoration projects. The State of California Fisheries Restoration Grant Program (FRGP) alone has invested over \$250 million dollars and supported approximately 3,500 salmonid restoration projects. These projects include fish passage, water conservation, improving instream habitats, watershed monitoring, education and organizational support to watershed groups. Many other entities have made investments to improve the range and habitat of salmonids. Previously, FRGP focused on projects associated with Southern Oregon/Northern California Coast coho salmon, Central California Coast coho salmon, Central California Coast steelhead, Southern California steelhead and South Central California Coast steelhead. Specific NC steelhead and CC Chinook salmon projects will now be eligible for FRGP funding now that this public draft federal recovery plan is released. Other funding sources for recovery work include, but are not limited to: NOAA Restoration Center, EPA, U.S. Fish and Wildlife, Natural Resource Conservation Service, Coastal

Conservancy, Wildlife Conservation Board, Water Quality Control Board, Department of Parks and Recreation, and the Sea Grant Program.



Novato Creek Population

CCC Steelhead Winter-Run

- Role within DPS: Potentially Independent Population
- Diversity Stratum: Coastal San Francisco Bay
- Spawner Density Target: 1,100 adults
- Current Intrinsic Potential: 28.7 IP-km

Steelhead Abundance and Distribution

NMFS is unaware of any estimates of steelhead (*Oncorhynchus mykiss*) abundance from Novato Creek. However, there have been several limited fish surveys undertaken in Novato Creek in recent years (Rich 1997, Fawcett Environmental Consulting 2000, Leidy *et al.* 2005, Fawcett Environmental Consulting 2006, Fawcett Environmental Consulting 2009); all of these surveys encountered steelhead. NMFS assumes that the population of steelhead in the Novato Creek watershed is small given the numbers of fish observations reported in those reports and the current habitat conditions in Novato Creek and its tributaries. Becker *et al.* 2007 reports reproducing steelhead from Novato Creek and two of its tributaries: Vineyard Creek and Bowman Canyon. These authors conclude that although steelhead have been observed in Arroyo San Jose, another Novato Creek tributary, there isn't sufficient information to characterize the system as supporting a reproducing population. Further, Becker *et al.* 2007 report observations of steelhead from Arroyo Avichi although they don't reach a conclusion as to whether or not steelhead are reproducing in that Novato Creek tributary. However, steelhead are likely blocked from accessing spawning habitat in Arroyo Avichi by culverts and trash racks about ¼ mile from that stream's confluence with Novato Creek. Leidy *et al.* 2005 surveyed Pacheco Creek, another Novato Creek tributary and observed no steelhead. Although that was only one survey, the current habitat in much of Pacheco Creek is poor, and there are several migration barriers, so the likelihood of steelhead presence is low.

History of Land Use

The Marin County Department of Public Works has reported on the human settlement history of the Novato Creek watershed¹. The following information is from that report: Miwok and Pomo people were the earliest residents of the watershed. In 1839, Rancho Novato was created through a Mexican land grant and led to significant conversion of the watershed, primarily for grazing uses. Other agricultural uses followed with conversions of grassland, oak woodlands, and tidal marshlands to grazing, orchards, and croplands. By the mid-1850s many of the creeks in the

¹ http://www.marinwatersheds.org/novato_creek.html

watershed had been channelized for irrigation. The tidal marshlands had also been diked and drained for agriculture (primarily oat-hay production) by the middle of the nineteenth century.

An interesting consequence of the California Gold Rush (beginning in the late 1840s) was the filling of the San Francisco Bay margins by sediments mobilized in the Sierra region by hydraulic mining operations.² By the 1890s, the shoreline extended a mile farther into the Bay because of the massive transfer of sediment from the Sierra Nevada foothills. The wetlands, including marshlands of lower Novato Creek watershed, have likely changed in area and location due to the influx of sediment to San Pablo Bay during this time.

Transportation has been significant in the development of the City of Novato. In the 1880s Novato Creek was dredged to make way for schooners bound for San Francisco, though currently, boat traffic is restricted to pleasure craft in the lower portion of the watershed, near Bel Marin Keys. Novato's population grew after the railroad was built in the mid- to late-1870s. Interstate Highway 101 traverses the eastern side of Novato, and Hamilton Air Force Base (commissioned from 1935 until 1974), and Marin County Airport (Gross Field) are other significant parts of transportation infrastructure that were or are found in the watershed.

Current Resources and Land Management

The County of Marin states that Novato is the fastest growing municipality in Marin County¹. The U.S. Census Bureau reports the 2000 human population of Novato was 47,630 and the 2010 population was 58,652³ -- more than a 23 percent increase in that decade. The County of Marin anticipates continued growth in the population of Novato and has projected a theoretical build-out population of Novato of approximately 63,000⁴. The Marin Countywide Plan does not provide a definitive time horizon for the theoretical build-out or for the plan in general; however, many projections for various elements throughout the Marin Countywide Plan go through 2020.

The City of Novato covers about half of the Novato Creek watershed and urban and commercial development is widespread within that area. "Novato is actively engaged in downtown redevelopment with proposed development of commercial and residential uses and supporting infrastructure. The Marin Countywide Plan⁵ identifies Novato as having the greatest growth potential in Marin for commercial and industrial development."¹

² <http://www.nbwatershed.org/millercreek/index6.html>

³ <http://factfinder.census.gov/>

⁴ http://www.co.marin.ca.us/depts/cd/main/fm/cwpcodes/CWP_CD2.pdf

⁵ http://www.co.marin.ca.us/depts/CD/main/fm/cwpcodes/CWP_CD2.pdf

More than three-quarters of the Novato Creek watershed is in private ownership⁶. Land ownership within the Novato Creek watershed is included in Table 1.

Table 1: Land ownership within the Novato Creek watershed.

| Land Ownership | Acres | Percent of Watershed |
|----------------------------|--------|----------------------|
| Private | 24,453 | 77% |
| Local (City/County Park) | 147 | 0% |
| Local (Open Space) | 4,335 | 14% |
| Local (Water District) | 236 | 1% |
| State (Fish & Game) | 700 | 2% |
| State (Parks & Recreation) | 4 | 0% |
| Federal (USAF-Hamilton) | 1,784 | 6% |

Information provided by Management Landscape, California Department of Forestry, 2002.

Several agencies or special districts operate within the Novato Creek watershed that may have an effect on aquatic habitat within the watershed. The North Marin Water District (NMWD) provides treated water for residents within the Novato Creek watershed. About 80 percent of the water delivered by the NMWD is purchased from the Sonoma County Water Agency (water is derived from the Russian River watershed), and about 20 percent of the water delivered by NMWD comes from Stafford Lake, an on-stream reservoir on Novato Creek. Additionally, since 2007, the NMWD operates the Deer Island Recycled Water Facility, located adjacent to Highway 37. Presently, water from this facility provides irrigation water to the Stone Tree Golf Course and Novato Fire Protection District Station 62. Ultimately, the expanded recycled water facilities will be used to offset approximately 220 million gallons per year of potable water demand for landscape irrigation, and reduce dependence on imported water supply from the Russian River and wastewater discharge into San Pablo Bay.

The Marin County Flood Control and Water Conservation District conducts the periodic dredging of portions of Novato Creek, Warner Creek and Arroyo Avichi for flood control, an annual creek clearance program carried out by the Marin Conservation Corps under the direction of District staff, and operation and maintenance of four stormwater pumping stations; and consults with the City of Novato regarding development proposals and their related flood control issues. Recently, the Marin County Flood Control and Water Conservation District undertook the Vineyard Creek Capital Improvement Project to increase flood conveyance, stabilize incised banks, and promote an ecologically healthy stream corridor along the approximately 2500 feet

⁶ NMFS GIS data – Novato Creek Watershed Characterization.

reach of Vineyard Creek, a major Novato Creek tributary. In 2007, the Marin County Flood Control and Water Conservation District produced Bank Stabilization Guidelines for a portion of Novato Creek.

Marin County's Department of Public Works also staffs the Novato Watershed Program, a collaboration of the County, Novato Sanitary District, North Marin Water District, and the City of Novato to provide a system-wide analysis of flood protection and habitat restoration options. The Novato Watershed Program is still in the process of determining project alternatives, but one initial project has been developed for flood protection and habitat restoration in lower Novato Creek baylands (behind Target/Costco) north of Hwy 37. The proposed project would lay back levees, increase tidal prism, and open 80 acres to tidal flushing and conversion to tidal marsh. The Novato Watershed Program has sought IRWMP grant funding for the project.

The Novato Sanitary District provides wastewater collection and treatment to Novato and some surrounding areas, as well as solid waste management, water education, and recycled wastewater⁷. The Marin Hazardous and Solid Waste Joint Powers Authority provide household hazardous waste collection, recycling and disposal information for residents and businesses, and ensures the County's compliance with recycling mandates. The Marin Resource Conservation District provides technical assistance to agricultural landowners on soil erosion and resource conservation matters. The County of Marin Open Space District manages select County-owned lands to preserve, protect, and enrich the natural aspect of those properties. Also, some open space parcels provide recreational opportunities.

The County of Marin reports the following land protection and restoration efforts in the Novato Creek watershed: Hamilton Wetland Restoration project, Rush Creek and Bahia restoration projects, and planning by the City of Novato and Marin County Open Space District for preservation and land acquisition for trails.

Salmonid Viability and Watershed Conditions

The following key attributes were rated Poor through the CAP process for steelhead: Estuary, Habitat Complexity, Hydrology, Landscape Patterns, Passage/Migration, Riparian, Sediment, Sediment Transport, Velocity Refuge, Viability, and Water Quality. Recovery strategies will focus on improving these poor conditions as well as those needed to ensure population viability and functioning watershed processes.

⁷ <http://www.novatosan.com/>

⁸ <http://www.nmwd.com/pdf/conservation/FAQ%20Web%20Final%20030311.pdf>

Current Conditions

The following discussion focuses on those conditions that were rated Fair or Poor as a result of our CAP viability analysis. The Novato Creek CAP Viability Table results are provided below. Recovery strategies will focus on improving these conditions.

Population and Habitat Conditions

Riparian Vegetation: Composition, Cover & Tree Diameter

The portions of the Novato Creek watershed that are tidally-influenced likely had limited abundance of riparian trees. However, the upper portions of the watershed were likely dominated by coast redwood (*Sequoia sempervirens*), quickly transforming to mixed woodland of California bay (*Umbellularia californica*), buckeye (*Aesculus glabra*), coast live oak (*Quercus agrifolia*), and California black oak (*Quercus kelloggii*), then becoming more savannah-like in lower elevations. Systematic data related to riparian tree diameter effects on adult steelhead within the Novato Creek watershed are not available. However, poor riparian conditions are common throughout much of the Novato Creek watershed, and have likely resulted in elevated summer water temperature, high substrate embeddedness levels, prevalent stream bank erosion, and limited recruitment of large woody debris for rearing salmonids. Tree diameter was used as an indicator of riparian function based on the average diameter at breast height of a stand of trees within a buffer that extends 100 meters back from the edge of the active channel. Within the Novato Creek watershed there are few (if any) places in which riparian tree vegetation extends 100 meters back from the edge of the active channel. In the headwater areas of the watershed, the condition of the riparian vegetation is likely related to anthropogenic factors and natural conditions based on local geology, and hydrologic conditions. Within the urbanized portion of the watershed, the area west of Highway 101, this is certainly attributable to anthropogenic factors, as there is much encroachment of the riparian areas of Novato Creek and its tributaries. The NMWD has worked with the County of Marin and private property owners in the watershed upstream of Stafford Dam to improve riparian conditions.⁹ The portion of the watershed east of Highway 101 has been highly modified through channelization, levees, and various water control structures, and is used primarily for agricultural activities, though some residential development has occurred. Threats contributing significantly to this condition include: Channel Modification; and Residential and Commercial Development.

Estuary: Quality and Extent

All of the main channel of Novato Creek east of Highway 101 is channelized and leveed, disconnecting the seasonal or tidal wetlands from the stream. The portion of Novato Creek near

⁹ January 23, 2012, letter from NMWD to NMFS,

Highway 101 is dredged on a regular basis (about every 3 or 4 years) as a flood control measure. The riparian vegetation community has been greatly modified and likely reduced as well and this may affect water temperature regime and the amount of allochthonous food items available to steelhead. Also, tide gates and other water management structures are present in that general area, and the majority of the area has been converted for agricultural uses. Bel Marin Keys is an unincorporated community of about 700 homes in the lower Novato Creek watershed. This community is east of Highway 101 and south of Highway 37 and lies on the southern flank of Novato Creek in an area of historic tidal wetlands that were converted to agricultural land in the early 20th century. Agricultural and urban land uses may lead to inputs of pollutants that may reach Novato Creek as stormwater. Fish kills in Novato Creek concomitant with discharge from Pacheco Pond, an artificial water body that is filled from discharges from Arroyo San Jose and Pacheco Creek, have been reported. All of these factors reduce the quality of aquatic and riparian habitat, and reduce opportunities for rearing of juvenile steelhead. Threats contributing significantly to this condition include: Agriculture and Channel Modification.

The Novato Watershed Program is still in the process of determining project alternatives, but one initial project has been developed for flood protection and habitat restoration in lower Novato Creek baylands (behind Target/Costco) north of Hwy 37. The proposed project would lay back levees, increase tidal prism, and open 80 acres to tidal flushing and conversion to tidal marsh. The Novato Watershed Program has sought IRWMP grant funding for the project. This project, if constructed, would reduce channelization, connect the stream and tidal habitats, increase amount of estuary, and increase tidal flushing. Additional projects may include further removal of levees, reduction of channelization, and conversion of agricultural lands currently used by Novato Sanitary District as summer sprayfields to marsh; however, these alternatives are still being developed.

Velocity Refuge: Floodplain Connectivity

Periodic inundation of floodplains by streams provides several ecological functions beneficial to salmonids, including: coarse sediment sorting, fine sediment storage, groundwater recharge, velocity refuge, formation and maintenance of off-channel habitats, and enhanced forage production. Floodplain connectivity is associated with more diverse and productive food webs. Specific data related to floodplain connectivity are not available. However, based on the amount of urbanization with encroachment into riparian areas, channel modification, bank stabilization, and wetland reclamation found throughout the watershed, floodplain connectivity is likely significantly reduced in the watershed. Threats contributing significantly to this condition include: Channel Modification, Residential and Commercial Development, Roads and Railroads, and Water Diversions and Impoundments.

As noted above, the Novato Watershed program is proposing a floodplain and marsh restoration project in the tidal portions of the watershed.

Hydrology: Baseflow and Passage Flows

The USGS maintains a stream gauge on Novato Creek (#11459500) that provides flow data. The record shows that in most years, there was little or no flow in Novato Creek in the summer and fall months. Stafford Dam on the upper mainstem of Novato Creek is a large-scale diversion facility that is used to provide about 20 percent of the potable water used by the residents of Novato. The reservoir behind Stafford Dam is filled at a time coinciding with the period of adult immigration and smolt emigration. The CDFG(W) prepared a flow-release schedule for Stafford Dam in 1983 that requires NMWD to release 150 acre-feet during the period May 1 through October 30. The flow-release schedule for Stafford Dam is:

| | | | |
|------|---------------------------------|-----------|----------|
| May | 0.2 cubic feet per second (cfs) | August | 0.3 cfs |
| June | 0.9 cfs | September | 0.2 cfs |
| July | 0.7 cfs | October | 0.2 cfs. |

Further, the urban areas in this watershed have experienced stream channelization and increases in the amount of impervious surfaces. Stream channelization generally cuts off the floodplain access for the stream and leads to accelerated water discharge, which may lead to further bank instability and channel incision. Impervious surfaces reduce rainwater infiltration and natural groundwater recharge, leading to higher peak flows and a quicker return to base flows, i.e., a flashier hydrologic regime. Threats contributing significantly to this condition include: Water Diversions and Impoundments.

Passage/Migration: Mouth or Confluence and Physical Barriers

Numerous passage and migration impairments exist within the Novato Creek watershed. Stafford Dam is a large on-channel reservoir that it used primarily for water supply, incidental flood control, and recreation. Several culverts and road crossings are either partial or complete barriers to steelhead migration, and some historic streams have been filled or placed in pipes (NMFS GIS 2015). All of these barriers impair hydrology and constrain migration of both adult and juvenile steelhead throughout the remaining accessible habitat. Threats contributing significantly to this condition include: Channel Modification; and Residential and Commercial Development.

Hydrology: Impervious Surfaces

Primary factors affecting hydrology in the Novato Creek watershed include flow regulation by Stafford Dam and urbanization, coupled with naturally xeric hydrologic conditions. Stafford

Dam diverts water year-around and does not have bypass flows that are sufficient to maintain watershed processes. Stafford Dam interrupts sediment transport below the dam and that may lead to increased channel instability and incision downstream of the dam, and the loss of spawning gravel. The urban areas in this watershed have experienced stream channelization and increases in the amount of impervious surfaces. Stream channelization generally cuts off the floodplain access for the stream and leads to accelerated water discharge, which may lead to further bank instability and channel incision. Impervious surfaces reduce rainwater infiltration and natural groundwater recharge, leading to higher peak flows and a quicker return to base flows, i.e., a flashier hydrologic regime. Threats contributing significantly to this condition include: Channel Modification and Water Diversions and Impoundments.

Habitat Complexity: Percent Primary Pools and Pool/Riffle/Flatwater Ratios

Specific data related to altered pool complexity and/or pool/riffle ratios in the Novato Creek watershed are not available. However, the abundance and quality of primary pools and the ratio of pool/riffle/flatwater habitats are likely substandard given the generally degraded condition of Novato Creek, particularly in the urbanized areas, the paucity of large woody debris, the amount of bank and channel stabilization, and the influence of tidal action in the lower portion of the watershed. The amount and diversity of cover elements in pools and an appropriate ratio of pool/riffle/flatwater habitats are important to all lifestages of steelhead. Threats contributing significantly to this condition include: Channel Modification and Residential and Commercial Development.

Habitat Complexity: Large Wood and Shelter

Specific data related to large woody debris or shelter rating for the Novato Creek watershed are not available. However, the abundance of large woody debris within the watershed is low. This paucity can be attributed to the poor riparian conditions, associated with encroachment by suburban development and channel hardening that limit recruitment of large woody debris to the stream, and to the removal of large woody debris for flood control. Threats contributing significantly to this condition include: Channel Modification and Residential and Commercial Development.

Sediment: Gravel Quality and Distribution of Spawning Gravels

Specific data related to gravel quality and quantity are not available for Novato Creek. However, observations by NMFS staff revealed abundant fine sediment at many sites within the watershed. The County of Marin reports extensive bank erosion in the watershed and upslope gully development in the watershed.¹⁰ Also, in the lower portions of Novato Creek and its lower

¹⁰ http://www.marinwatersheds.org/novato_creek.html

tributaries, Arroyo Avichi and Warner/Vineyard Creek have very high amounts of fine sediment and are subject to mechanical sediment removal activities on a four-year cycle. This high amount of fine sediments impairs gravel quality resulting in reduced feeding opportunities by virtue of changes in available invertebrates, and reduced spawning success. Stafford Dam interrupts sediment transport to the lower watershed and the increased frequency of channel incision increases sediment transport out of the lower watershed. Threats contributing significantly to this condition include: Water Diversion and Impoundments.

Landscape Patterns: Agriculture, Timber Harvest & Urbanization

Major landscape disturbance within the Novato Creek watershed is primarily associated with urban and water development, though agriculture is a major disturbance in the watershed east of Highway 101. The City of Novato covers about one-half of the Novato Creek watershed. Also, there is urban development at Bel Marin Keys and Ignacio. The Marin Countywide Plan identifies Novato as having the greatest growth potential in Marin for commercial and industrial development.¹ Urban and commercial development are widespread within the watershed. Adverse factors within the Novato Creek watershed associated with urbanization include: high density of dwellings, high amount of miles of roads per square mile of watershed, high amount of impervious surfaces, encroachment of riparian areas, stream channelization, flood control activities, and filling and piping of historic Novato Creek tributaries. The agricultural development in the watershed has led to leveed and channelized streams, loss of wetlands through conversion to grazing lots and hay fields, and filling and piping of some historic streams. Threats contributing significantly to this condition include: Channel Modification; and Water Diversion and Impoundments.

Water Quality: Temperature

Systematic data related to stream water temperature within the Novato Creek watershed are not available. However, several factors may affect water temperature within the watershed: presence and operation of Stafford Dam, water withdrawals, reductions of riparian vegetation, high amounts of impervious surfaces, and stream channelization. Some spot water temperature data taken during fish relocation activities in lower Novato Creek and its tributaries indicate that summertime and fall water temperature may exceed 20 degrees Celsius (Fawcett Environmental Consulting 2006, Fawcett Environmental Consulting 2009, Fawcett, unpublished data.) Threats contributing significantly to this stress include: Channel Modification, Residential and Commercial Development, and Water Diversion and Impoundments.

Water Quality: Turbidity or Toxicity

Systematic data related to stream turbidity or toxicity within the Novato Creek watershed are not available. However, several factors may affect turbidity or toxicity within the watershed: incising

channel bed, unstable stream banks, reductions of riparian vegetation, and high amounts of residential and commercial lands with corresponding high amounts of impervious surfaces. Novato Creek is included on the US Environmental Protection Agency's list of impaired streams in the San Francisco area¹¹. The reported sources of the impaired water quality in this watershed are urban runoff and storm sewers. Further, the US Environmental Protection Agency's Better Assessment Science Integrating Point & Non-point Sources database lists 70 hazardous and solid waste, industrial discharges, or toxic release sites within the Novato Creek watershed. Threats contributing significantly to this condition include: Channel Modification, Residential and Commercial Development, Roads and Railroads, and Water Diversion and Impoundments.

Threats

The following discussion focuses on those threats that were rated as High or Very High (see Novato Creek CAP Results). Recovery strategies will likely focus on ameliorating High rated threats; however, some strategies may address Medium and Low threats when the strategy is essential to recovery efforts.

Agriculture

Historically, within the Novato Creek watershed grasslands, oak woodlands, and tidal marshlands were converted to grazing lands, orchards, and croplands. However, currently those activities are not occurring within the watershed on a significant scale. By the mid-1850s many of the creeks in the watershed had been channelized for irrigation. The portion of the watershed east of Highway 101 has been highly modified for agricultural benefit (primarily oat-hay production) by channelization of streams, construction of levees, and filling and piping of stream channels. This area continues to be used for agricultural practices, and the Novato Sanitary District uses some areas as sprayfields. As noted above, the Novato Watershed program is proposing a floodplain and marsh restoration project in the tidal portions of the watershed. Additional projects south of Hwy 37 and east of Hwy 101 could include restoration of agricultural lands/spray fields, further laying back of levees, and increasing the tidal prism.

Channel Modification

Much of the Novato Creek watershed has experienced channel modifications, including straightening, stream bank hardening, channel realignment, filling and piping, levee construction, and dredging. These modifications, combined with other landscape altering practices, have destroyed estuarine habitat, disconnected streams from their floodplains, and constrained natural fluvial and geomorphic processes that create and maintain instream and

¹¹ http://oaspub.epa.gov/tmdl/attains_waterbody.control?p_list_id=CAR206%2E200NOVATO%20CREEK&p_cycle=2002&p_report_type=T

riparian habitat that support viable steelhead populations. As noted above, the Novato Watershed program is proposing a floodplain and marsh restoration project in the tidal portions of the watershed.

Recreational Areas and Activities

The primary recreational lands within the watershed are associated with Open Space, parks, the Marin Country Club, and the Stone Tree Golf Course. Parks and golf courses can be sources of decreased water quality associated with diversions, reductions of riparian vegetation, and use of polluting chemicals associated with landscape maintenance.

Residential and Commercial Development

The County of Marin states that Novato has been the fastest growing municipality in Marin County¹. The city's population grew 23 percent between 2000 and 2010, and the County of Marin is anticipating significant human population growth in this current decade too. Novato covers about half of the Novato Creek watershed and other smaller communities occur in the watershed, too, and urban and commercial development is widespread. The City of Novato is engaged in downtown redevelopment with proposed development of commercial and residential uses and supporting infrastructure. The Marin Countywide Plan identifies Novato as having the greatest growth potential in Marin for commercial and industrial development.¹

During the 2010 census, the average density of housing units in Novato was 756.8 per square mile (NMFS GIS, 2015). Intensive and widespread urban development has increased the impervious surface area, greatly impacting hydrology as well as the pollutant level within the aquatic environment, and impaired instream conditions (e.g., passage, instream habitat, hydrology, and floodplain connection).

Roads and Railroads

Roads are a significant threat for adult and smolt lifestages of steelhead in the Novato Creek watershed. Road networks within the Novato Creek watershed are largely paved systems associated with urban development, and represent a significant source of the total impervious surface within the basin. Further, the Novato Creek watershed has a relatively high concentration of roads within riparian zones (4.5 miles of roads per square mile of 100 meter riparian buffer) (NMFS GIS 2015). Roadways in the Novato Creek watershed amplify storm flow intensity and duration during precipitation events, deliver road-born pollution (e.g., oils, urban runoff, etc.) directly to the aquatic system, and necessitate culverts and other structures that obstruct steelhead migration.

Water Diversion and Impoundments

The Novato Creek watershed is highly affected by the presence and operation of Stafford Dam. Additionally, there are on-channel reservoirs on Arroyo San Jose, a Novato Creek tributary. These dams may affect all lifestages of steelhead by blocking passage, limiting migration periods, and altering hydrology and instream habitat.

Limiting Stresses, Lifestages, and Habitats

Threat and stress analyses within the CAP workbook suggest that all lifestages are limited by impaired conditions within the Novato Creek watershed. Primary factors contributing to habitat limitations and limited steelhead abundance are extensive watershed development for urban, suburban, and commercial land uses. Stafford Lake is a complete barrier to migration and dramatically affects the hydrology of Novato Creek. In addition many other complete and partial barriers to steelhead movement are found throughout the Novato Creek watershed. Also, because of residential and commercial development and some flood control actions, riparian vegetation and large woody debris are reduced. These stresses identified in this paragraph affect all lifestages of steelhead.

General Recovery Strategy

In general, recovery strategies will focus on improving conditions and ameliorating stresses and threats discussed in the previous paragraph. Recovery actions should identify and target habitat constraints within stream reaches with high potential to benefit steelhead recovery and may consider mechanisms for reoperation of and passage around dams by increasing hydraulic and floodplain connectivity, increasing and improving riparian vegetation and large woody debris retention and recruitment, and improving passage within the watershed. Other stresses or threats to steelhead or their habitat may also be developed where implementation of these strategies is critical.

Improve Canopy Cover and Riparian Recruitment

The Novato Creek watershed would benefit from improved riparian composition and structure, which would increase stream shading, and improve large woody debris recruitment for eventual increases in instream shelter for steelhead. Practices to improve riparian condition include native riparian planting, and development and enforcement of riparian buffers. As noted above, the NMWD has worked with the County of Marin and private property owners in the watershed upstream of Stafford Dam to improve riparian conditions.¹²

Improve Connectivity of Streams and Floodplains

¹² January 23, 2012, letter from NMWD to NMFS,

Floodplain habitat and function within much of the Novato Creek watershed is impaired, primarily due to urbanization and the resulting effects of altered hydrology and channel confinement. Novato Creek and its tributaries would benefit from utilizing bio-technical vegetative techniques to reestablish floodplain benches and create a defined low flow channel.

Improve Connectivity of Wetlands

Most of the wetland habitats within the Novato Creek watershed have been separated hydraulically from the stream habitats. This separation has occurred primarily through levees and filling for agricultural and urban development land uses. Aquatic habitat, and perhaps flood capacity, would benefit from reconnection of wetlands to the stream habitats, thereby benefitting steelhead.

As noted above, the Novato Watershed program is proposing a floodplain and marsh restoration project in the tidal portions of the watershed.

Increase Instream Shelter Ratings and Pool Volume

Shelter ratings should be improved within poor quality reaches throughout the Novato Creek watershed. Adding large woody debris will improve the habitat complexity of existing pool habitats where shelter components are currently comprised of undercut banks and a few pieces of woody debris. Restoration efforts may include construction of wood/boulder structures into degraded reaches to increase pool frequency and volume and increase stream channel heterogeneity, thereby increasing the carrying capacity of steelhead for Novato Creek and its tributaries. The NMWD has completed a project to reduce bank erosion using large woody debris for habitat enhancement.

Residential and Commercial Development

Novato Creek and its tributaries would benefit from restoration actions that reduce the amount of impervious surfaces and from measures that collect stormwater in a manner that reduces adverse effects on hydrology and water quality associated with stormwater runoff. Further, future development should avoid or minimize features to increase impervious surfaces, and should include greater setbacks from streamside locations.

Channel Modification

Recovery actions that reconnect historic floodplains to stream channels, reconstruct floodplains, reconnect wetlands, replace lost wetlands, increase channel complexity, and improve fluvial and geomorphic processes should improve habitat conditions in the Novato Creek watershed. As noted above, the Novato Watershed program is proposing a floodplain and marsh restoration project in the tidal portions of the watershed.

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Novato Creek CAP Viability Results

| # | Conservation Target | Category | Key Attribute | Indicator | Poor | Fair | Good | Very Good | Current Indicator Measurement | Current Rating |
|---|---------------------|-----------|---------------------|--|---|---|---|---|---|----------------|
| 1 | Adults | Condition | Habitat Complexity | Large Wood Frequency (BFW 0-10 meters) | <50% of streams/ IP-Km (>6 Key Pieces/100 meters) | 50% to 74% of streams/ IP-Km (>6 Key Pieces/100 meters) | 75% to 90% of streams/ IP-Km (>6 Key Pieces/100 meters) | >90% of streams/ IP-Km (>6 Key Pieces/100 meters) | <50% of streams/ IP-km (>6 Key Pieces/100 meters) | Poor |
| | | | Habitat Complexity | Large Wood Frequency (BFW 10-100 meters) | <50% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | 50% to 74% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | 75% to 90% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | >90% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | <50% of streams/ IP-km (>1.3 Key Pieces/100 meters) | Poor |
| | | | Habitat Complexity | Pool/Riffle/Flatwater Ratio | <50% of streams/ IP-Km (>40% Pools; >20% Riffles) | 50% to 74% of streams/ IP-Km (>40% Pools; >20% Riffles) | 75% to 90% of streams/ IP-Km (>40% Pools; >20% Riffles) | >90% of streams/ IP-Km (>40% Pools; >20% Riffles) | <50% of streams/ IP-km (>40% Pools; >20% Riffles) | Poor |
| | | | Habitat Complexity | Shelter Rating | <50% of streams/ IP-Km (>80 stream average) | 50% to 74% of streams/ IP-Km (>80 stream average) | 75% to 90% of streams/ IP-Km (>80 stream average) | >90% of streams/ IP-Km (>80 stream average) | <50% of streams/ IP-km (>80 stream average) | Poor |
| | | | Hydrology | Passage Flows | NMFS Flow Protocol: Risk Factor Score >75 | NMFS Flow Protocol: Risk Factor Score 51-75 | NMFS Flow Protocol: Risk Factor Score 35-50 | NMFS Flow Protocol: Risk Factor Score <35 | NMFS Flow Protocol: Risk Factor Score 92 | Poor |
| | | | Passage/Migration | Passage at Mouth or Confluence | <50% of IP-Km or <16 IP-Km accessible* | 50% of IP-Km to 74% of IP-km | 75% of IP-Km to 90% of IP-km | >90% of IP-km | <50% of IP-km | Poor |
| | | | Passage/Migration | Physical Barriers | <50% of IP-Km or <16 IP-Km accessible* | 50% of IP-Km to 74% of IP-km | 75% of IP-Km to 90% of IP-km | >90% of IP-km | 75.9 of IP-km | Fair |
| | | | Riparian Vegetation | Tree Diameter (North of SF Bay) | ≤39% Class 5 & 6 across IP-km | 40 - 54% Class 5 & 6 across IP-km | 55 - 69% Class 5 & 6 across IP-km | >69% Class 5 & 6 across IP-km | 739% Class 5 & 6 across IP-km | Poor |
| | | | Riparian Vegetation | Tree Diameter (South of SF Bay) | ≤69% Density rating "D" across IP-km | 70-79% Density rating "D" across IP-km | ≥80% Density rating "D" across IP-km | Not Defined | | |

| | | | | | | | | | | |
|---|--------------------------|-----------|-----------------|---|--|--|---|---|--|------|
| | | | Sediment | Quantity & Distribution of Spawning Gravels | <50% of IP-Km or <16 IP-Km accessible* | 50% of IP-Km to 74% of IP-Km | 75% of IP-Km to 90% of IP-Km | >90% of IP-Km | <50% of IP-Km | Poor |
| | | | Velocity Refuge | Floodplain Connectivity | <50% Response Reach Connectivity | 50-80% Response Reach Connectivity | >80% Response Reach Connectivity | Not Defined | <50% Response Reach Connectivity | Poor |
| | | | Water Quality | Toxicity | Acute | Sublethal or Chronic | No Acute or Chronic | No Evidence of Toxins or Contaminants | Acute | Fair |
| | | | Water Quality | Turbidity | <50% of streams/ IP-Km maintains severity score of 3 or lower | 50% to 74% of streams/ IP-Km maintains severity score of 3 or lower | 75% to 90% of streams/ IP-Km maintains severity score of 3 or lower | >90% of streams/ IP-Km maintains severity score of 3 or lower | 50% to 74% of streams/ IP-Km maintains severity score of 3 or lower | Fair |
| | | Size | Viability | Density | <1 spawner per IP-km to < low risk spawner density per Spence (2008) | >1 spawner per IP-km to < low risk spawner density per Spence (2008) | low risk spawner density per Spence (2008) | | <1 spawner per IP-km to < low risk spawner density per Spence (2008) | Poor |
| 2 | Eggs | Condition | Hydrology | Flow Conditions (Instantaneous Condition) | NMFS Flow Protocol: Risk Factor Score >75 | NMFS Flow Protocol: Risk Factor Score 51-75 | NMFS Flow Protocol: Risk Factor Score 35-50 | NMFS Flow Protocol: Risk Factor Score <35 | NMFS Flow Protocol: Risk Factor Score 51-75 | Fair |
| | | | Hydrology | Redd Scour | NMFS Flow Protocol: Risk Factor Score >75 | NMFS Flow Protocol: Risk Factor Score 51-75 | NMFS Flow Protocol: Risk Factor Score 35-50 | NMFS Flow Protocol: Risk Factor Score <35 | NMFS Flow Protocol: Risk Factor Score 51-75 | Fair |
| | | | Sediment | Gravel Quality (Bulk) | >17% (0.85mm) and >30% (6.4mm) | 15-17% (0.85mm) and <30% (6.4mm) | 12-14% (0.85mm) and <30% (6.4mm) | <12% (0.85mm) and <30% (6.4mm) | 15-17% (0.85mm) and <30% (6.4mm) | Poor |
| | | | Sediment | Gravel Quality (Embeddedness) | <50% of streams/ IP-Km (>50% stream average scores of 1 & 2) | 50% to 74% of streams/ IP-Km (>50% stream average scores of 1 & 2) | 75% to 90% of streams/ IP-Km (>50% stream average scores of 1 & 2) | >90% of streams/ IP-Km (>50% stream average scores of 1 & 2) | <50% of streams/ IP-Km (>50% stream average scores of 1 & 2) | Poor |
| 3 | Summer Rearing Juveniles | Condition | Estuary/Lagoon | Quality & Extent | Impaired/non-functional | Impaired but functioning | Properly Functioning Condition | Unimpaired Condition | Impaired/non-functional | Poor |

| | | | | | | | |
|--------------------|---|--|--|--|--|--|------|
| Habitat Complexity | Large Wood Frequency (Bankfull Width 0-10 meters) | <50% of streams/ IP-Km (>5 Key Pieces/100 meters) | 50% to 74% of streams/ IP-Km (>6 Key Pieces/100 meters) | 75% to 90% of streams/ IP-Km (>6 Key Pieces/100 meters) | >90% of streams/ IP-Km (>6 Key Pieces/100 meters) | <50% of streams/ IP-km (>6 Key Pieces/100 meters) | Poor |
| Habitat Complexity | Large Wood Frequency (Bankfull Width 10-100 meters) | <50% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | 50% to 74% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | 75% to 90% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | >90% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | <50% of streams/ IP-km (>1.3 Key Pieces/100 meters) | Poor |
| Habitat Complexity | Percent Primary Pools | <50% of streams/ IP-Km (>40% average primary pool frequency) | 50% to 74% of streams/ IP-Km (>40% average primary pool frequency) | 75% to 89% of streams/ IP-Km (>40% average primary pool frequency) | >90% of streams/ IP-Km (>40% average primary pool frequency) | <50% of streams/ IP-km (>40% average primary pool frequency) | Poor |
| Habitat Complexity | Pool/Riffle/Flatwater Ratio | <50% of streams/ IP-Km (>40% Pools; >20% Riffles) | 50% to 74% of streams/ IP-Km (>40% Pools; >20% Riffles) | 75% to 90% of streams/ IP-Km (>40% Pools; >20% Riffles) | >90% of streams/ IP-Km (>40% Pools; >20% Riffles) | <50% of streams/ IP-km (>40% Pools; >20% Riffles) | Poor |
| Habitat Complexity | Shelter Rating | <50% of streams/ IP-Km (>80 stream average) | 50% to 74% of streams/ IP-Km (>80 stream average) | 75% to 90% of streams/ IP-Km (>80 stream average) | >90% of streams/ IP-Km (>80 stream average) | <50% of streams/ IP-km (>80 stream average) | Poor |
| Hydrology | Flow Conditions (Baseflow) | NMFS Flow Protocol: Risk Factor Score >75 | NMFS Flow Protocol: Risk Factor Score 51-75 | NMFS Flow Protocol: Risk Factor Score 35-50 | NMFS Flow Protocol: Risk Factor Score <35 | NMFS Flow Protocol: Risk Factor Score >75 | Poor |
| Hydrology | Flow Conditions (Instantaneous Condition) | NMFS Flow Protocol: Risk Factor Score >75 | NMFS Flow Protocol: Risk Factor Score 51-75 | NMFS Flow Protocol: Risk Factor Score 35-50 | NMFS Flow Protocol: Risk Factor Score <35 | NMFS Flow Protocol: Risk Factor Score 51-75 | Fair |
| Hydrology | Number, Condition and/or Magnitude of Diversions | >5 Diversions/10 IP km | 1.1 - 5 Diversions/10 IP km | 0.01 - 1 Diversions/10 IP km | 0 Diversions | 1.1 - 5 Diversions/10 IP km | Fair |
| Passage/Migration | Passage at Mouth or Confluence | <50% of IP-Km or <16 IP-Km accessible* | 50% of IP-Km to 74% of IP-km | 75% of IP-Km to 90% of IP-km | >90% of IP-km | 50% of IP-km to 74% of IP-km | Fair |
| Passage/Migration | Physical Barriers | <50% of IP-Km or <16 IP-Km accessible* | 50% of IP-Km to 74% of IP-km | 75% of IP-Km to 90% of IP-km | >90% of IP-km | 75.9 of IP-km | Fair |

| | | | | | | | |
|------------------------------|---------------------------------|--|--|--|--|---|------|
| Riparian Vegetation | Canopy Cover | <50% of streams/ IP-Km (>70% average stream canopy; >85% where coho IP overlaps) | 50% to 74% of streams/ IP-Km (>70% average stream canopy; >85% where coho IP overlaps) | 75% to 90% of streams/ IP-Km (>70% average stream canopy; >85% where coho IP overlaps) | >90% of streams/ IP-Km (>70% average stream canopy; >85% where coho IP overlaps) | <50% of IP-km (>70% average stream canopy; >85% where coho IP overlaps) | Poor |
| Riparian Vegetation | Tree Diameter (North of SF Bay) | ≤39% Class 5 & 6 across IP-km | 40 - 54% Class 5 & 6 across IP-km | 55 - 69% Class 5 & 6 across IP-km | >69% Class 5 & 6 across IP-km | ?39% Class 5 & 6 across IP-km | Poor |
| Riparian Vegetation | Tree Diameter (South of SF Bay) | ≤69% Density rating "D" across IP-km | 70-79% Density rating "D" across IP-km | ≥80% Density rating "D" across IP-km | Not Defined | | |
| Sediment (Food Productivity) | Gravel Quality (Embeddedness) | <50% of streams/ IP-Km (>50% stream average scores of 1 & 2) | 50% to 74% of streams/ IP-Km (>50% stream average scores of 1 & 2) | 75% to 90% of streams/ IP-Km (>50% stream average scores of 1 & 2) | >90% of streams/ IP-Km (>50% stream average scores of 1 & 2) | <50% of streams/ IP-km (>50% stream average scores of 1 & 2) | Poor |
| Water Quality | Temperature (MWMT) | <50% IP km (<20 C MWMT; <16 C MWMT where coho IP overlaps) | 50 to 74% IP km (<20 C MWMT; <16 C MWMT where coho IP overlaps) | 75 to 89% IP km (<20 C MWMT; <16 C MWMT where coho IP overlaps) | >90% IP km (<20 C MWMT; <16 C MWMT where coho IP overlaps) | <50% IP-km (<20 C MWMT; <16 C MWMT where coho IP overlaps) | Poor |
| Water Quality | Toxicity | Acute | Sublethal or Chronic | No Acute or Chronic | No Evidence of Toxins or Contaminants | Sublethal or Chronic | Fair |
| Water Quality | Turbidity | <50% of streams/ IP-Km maintains severity score of 3 or lower | 50% to 74% of streams/ IP-Km maintains severity score of 3 or lower | 75% to 90% of streams/ IP-Km maintains severity score of 3 or lower | >90% of streams/ IP-Km maintains severity score of 3 or lower | 50% to 74% of streams/ IP-km maintains severity score of 3 or lower | Fair |
| Viability | Density | <0.2 Fish/m^2 | 0.2 - 0.6 Fish/m^2 | 0.7 - 1.5 Fish/m^2 | >1.5 Fish/m^2 | <0.2 Fish/m^2 | Poor |
| Viability | Spatial Structure | <50% of Historical Range | 50-74% of Historical Range | 75-90% of Historical Range | >90% of Historical Range | 50-74% of Historical Range | Fair |

| | | | | | | | | | | |
|---|--------------------------|-----------|------------------------------|---|--|--|--|--|--|------|
| 4 | Winter Rearing Juveniles | Condition | Habitat Complexity | Large Wood Frequency (Bankfull Width 0-10 meters) | <50% of streams/ IP-Km (>6 Key Pieces/100 meters) | 50% to 74% of streams/ IP-Km (>6 Key Pieces/100 meters) | 75% to 90% of streams/ IP-Km (>6 Key Pieces/100 meters) | >90% of streams/ IP-Km (>6 Key Pieces/100 meters) | <50% of streams/ IP-km (>6 Key Pieces/100 meters) | Poor |
| | | | Habitat Complexity | Large Wood Frequency (Bankfull Width 10-100 meters) | <50% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | 50% to 74% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | 75% to 90% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | >90% of streams/ IP-Km (>1.3 Key Pieces/100 meters) | <50% of streams/ IP-km (>1.3 Key Pieces/100 meters) | Poor |
| | | | Habitat Complexity | Pool/Riffle/Flatwater Ratio | <50% of streams/ IP-Km (>40% Pools; >20% Riffles) | 50% to 74% of streams/ IP-Km (>40% Pools; >20% Riffles) | 75% to 90% of streams/ IP-Km (>40% Pools; >20% Riffles) | >90% of streams/ IP-Km (>40% Pools; >20% Riffles) | <50% of streams/ IP-km (>40% Pools; >20% Riffles) | Poor |
| | | | Habitat Complexity | Shelter Rating | <50% of streams/ IP-Km (>80 stream average) | 50% to 74% of streams/ IP-Km (>80 stream average) | 75% to 90% of streams/ IP-Km (>80 stream average) | >90% of streams/ IP-Km (>80 stream average) | | |
| | | | Passage/Migration | Physical Barriers | <50% of IP-Km or <16 IP-Km accessible* | 50% of IP-Km to 74% of IP-km | 75% of IP-Km to 90% of IP-km | >90% of IP-km | 75.9 of IP-km | Good |
| | | | Riparian Vegetation | Tree Diameter (North of SF Bay) | ≤39% Class 5 & 6 across IP-km | 40 - 54% Class 5 & 6 across IP-km | 55 - 69% Class 5 & 6 across IP-km | >69% Class 5 & 6 across IP-km | 739% Class 5 & 6 across IP-km | Poor |
| | | | Riparian Vegetation | Tree Diameter (South of SF Bay) | ≤69% Density rating "D" across IP-km | 70-79% Density rating "D" across IP-km | ≥80% Density rating "D" across IP-km | Not Defined | | |
| | | | Sediment (Food Productivity) | Gravel Quality (Embeddedness) | <50% of streams/ IP-Km (>50% stream average scores of 1 & 2) | 50% to 74% of streams/ IP-Km (>50% stream average scores of 1 & 2) | 75% to 90% of streams/ IP-Km (>50% stream average scores of 1 & 2) | >90% of streams/ IP-Km (>50% stream average scores of 1 & 2) | <50% of streams/ IP-km (>50% stream average scores of 1 & 2) | Poor |
| | | | Velocity Refuge | Floodplain Connectivity | <50% Response Reach Connectivity | 50-80% Response Reach Connectivity | >80% Response Reach Connectivity | Not Defined | <50% Response Reach Connectivity | Poor |
| | | | Water Quality | Toxicity | Acute | Sublethal or Chronic | No Acute or Chronic | No Evidence of Toxins or Contaminants | Sublethal or Chronic | Fair |

| | | | Water Quality | Turbidity | <50% of streams/ IP-Km maintains severity score of 3 or lower | 50% to 74% of streams/ IP-Km maintains severity score of 3 or lower | 75% to 90% of streams/ IP-Km maintains severity score of 3 or lower | >90% of streams/ IP-Km maintains severity score of 3 or lower | | |
|---|--------|-----------|--------------------|--|--|--|---|---|--|------|
| 5 | Smolts | Condition | Estuary/Lagoon | Quality & Extent | Estuary/Lagoon Decision Matrix | | | | | Fair |
| | | | Habitat Complexity | Shelter Rating | <50% of streams/ IP-Km (>80 stream average) | 50% to 74% of streams/ IP-Km (>80 stream average) | 75% to 90% of streams/ IP-Km (>80 stream average) | >90% of streams/ IP-Km (>80 stream average) | <50% of streams/ IP-Km (>80 stream average) | Poor |
| | | | Hydrology | Number, Condition and/or Magnitude of Diversions | >5 Diversions/10 IP km | 1.1 - 5 Diversions/10 IP km | 0.01 - 1 Diversions/10 IP km | 0 Diversions | 1.1 - 5 Diversions/10 IP km | Fair |
| | | | Hydrology | Passage Flows | NMFS Flow Protocol: Risk Factor Score >75 | NMFS Flow Protocol: Risk Factor Score 51-75 | NMFS Flow Protocol: Risk Factor Score 35-50 | NMFS Flow Protocol: Risk Factor Score <35 | NMFS Flow Protocol: Risk Factor Score >75 | Poor |
| | | | Passage/Migration | Passage at Mouth or Confluence | <50% of IP-Km or <16 IP-Km accessible* | 50% of IP-Km to 74% of IP-Km | 75% of IP-Km to 90% of IP-Km | >90% of IP-Km | 50% of IP-Km to 74% of IP-Km | Fair |
| | | | Smoltification | Temperature | <50% IP-Km (>6 and <14 C) | 50-74% IP-Km (>6 and <14 C) | 75-90% IP-Km (>6 and <14 C) | >90% IP-Km (>6 and <14 C) | 50-74% IP-Km (>6 and <14 C) | Fair |
| | | | Water Quality | Toxicity | Acute | Sublethal or Chronic | No Acute or Chronic | No Evidence of Toxins or Contaminants | Sublethal or Chronic | Fair |
| | | | Water Quality | Turbidity | <50% of streams/ IP-Km maintains severity score of 3 or lower | 50% to 74% of streams/ IP-Km maintains severity score of 3 or lower | 75% to 90% of streams/ IP-Km maintains severity score of 3 or lower | >90% of streams/ IP-Km maintains severity score of 3 or lower | 50% to 74% of streams/ IP-Km maintains severity score of 3 or lower | Fair |
| | | Size | Viability | Abundance | Smolt abundance which produces high risk spawner density per Spence (2008) | Smolt abundance which produces moderate risk spawner density per Spence (2008) | Smolt abundance to produce low risk spawner density per Spence (2008) | | Smolt abundance which produces high risk spawner density per Spence (2008) | Poor |

| | | | | | | | | | | |
|---|---------------------|-------------------|---------------------|---------------------------------|--|--|--|--|--|-----------|
| 6 | Watershed Processes | Landscape Context | Hydrology | Impervious Surfaces | >10% of Watershed in Impervious Surfaces | 7-10% of Watershed in Impervious Surfaces | 3-6% of Watershed in Impervious Surfaces | <3% of Watershed in Impervious Surfaces | >10% of Watershed in Impervious Surfaces | Poor |
| | | | Landscape Patterns | Agriculture | >30% of Watershed in Agriculture | 20-30% of Watershed in Agriculture | 10-19% of Watershed in Agriculture | <10% of Watershed in Agriculture | 27% of Watershed in Agriculture | Fair |
| | | | Landscape Patterns | Timber Harvest | >35% of Watershed in Timber Harvest | 26-35% of Watershed in Timber Harvest | 25-15% of Watershed in Timber Harvest | <15% of Watershed in Timber Harvest | <15% of Watershed in Timber Harvest | Very Good |
| | | | Landscape Patterns | Urbanization | >20% of watershed >1 unit/20 acres | 12-20% of watershed >1 unit/20 acres | 8-11% of watershed >1 unit/20 acres | <8% of watershed >1 unit/20 acres | 43% of watershed >1 unit/20 acres | Poor |
| | | | Riparian Vegetation | Species Composition | <25% Intact Historical Species Composition | 25-50% Intact Historical Species Composition | 51-74% Intact Historical Species Composition | >75% Intact Historical Species Composition | <25% Intact Historical Species Composition | Poor |
| | | | Sediment Transport | Road Density | >3 Miles/Square Mile | 2.5 to 3 Miles/Square Mile | 1.6 to 2.4 Miles/Square Mile | <1.6 Miles/Square Mile | 5.2 Miles/Square Mile | Poor |
| | | | Sediment Transport | Streamside Road Density (100 m) | >1 Miles/Square Mile | 0.5 to 1 Miles/Square Mile | 0.1 to 0.4 Miles/Square Mile | <0.1 Miles/Square Mile | 4.5 Miles/Square Mile | Poor |

Novato Creek CAP Threat Results

| Threats Across Targets | | Adults | Eggs | Summer Rearing Juveniles | Winter Rearing Juveniles | Smolts | Watershed Processes | Overall Threat Rank |
|---------------------------------------|--|-----------|--------|--------------------------|--------------------------|--------|---------------------|---------------------|
| Project-specific-threats | | 1 | 2 | 3 | 4 | 5 | 6 | |
| 1 | Agriculture | Medium | Low | Very High | Medium | Low | Medium | High |
| 2 | Channel Modification | Very High | High | Very High | Very High | High | Very High | Very High |
| 3 | Disease, Predation and Competition | Medium | Low | Medium | Medium | Low | Medium | Medium |
| 4 | Hatcheries and Aquaculture | Low | Low | Medium | Low | Low | | Low |
| 5 | Fire, Fuel Management and Fire Suppression | Low | Low | Medium | Medium | Low | Low | Medium |
| 6 | Fishing and Collecting | Low | Low | Medium | | Low | | Low |
| 7 | Livestock Farming and Ranching | Medium | Low | Medium | Medium | Low | Low | Medium |
| 8 | Logging and Wood Harvesting | Low | Low | Medium | Medium | Low | Low | Medium |
| 9 | Mining | Low | Low | Medium | Medium | Low | Low | Medium |
| 10 | Recreational Areas and Activities | Medium | Medium | Medium | High | Low | Medium | Medium |
| 11 | Residential and Commercial Development | Very High | High | Very High | Very High | High | Very High | Very High |
| 12 | Roads and Railroads | High | High | High | High | High | Very High | Very High |
| 13 | Severe Weather Patterns | Medium | Low | Medium | Medium | Low | Low | Medium |
| 14 | Water Diversion and Impoundments | Very High | High | Very High | Very High | High | High | Very High |
| Threat Status for Targets and Project | | Very High | High | Very High | Very High | High | Very High | Very High |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|------------------|-----------------|------------------------------|--|-----------------|-------------------------|--|-------------|---------|----------|----------|----------|-----------------|--|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-1.1 | Objective | Estuary | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-1.1.1 | Recovery Action | Estuary | Increase quality and extent of estuarine habitat | | | | | | | | | | |
| NvC-CCCS-1.1.1.1 | Action Step | Estuary | Evaluate all floodgates located within the tidal portion of Novato Creek and determine the feasibility of reclaiming historic tidal slough habitat. | 3 | 5 | City of Novato, Marin County | | | | | | 0 | Action is considered In-Kind |
| NvC-CCCS-1.1.1.2 | Action Step | Estuary | Evaluate water quality conditions (salinity, dissolved oxygen, temperature) in potential steelhead estuary rearing areas. | 3 | 5 | City of Novato, Marin County | 15.00 | | | | | 15 | Cost based on installing a minimum of 3 continuous water quality monitoring stations at a rate of \$5,000/station. Cost does not account for data management or maintenance. |
| NvC-CCCS-1.1.1.3 | Action Step | Estuary | Identify and provide recommendations for potential rehabilitation sites that have been altered by dredging and diking. | 3 | 5 | City of Novato, Marin County | 339.00 | | | | | 339 | Cost based on estuary use/residence timing model at a rate of \$338,679/project. |
| NvC-CCCS-1.1.1.4 | Action Step | Estuary | Identify locations to install habitat complexity features to enhance steelhead estuary rearing conditions. | 3 | 5 | City of Novato, Marin County | | | | | | 0 | Action is considered In-Kind |
| NvC-CCCS-1.1.1.5 | Action Step | Estuary | Develop and implement estuary rehabilitation and enhancement strategies. | 3 | 15 | City of Novato, Marin County | 613 | 613 | 613 | | | 1,838 | Cost based on treating 5% of total estuarine acres at a rate of \$49,200/acre. |
| NvC-CCCS-1.1.2 | Recovery Action | Estuary | Increase and enhance habitat complexity features | | | | | | | | | | |
| NvC-CCCS-1.1.2.1 | Action Step | Estuary | Evaluate, and if feasible implement restoration projects that integrate upland and intertidal habitats. | 3 | 15 | City of Novato, Marin County | | | | | | 0 | Cost accounted for in above action step. |
| NvC-CCCS-1.1.2.2 | Action Step | Estuary | Evaluate and implement, where feasible, programs to enhance native benthic flora and fauna (such as native bivalves) to reduce habitat related effects of non-native invasive species. | 3 | 10 | City of Novato, Marin County | | | | | | 0 | Cost accounted for in above action step. |
| NvC-CCCS-1.1.2.3 | Action Step | Estuary | Restore large areas of tidal marsh in diked and muted tidal marsh areas throughout the watershed. | 3 | 15 | City of Novato, Marin County | | | | | | 0 | Cost accounted for in above action step. |
| NvC-CCCS-1.1.2.4 | Action Step | Estuary | Use only native species in restoration, inspecting all live restoration and construction materials for aquatic invasive species and cleaning all equipment prior to and post restoration/construction. | 3 | 15 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-1.1.2.5 | Action Step | Estuary | Monitor all restoration projects to identify success of techniques. Also, when unsatisfactory results are identified, implement responses to address causes of poor results. | 3 | 25 | City of Novato, Marin County | 27.60 | 27.60 | 27.60 | 27.60 | 27.60 | 138 | Cost based on fish/habitat restoration model at a rate of \$137,833/project. |
| NvC-CCCS-1.1.3 | Recovery Action | Estuary | Reduce toxicity and pollutants | | | | | | | | | | |
| NvC-CCCS-1.1.3.1 | Action Step | Estuary | Reduce and minimize habitat modification that has caused, is causing, or may cause impaired water quality affecting juveniles and adults. | 2 | 15 | City of Novato, Marin County, NBWD | | | | | | 0 | Cost will be accounted through implementation of other action steps. |
| NvC-CCCS-1.1.3.2 | Action Step | Estuary | Implement tidal restoration projects that help capture and provide treatment of upland runoff. | 3 | 5 | City of Novato, Marin County | | | | | | 0 | Costs accounted for in previous actions related to tidal restoration. |
| NvC-CCCS-1.1.3.3 | Action Step | Estuary | Plan and implement Total Maximum Daily Load plans for known pollutant impairments. | 3 | 10 | City of Novato, Marin County, RWQCB | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-1.1.3.4 | Action Step | Estuary | Plan and implement structural solutions to reduce urban storm runoff pollutant loads. | 3 | 15 | City of Novato, Marin County, Marin RCD, MMVWD | | | | | | 0 | Cost accounted for in above action step. |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|------------------|-----------------|------------------------------|---|-----------------|-------------------------|--|-------------|---------|----------|----------|----------|-----------------|---|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-2.1 | Objective | Floodplain Connectivity | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-2.1.1 | Recovery Action | Floodplain Connectivity | Increase and enhance velocity refuge | | | | | | | | | | |
| NvC-CCCS-2.1.1.1 | Action Step | Floodplain Connectivity | Identify the floodplain activation flow which is the smallest flood pulse event that initiates substantial beneficial ecological processes when associated with floodplain inundation (Williams et al. 2009). | 3 | 5 | City of Novato, Marin County, Marin RCD, NBWD | 79.00 | | | | | 79 | Cost based on stream flow/precipitation model at a rate of \$78,100/project. |
| NvC-CCCS-2.1.2 | Recovery Action | Floodplain Connectivity | Rehabilitate and enhance floodplain connectivity | | | | | | | | | | |
| NvC-CCCS-2.1.2.1 | Action Step | Floodplain Connectivity | Identify areas where floodplain connectivity can be re-established in modified channel areas. | 2 | 5 | City of Novato, Marin County, Marin RCD, NBWD | 345.00 | | | | | 345 | Cost based on riparian and wetland restoration model at a rate of \$88,551 and \$255,968/project, respectively. |
| NvC-CCCS-2.1.2.2 | Action Step | Floodplain Connectivity | Encourage willing landowners to restore historical floodplains or offchannel habitats through conservation easements, etc. | 3 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD, NMFS | | | | | | 0 | Existing programs and outreach are considered In-Kind. □ |
| NvC-CCCS-2.1.2.3 | Action Step | Floodplain Connectivity | Design and implement floodplain rehabilitation projects that target velocity refuge for migrating salmonids. | 3 | 15 | City of Novato, Marin County, Marin RCD, NBWD | 595 | 595 | 595 | | | 1,786 | Cost based on treating 0.5 miles (assume 80 acres/mile) at a rate of \$44,640/acre. |
| NvC-CCCS-2.1.2.4 | Action Step | Floodplain Connectivity | Design and implement floodplain rehabilitation projects that target winter rearing habitat for juvenile steelhead. | 3 | 15 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Cost accounted for in above action step. |
| NvC-CCCS-3.1 | Objective | Hydrology | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-3.1.1 | Recovery Action | Hydrology | Improve passage flows | | | | | | | | | | |
| NvC-CCCS-3.1.1.1 | Action Step | Hydrology | Reduce impacts of impaired hydrology (reduced pulse-flows, magnitude, duration, and timing of freshets) that preclude adult and smolt passage over critical riffles and other nature obstacles. | 1 | 5 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will depend on amount of water released from Stafford Lake and other factors. |
| NvC-CCCS-3.1.1.2 | Action Step | Hydrology | Establish a comprehensive stream flow evaluation program to determine instream flow needs for steelhead. | 3 | 5 | CDFW, City of Novato, Marin County, NBWD | 79.00 | | | | | 79 | Cost based on stream flow/precipitation model at a rate of \$78,100/project. |
| NvC-CCCS-3.1.2 | Recovery Action | Hydrology | Improve flow conditions | | | | | | | | | | |
| NvC-CCCS-3.1.2.1 | Action Step | Hydrology | Increase the amount of available spawning and rearing habitat by improving instream flow conditions. | 1 | 5 | City of Novato, Marin County, NBWD, RWQCB | | | | | | 0 | Costs will be attributed to implementation of other action steps. |
| NvC-CCCS-3.1.2.2 | Action Step | Hydrology | Continue to implement strategies for efficient water use and conservation through the Urban Water Conservation Council and the Sonoma Marin Saving Water partnership. | 3 | 5 | City of Novato, Marin County, Marin RCD, NBWD, Sonoma County | | | | | | 0 | Existing programs and outreach are considered In-Kind. □ |
| NvC-CCCS-3.1.2.3 | Action Step | Hydrology | Develop and implement a water use plan ensuring base-flow sustainability. | 3 | 5 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Action is considered In-Kind. |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|------------------|-----------------|------------------------------|--|-----------------|-------------------------|---|-------------|---------|----------|----------|----------|-----------------|--|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-3.1.2.4 | Action Step | Hydrology | Require streamflow gaging devices to evaluate impairment to current streamflow conditions. | 2 | 5 | City of Novato, Marin County, NBWD | 45.50 | | | | | 46 | Initial cost based on installing a minimum of 3 stream flow gauges at a rate of \$1,000/gauge. Cost does not account for data management or maintenance. Cost revised with information from NBWA, to \$10,500 per gauge. |
| NvC-CCCS-3.1.2.5 | Action Step | Hydrology | Implement conjunctive use of water for water projects whenever possible to maintain or restore steelhead habitat. | 3 | 10 | City of Novato, Marin County, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-3.1.2.6 | Action Step | Hydrology | Encourage Marin County Club to use and conserve treated waste water to irrigate. | 2 | 20 | Marin County Club, Marin Municipal Water District, NBWD | | | | | | TBD | |
| NvC-CCCS-5.1 | Objective | Passage | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-5.1.1 | Recovery Action | Passage | Modify or remove physical passage barriers | | | | | | | | | | |
| NvC-CCCS-5.1.1.1 | Action Step | Passage | Restore passage per NMFS' Guidelines for Salmonid Passage at Stream Crossings (NMFS 2001). | 3 | 5 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | 809 | | | | | 809 | Cost based on adult escapement and juvenile migration model for 3 impassable barriers at a rate of \$269,570/project. Three impassable dams were identified in the 2008 Passage Assessment Database not counting Stafford Dam. |
| NvC-CCCS-5.1.1.2 | Action Step | Passage | Evaluate the feasibility and benefit of providing passage (both adult immigration and adult/smolt emigration) to the stream reaches located upstream of Stafford Dam and the dams on the Marin County Club property. | 3 | 5 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | 250 | | | | | 250 | Costs estimate for developing an feasibility analysis and report on providing passage at Stafford Dam. |
| NvC-CCCS-5.1.1.3 | Action Step | Passage | If deemed feasible and beneficial, evaluate and prescribe volitional and non-volitional passage methodologies at Stafford Dam and the dams on the Marin County Club property. | 2 | 5 | CDFW, City of Novato, Marin County, NBWD | | | | | | 0 | Cost accounted for in above action steps. |
| NvC-CCCS-6.1 | Objective | Habitat Complexity | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-6.1.1 | Recovery Action | Habitat Complexity | Improve large wood frequency | | | | | | | | | | |
| NvC-CCCS-6.1.1.1 | Action Step | Habitat Complexity | Increase wood frequency in spawning and rearing areas to the extent that a minimum of six key LWD pieces exists every 100 meters in 0-10 meters BFW streams. | 2 | 10 | City of Novato, Marin County, Marin RCD, NBWD | 8.00 | 8.00 | | | | 16 | Cost based on treating 0.5 miles at a rate of \$31,200/mile. Cost likely higher with increased engineering and oversight. Use of ELJ estimate is \$124,800/ELJ. |
| NvC-CCCS-6.1.1.2 | Action Step | Habitat Complexity | Identify and optimize the appropriate number of key LWD pieces throughout the watershed. | 2 | 15 | City of Novato, Marin County, NBWD | 46.00 | 46.00 | 46.00 | | | 138 | Cost based on fish/habitat restoration model at \$137,833/project |
| NvC-CCCS-6.1.1.3 | Action Step | Habitat Complexity | Develop strategies to optimize hydraulic diversity and habitat complexity when implementing/installing LWD structures. | 3 | 10 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will vary depending on methods implemented and extent of rehabilitation. |
| NvC-CCCS-6.1.1.4 | Action Step | Habitat Complexity | Develop and install seasonal habitat rearing features that achieve optimal performance during spring/fall baseflow conditions throughout the watershed. | 3 | 10 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will vary depending on methods implemented and extent of rehabilitation. |
| NvC-CCCS-6.1.2 | Recovery Action | Habitat Complexity | Improve frequency of primary pools | | | | | | | | | | |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|------------------|-----------------|------------------------------|---|-----------------|-------------------------|---|-------------|---------|----------|----------|----------|-----------------|--|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-6.1.2.1 | Action Step | Habitat Complexity | Increase the number of primary pools to the extent that more than 40% of summer rearing pools meet primary pool criteria (>2.5 feet deep in 1st and 2nd order streams; >3 feet in third order or larger streams.) | 3 | 15 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Cost accounted for in above action step. |
| NvC-CCCS-6.1.2.2 | Action Step | Habitat Complexity | Enhance pool depth: increase depth, cover, and complexity using CDFW protocols (SCWLFA 2006). | 3 | 10 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Cost accounted for in above action step. |
| NvC-CCCS-6.1.3 | Recovery Action | Habitat Complexity | Improve shelter | | | | | | | | | | |
| NvC-CCCS-6.1.3.1 | Action Step | Habitat Complexity | Increase the number of pools that have a minimum shelter of 80 (See NMFS criteria). | 3 | 15 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Cost accounted for in above action step. |
| NvC-CCCS-6.1.3.2 | Action Step | Habitat Complexity | Evaluate, identify, and improve shelters in pools throughout the watershed. | 3 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Cost accounted for in above action step. |
| NvC-CCCS-6.1.4 | Recovery Action | Habitat Complexity | Improve pool/riffle/flatwater ratios (hydraulic diversity) | | | | | | | | | | |
| NvC-CCCS-6.1.4.1 | Action Step | Habitat Complexity | Evaluate, identify, and develop strategies that will encourage riffle habitat formation throughout the watershed | 3 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Cost accounted for in above action step. |
| NvC-CCCS-7.1 | Objective | Riparian | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-7.1.1 | Recovery Action | Riparian | Improve canopy cover | | | | | | | | | | |
| NvC-CCCS-7.1.1.1 | Action Step | Riparian | Increase the average stream canopy cover within all current and potential spawning and rearing reaches to a minimum of 80%. | 3 | 20 | CDFW, Marin County, Marin RCD, NBWD | 112.00 | 112.00 | 112.00 | 112.00 | | 447 | Cost based on treating 1.0 miles (assume 1 project/mile with 10 acres/mile) at a rate of \$44,640/acre. This action step should be coordinated with similar action step to reduce cost and redundancy. |
| NvC-CCCS-7.1.1.2 | Action Step | Riparian | Assess riparian canopy and impacts of exotic vegetation (e.g., Arundo donax, etc.), prioritize and develop riparian habitat reclamation and enhancement programs (CDFG 2004). | 3 | 5 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Cost accounted for in above action steps. |
| NvC-CCCS-7.1.1.3 | Action Step | Riparian | Ensure that mature trees within the stream riparian corridor are not disturbed or lost due to land management activities (roads, cattle, flood control, etc.). | 2 | 25 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-7.1.1.4 | Action Step | Riparian | Promote streamside conservation measures, including conservation easements, setbacks, and riparian buffers. | 3 | 25 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs for conservation easements vary. |
| NvC-CCCS-8.1 | Objective | Sediment | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-8.1.1 | Recovery Action | Sediment | Improve instream gravel quality to reduce embeddedness | | | | | | | | | | |
| NvC-CCCS-8.1.1.1 | Action Step | Sediment | Increase the percentage of pool tail-out embeddedness with values of 1s and 2s (See NMFS Conservation Action Planning Attribute Table Report) within all spawning reaches. | 2 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | This action step is based on implementation of other action steps. |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|-------------------|-----------------|------------------------------|---|-----------------|-------------------------|---|-------------|---------|----------|----------|----------|-----------------|--|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-8.1.1.2 | Action Step | Sediment | Evaluate, develop, and eventually implement spawning gravel augmentation programs in essential areas. | 3 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD, NMFS | | | | | | TBD | Cost to be determined pending an assessment of features. Estimate for spawning gravel is \$39.5/cu. yd. |
| NvC-CCCS-8.1.1.3 | Action Step | Sediment | Add channel roughness (logs, boulders) in strategic locations to encourage spawning tailout formations and gravel sorting. | 3 | 10 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | 16.00 | 16.00 | | | | 32 | Cost based on treating 1 mile (assume 1 project/mile) at a rate of \$31,200/ mile. Cost likely higher with greater level of engineering and oversight. Use of ELJ is estimated at \$124,800/ELJ. |
| NvC-CCCS-8.1.2 | Recovery Action | Sediment | Improve gravel quantity and distribution for macro-invertebrate production (food) | | | | | | | | | | |
| NvC-CCCS-8.1.2.1 | Action Step | Sediment | Increase the percentage of gravel quality embeddedness to values of 1s and 2s (See NMFS Conservation Action Planning Attribute Table Report) in all current and potential juvenile salmonid summer and seasonal (fall/winter/spring) rearing areas. | 3 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Cost accounted for. |
| NvC-CCCS-8.1.2.2 | Action Step | Sediment | Increase stream bed and bank stability using biotechnical materials (vegetation, plant fiber, and native wood and rock), where appropriate (SCWLFA 2006). | 3 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Cost based on number and type of stream bed and bank stability to be used. Estimate for bioengineering methods range from \$418/100' x 10' (WSDOT 2001). |
| NvC-CCCS-8.1.2.3 | Action Step | Sediment | Re-mediate upland sources (prevent eroded soils from entering the stream system) (SCWLFA 2006). | 3 | 10 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will vary depending on methods implemented and extent of rehabilitation. |
| NvC-CCCS-8.1.2.4 | Action Step | Sediment | Add channel roughness features (logs, large boulders) to trap cobbles in current and potential seasonal reaches. | 3 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Cost accounted for in other action steps. |
| NvC-CCCS-10.1 | Objective | Water Quality | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-10.1.1 | Recovery Action | Water Quality | Reduce toxicity and pollutants | | | | | | | | | | |
| NvC-CCCS-10.1.1.1 | Action Step | Water Quality | Address water pollution from non-point sources within the watershed through outreach, education and enforcement... | 2 | 10 | CDFW, City of Novato, Marin County, NBWD, RWQCB | 7.50 | 7.50 | | | | 15 | Cost based on installing continuous water quality stations at a rate of \$5,000/station. Cost does not account for data management or maintenance. |
| NvC-CCCS-10.1.1.2 | Action Step | Water Quality | Identify and remediate sources of pulses of water originating from human activities (e.g. flushing of swimming pools, etc.). | 3 | 5 | CDFW, City of Novato, Marin County, NBWD | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-10.1.1.3 | Action Step | Water Quality | Identify nutrient loading sources causing poor water quality conditions for steelhead and implement strategies for remediating or avoiding future inputs of pollution to watershed streams. | 3 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs vary with monitoring effort and measures to be implemented. |
| NvC-CCCS-10.1.1.4 | Action Step | Water Quality | Avoid, or at a minimum minimize, the use of commercial and industrial products (e.g., pesticides) with high potential for contamination of local waterways. | 3 | 10 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-10.1.1.5 | Action Step | Water Quality | Encourage the use of native vegetation in new landscaping to reduce the need for watering and application of herbicides, pesticides, and fertilizers. | 3 | 25 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-10.1.2 | Recovery Action | Water Quality | Improve stream temperature conditions | | | | | | | | | | |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|-------------------|-----------------|------------------------------|--|-----------------|-------------------------|---|-------------|---------|----------|----------|----------|-----------------|---|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-10.1.2.1 | Action Step | Water Quality | Implement comprehensive evaluation and monitoring program to determine areas where poor riparian habitat is contributing to increased water temperatures limiting juvenile steelhead survival and aquatic habitat potential. | 3 | 5 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs vary with monitoring effort and measures to be implemented. |
| NvC-CCCS-10.1.2.2 | Action Step | Water Quality | Rehabilitate or restore riparian corridor conditions within all current and potential high value habitat summer rearing areas. | 2 | 10 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Costs accounted for in previous actions related to riparian restoration. |
| NvC-CCCS-10.1.3 | Recovery Action | Water Quality | Reduce turbidity and suspended sediment | | | | | | | | | | |
| NvC-CCCS-10.1.3.1 | Action Step | Water Quality | Where feasible, utilize native plants and bioengineering techniques to stabilize banks. | 3 | 25 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-10.1.3.2 | Action Step | Water Quality | Identify and implement strategies to reduce landslide hazard areas and other upslope sources of fine sediment (hillslope hollows, deep-seated landslides, etc.). | 3 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will vary depending on methods implemented and extent of rehabilitation. |
| NvC-CCCS-11.1 | Objective | Viability | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-11.1.1 | Recovery Action | Viability | Increase density, abundance, spatial structure, and diversity based on the biological recovery criteria | | | | | | | | | | |
| NvC-CCCS-11.1.1.1 | Action Step | Viability | Conduct a comprehensive assessment of watershed processes (e.g., hydrology, geology, fluvial-geomorphology, water quality, and vegetation), instream habitat, and factors limiting steelhead production. | 2 | 10 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Cost will vary with assessment methods and level of detail. |
| NvC-CCCS-11.1.1.2 | Action Step | Viability | Continue and expand upon watershed and instream habitat assessments and population status monitoring; use new knowledge to adapt strategies. | 2 | 25 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Cost will vary with assessment methods and level of detail. |
| NvC-CCCS-11.1.1.3 | Action Step | Viability | Conduct periodic, standardized spawning surveys to estimate adult abundance in the watershed. | 2 | 25 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Costs for monitoring are covered under in the Monitoring Chapter as part of the Coastal Monitoring Plan |
| NvC-CCCS-11.1.1.4 | Action Step | Viability | Conduct habitat surveys to monitor change in key habitat variables. | 3 | 10 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Costs for monitoring are covered under in the Monitoring Chapter as part of the Coastal Monitoring Plan |
| NvC-CCCS-11.1.1.5 | Action Step | Viability | Initiate smolt outmigration study and develop smolt abundance estimates. | 2 | 5 | CDFW, City of Novato, Marin County, Marin RCD, NBWD, NMFS | | | | | | 0 | Costs for monitoring are covered under in the Monitoring Chapter as part of the Coastal Monitoring Plan |
| NvC-CCCS-11.1.1.6 | Action Step | Viability | Develop standardized watershed assessments within sub-watersheds to define limiting factors specific to those areas. | 3 | 10 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Cost will vary with assessment methods and level of detail. |
| NvC-CCCS-11.1.1.7 | Action Step | Viability | Improve conditions for steelhead through supporting enforcement of environmental laws and regulations. | 2 | 25 | CDFW, City of Novato, Marin County, NBWD, NMFS OLE | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-12.1 | Objective | Agriculture | Address the present of threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-12.1.1 | Recovery Action | Agriculture | Prevent or minimize impairment to habitat complexity (reduced large wood and/or shelter) | | | | | | | | | | |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|-------------------|-----------------|------------------------------|---|-----------------|-------------------------|---|-------------|---------|----------|----------|----------|-----------------|---|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-12.1.1.1 | Action Step | Agriculture | Promote the re-vegetation of the native riparian plant community within inset floodplains and riparian corridors to provide future recruitment of large wood and other shelter components. | 2 | 10 | City of Novato, Marin County, NBWD | | | | | | 0 | Costs captured in other recovery actions. See Riparian. |
| NvC-CCCS-12.1.1.2 | Action Step | Agriculture | Avoid the removal of large wood and other shelter components from the stream system. | 2 | 5 | City of Novato, Marin County, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-12.1.2 | Recovery Action | Agriculture | Prevent or minimize alterations to sediment transport (road condition/density, dams, etc.) | | | | | | | | | | |
| NvC-CCCS-12.1.2.1 | Action Step | Agriculture | Complete Farm Conservation Plans (through the SRCD, NRCS, Fish Friendly Farming program or other cooperative conservation programs) to reduce sediment sources and improve riparian habitat within the watershed. | 3 | 5 | City of Novato, Marin County, Marin RCD, Private Landowners | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-12.1.2.2 | Action Step | Agriculture | Continue the use of cover crops in agriculture fields. | 2 | 5 | City of Novato, Marin County, Marin RCD, Private Landowners | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-12.1.2.3 | Action Step | Agriculture | Encourage the NRCS, RCDs, and other appropriate organizations to increase the number of landowners participating in sediment reduction planning and implementation. | 3 | 5 | City of Novato, Marin County, Marin RCD, NMFS | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-12.1.2.4 | Action Step | Agriculture | Assess the effectiveness of erosion control measures throughout the winter period. | 2 | 5 | City of Novato, Marin County, Marin RCD | | | | | | 0 | Action is considered In-Kind. |
| NvC-CCCS-12.1.3 | Recovery Action | Agriculture | Prevent or minimize impairment to water quality (increased turbidity, suspended sediment, and/or toxicity) | | | | | | | | | | |
| NvC-CCCS-12.1.3.1 | Action Step | Agriculture | Maintain adequate stream corridor buffers to filter and prevent fine sediment input from entering streams of the watershed. | 2 | 10 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-12.1.3.2 | Action Step | Agriculture | Reduce discharge of chemical effluent and fertilizer related to agricultural practices. | 3 | 10 | City of Novato, Marin County, Marin RCD, Private Landowners | | | | | | TBD | Costs will vary depending on methods implemented. |
| NvC-CCCS-12.1.4 | Recovery Action | Agriculture | Prevent or minimize impairment to water quality (impaired stream temperature) | | | | | | | | | | |
| NvC-CCCS-12.1.4.1 | Action Step | Agriculture | Minimize the amount of water used for agriculture to protect stream flow and temperatures. | 2 | 10 | City of Novato, Marin County, Marin RCD, Private Landowners | | | | | | TBD | Costs will vary depending on methods implemented. |
| NvC-CCCS-12.1.4.2 | Action Step | Agriculture | Ensure that mature trees within the stream riparian corridor are not disturbed or lost due to agricultural activities. | 2 | 10 | City of Novato, Marin County, Marin RCD, Private Landowners | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-12.1.5 | Recovery Action | Agriculture | Prevent or minimize alterations to riparian species composition and structure | | | | | | | | | | |
| NvC-CCCS-12.1.5.1 | Action Step | Agriculture | Re-establish native plant communities in riparian zones to increase stream canopy to a minimum of 80%. | 3 | 15 | City of Novato, Marin County, Marin RCD | | | | | | TBD | Costs will vary depending on methods implemented and extent of rehabilitation. |
| NvC-CCCS-12.1.5.2 | Action Step | Agriculture | Develop and implement riparian setbacks/buffers that protect existing native riparian species composition and structure. | 3 | 15 | City of Novato, Marin County, Marin RCD | | | | | | TBD | Costs will vary depending on methods implemented and extent of rehabilitation. |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|-------------------|-----------------|------------------------------|--|-----------------|-------------------------|---|-------------|---------|----------|----------|----------|-----------------|---|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-12.1.6 | Recovery Action | Agriculture | Prevent or minimize impairment to stream hydrology (impaired water flow) | | | | | | | | | | |
| NvC-CCCS-12.1.6.1 | Action Step | Agriculture | Identify and eliminate depletion of summer base flows from unauthorized water uses. | 2 | 5 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-13.1 | Objective | Channel Modification | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-13.1.1 | Recovery Action | Channel Modification | Prevent or minimize impairment to floodplain connectivity (impaired quality & extent) | | | | | | | | | | |
| NvC-CCCS-13.1.1.1 | Action Step | Channel Modification | Limit new development - flood control projects or other modifications facilitating new development (as opposed to protecting existing infrastructure) should be avoided. | 3 | 25 | City of Novato, Marin County | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-13.1.1.2 | Action Step | Channel Modification | Prevent channel modification activities from causing future impediments to the creation, or blocking access to, off channel habitat used by salmonids as refuge and winter rearing habitat during high stream flows. | 3 | 5 | City of Novato, Marin County | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-13.1.2 | Recovery Action | Channel Modification | Prevent or minimize impairment to habitat complexity (altered pool complexity and/or pool, riffle ratio) | | | | | | | | | | |
| NvC-CCCS-13.1.2.1 | Action Step | Channel Modification | All proposed flood control projects should include habitat protection, and/or alternatives that minimize impacts to salmon habitat. | 1 | 15 | City of Novato, Marin County, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-13.1.2.2 | Action Step | Channel Modification | Ensure future retention and recruitment of large woody and root wads to rehabilitate existing stream complexity, pool frequency, and depth. | 3 | 15 | City of Novato, Marin County | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-13.1.2.3 | Action Step | Channel Modification | Protect existing natural channel reaches from channelization and enhance winter refuge and seasonal habitat features where appropriate. | 1 | 10 | City of Novato, Marin County, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-13.1.3 | Recovery Action | Channel Modification | Prevent or minimize impairment to habitat complexity (reduce large wood and/or shelter) | | | | | | | | | | |
| NvC-CCCS-13.1.3.1 | Action Step | Channel Modification | Identify locations where channel modification has resulted in decreased shelter, LWD frequency, and habitat complexity, and develop and implement site specific plans to improve these conditions. Consider flow rates and discharges when designing LWD and shelter enhancement features. | 3 | 5 | City of Novato, Marin County, Marin RCD, NBWD | 536 | | | | | 536 | Cost based on 0.5 miles of flood channel at a rate of \$1,070,400/mile. |
| NvC-CCCS-13.1.3.2 | Action Step | Channel Modification | Incorporate velocity refuge habitat features in all future and existing engineered and modified channels. | 2 | 10 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Cost accounted for in above action steps. |
| NvC-CCCS-18.1 | Objective | Livestock | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-18.1.1 | Recovery Action | Livestock | Prevent or minimize impairment to instream substrate/food productivity (gravel quality and quantity) | | | | | | | | | | |
| NvC-CCCS-18.1.1.1 | Action Step | Livestock | Reduce impacts from livestock grazing. | 2 | 20 | City of Novato, Marin RCD, RWQCB | | | | | | TBD | |
| NvC-CCCS-21.1 | Objective | Recreation | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|-------------------|-----------------|-------------------------------------|---|-----------------|-------------------------|--|-------------|---------|----------|----------|----------|-----------------|---|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-21.1.1 | Recovery Action | Recreation | Prevent or minimize adverse alterations to riparian species composition and structure | | | | | | | | | | |
| NvC-CCCS-21.1.1.1 | Action Step | Recreation | Improve conditions for steelhead by increasing the beneficial effects, and decreasing the detrimental effects, of recreational areas and activities within the watershed. | 3 | 10 | CDFW, City of Novato, Marin County, NBWD | | | | | | 0 | Existing programs and outreach are considered In-Kind. □ |
| NvC-CCCS-21.1.1.2 | Action Step | Recreation | Encourage riparian restoration within recreational areas. | 3 | 10 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Existing programs and outreach are considered In-Kind. □ |
| NvC-CCCS-21.1.1.3 | Action Step | Recreation | Assess riparian canopy and impacts of exotic vegetation (e.g., Arundo donax, etc.), prioritize and develop riparian habitat reclamation and enhancement programs at recreational sites including park lands and Marin Country Club property. | 3 | 5 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | | Costs covered under other recovery actions. See Riparian. |
| NvC-CCCS-21.1.1.4 | Action Step | Recreation | Ensure that mature trees within the stream riparian corridor are not disturbed or lost due to land management activities (e.g. flood control, park or golf course landscaping, etc.). | 3 | 25 | City of Novato, Marin County, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-21.1.2 | Recovery Action | Recreation | Prevent or minimize impairment to floodplain connectivity (impaired quality and extent) | | | | | | | | | | |
| NvC-CCCS-21.1.2.1 | Action Step | Recreation | Evaluate the effects of recreational facilities such as levees, bike/pedestrian trails, and road crossings that may constrain opportunities to expand channel width and/or reconnect floodplain at recreational sites including park lands and Marin Country Club property. | 3 | 5 | City of Novato, Marin County, NBWD | 138.00 | | | | | 138 | Cost based on fish/habitat restoration model at a rate of \$137,833/project. |
| NvC-CCCS-21.1.2.2 | Action Step | Recreation | Develop and implement a plan that remediates existing recreational facilities to allow for stream functions, and sites new facilities in such a way that their placement does not constrain channel width or floodplain connection. | 3 | 10 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will vary depending on methods implemented and extent of rehabilitation. |
| NvC-CCCS-21.1.3 | Recovery Action | Recreation | Prevent or minimize impairment to passage and migration | | | | | | | | | | |
| NvC-CCCS-21.1.3.1 | Action Step | Recreation | Assess and restore passage at barriers associated with at recreational sites throughout the watershed. | 3 | 5 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | | Costs covered under other recovery actions. See Passage. |
| NvC-CCCS-22.1 | Objective | Residential /Commercial Development | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-22.1.1 | Recovery Action | Residential /Commercial Development | Prevent or minimize impairment to the estuary (impaired quality and extent) | | | | | | | | | | |
| NvC-CCCS-22.1.1.1 | Action Step | Residential /Commercial Development | Curtail further development in active wetlands through zoning restrictions, county master plans and other Federal, State, and county planning and regulatory processes, and land protection agreements. | 3 | 25 | California Coastal Conservancy, City of Novato, Marin County | | | | | | 0 | Action is considered In-Kind |
| NvC-CCCS-22.1.1.2 | Action Step | Residential /Commercial Development | Increase monitoring and enforcement of illegal bank or shoreline stabilization activities. | 3 | 10 | CDFW, City of Novato, Marin County, NBWD | | | | | | 0 | Existing programs and outreach are considered In-Kind. □ |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|-------------------|-----------------|-------------------------------------|--|-----------------|-------------------------|---|-------------|---------|----------|----------|----------|-----------------|--|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-22.1.1.3 | Action Step | Residential /Commercial Development | Promote native intertidal and subtidal vegetation through eradication and control of non-native species. | 3 | 10 | California Coastal Conservancy, City of Novato, Marin County, Marin RCD, NBWD | 8.50 | 8.50 | | | | 17 | Cost based on treating 0.2 miles (assume 1 project/mile with 80 acres/mile) at a rate of \$1,026/acre. |
| NvC-CCCS-22.1.2 | Recovery Action | Residential /Commercial Development | Prevent or minimize increased landscape disturbance | | | | | | | | | | |
| NvC-CCCS-22.1.2.1 | Action Step | Residential /Commercial Development | Minimize new development, or road construction within floodplains, riparian areas, unstable soils or other sensitive areas. | 3 | 25 | City of Novato, Marin County | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-22.1.2.2 | Action Step | Residential /Commercial Development | Conserve open space in relatively intact landscapes, protect floodplain areas and riparian corridors, and develop conservation easements. | 3 | 25 | City of Novato, Marin County, Private Landowners | | | | | | TBD | Costs for conservation easements vary. |
| NvC-CCCS-22.1.3 | Recovery Action | Residential /Commercial Development | Prevent or minimize impairment to water quality (increased turbidity, suspended sediment, and/or toxicity) | | | | | | | | | | |
| NvC-CCCS-22.1.3.1 | Action Step | Residential /Commercial Development | Prevent the future use of commercial and industrial products (e.g., pesticides) with high potential for contamination of local waterways. | 3 | 15 | CDFW, City of Novato, Marin County, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-22.1.3.2 | Action Step | Residential /Commercial Development | Upgrade existing stormwater systems into a spatially distributed discharge network (rather than a few point discharges). | 3 | 25 | City of Novato, Marin County, NBWD | | | | | | TBD | Costs will vary depending on methods implemented. |
| NvC-CCCS-22.1.3.3 | Action Step | Residential /Commercial Development | Educate county and city public works departments, flood control districts, and planning departments, etc., on the critical importance of maintaining riparian vegetation, instream LWD, and LWD recruitment. | 3 | 5 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-22.1.4 | Recovery Action | Residential /Commercial Development | Prevent or minimize impairment to floodplain connectivity (impaired quality & extent) | | | | | | | | | | |
| NvC-CCCS-22.1.4.1 | Action Step | Residential /Commercial Development | Minimize new development within 100-year floodprone zones. | 3 | 25 | City of Novato, Marin County, NBWD | | | | | | 0 | Action is considered In-Kind |
| NvC-CCCS-22.1.4.2 | Action Step | Residential /Commercial Development | Rehabilitate areas where existing and dilapidated infrastructure impairs the quality of floodplain and winter rearing for habitat for steelhead within the watershed. | 2 | 15 | City of Novato, Marin County, Marin RCD, NBWD | 585 | 585 | 585 | | | 1,756 | Cost based on treating 0.5 miles (assume 1 project/mile with 80 acres/mile) at a rate of \$44,640/acre. |
| NvC-CCCS-22.1.4.3 | Action Step | Residential /Commercial Development | Recalculate 100-year flood interval that takes into consideration global climate change and rising sea levels. | 3 | 15 | City of Novato, Marin County, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-22.1.5 | Recovery Action | Residential /Commercial Development | Prevent or minimize impairment to stream hydrology (impaired water flow) | | | | | | | | | | |
| NvC-CCCS-22.1.5.1 | Action Step | Residential /Commercial Development | Encourage and identify opportunities for on-site rain retention facilities. | 3 | 25 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-22.1.5.2 | Action Step | Residential /Commercial Development | Develop filter or buffer systems that reduce pollutants from entering streams and waterways. | 3 | 15 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Cost based on amount and type of filter or buffer system needed to improve conditions. Estimate for filter strip ranges from \$32,000 - \$84,000/system. |
| NvC-CCCS-22.1.6 | Recovery Action | Residential /Commercial Development | Prevent or minimize impairment to hydrology (gravel scouring events) | | | | | | | | | | |
| NvC-CCCS-22.1.6.1 | Action Step | Residential /Commercial Development | Minimize impervious surfaces in new and development projects (SCWLFA 2006). | 3 | 25 | City of Novato, Marin County, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|-------------------|-----------------|------------------------------|---|-----------------|-------------------------|---|-------------|---------|----------|----------|----------|-----------------|---|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-23.1 | Objective | Roads/Railroads | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-23.1.1 | Recovery Action | Roads/Railroads | Prevent or minimize increased landscape disturbance | | | | | | | | | | |
| NvC-CCCS-23.1.1.1 | Action Step | Roads/Railroads | Decommission and/or re-locate riparian roads upslope to achieve desirable riparian road density criteria (<0.1 to 0.4 Miles/Square Mile). | 3 | 25 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | 144.00 | 144.00 | | | 288 | Cost based on decommissioning 20 miles of road at a rate of \$14,400/mile. Cost likely higher due to infrastructure.. |
| NvC-CCCS-23.1.2 | Recovery Action | Roads/Railroads | Prevent or minimize impairment to passage and migration | | | | | | | | | | |
| NvC-CCCS-23.1.2.1 | Action Step | Roads/Railroads | Ensure all future new, repair, and replacement road/stream crossing provide unimpaired passage for all steelhead life stages. | 3 | 25 | Caltrans, CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-23.1.2.2 | Action Step | Roads/Railroads | Conduct collaborative evaluations of priorities for treatment of road-related CCC steelhead passage barriers, such as the Fish Passage Forum. | 3 | 5 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Cost will vary with assessment methods and level of detail. |
| NvC-CCCS-23.1.2.3 | Action Step | Roads/Railroads | Use NMFS Guidelines for Salmonid Passage at Stream Crossings (NMFS 2001) and appropriate barrier databases when developing new or retrofitting existing road crossings. | 3 | 25 | CDFW, City of Novato, Marin County, Marin RCD, NBWD, NMFS | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-23.1.2.4 | Action Step | Roads/Railroads | All new crossings and upgrades to existing crossings (bridges, culverts, fills, and other crossings) must accommodate 100-year flow event and associated sediment transport. | 3 | 25 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will vary depending on methods implemented. |
| NvC-CCCS-23.1.3 | Recovery Action | Roads/Railroads | Prevent or minimize alterations to sediment transport (road condition/density, dams, etc.) | | | | | | | | | | |
| NvC-CCCS-23.1.3.1 | Action Step | Roads/Railroads | Utilize best management practices for road construction, maintenance, management and decommissioning (e.g., Fishnet 4c County Roads Manual; Hagans & Weaver, 1994; Oregon Department of Transportation, 1999; Sommarstrom 2002). | 3 | 25 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-23.1.3.2 | Action Step | Roads/Railroads | Bridges associated with new roads or replacement bridges (including railroad bridges) should be free span or constructed with the minimum number of bents feasible in order to minimize drift accumulation and facilitate fish passage. | 3 | 25 | Caltrans, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will vary depending on methods implemented. |
| NvC-CCCS-23.1.3.3 | Action Step | Roads/Railroads | Minimize the construction of new roads near high value habitat areas or sensitive habitat areas. | 3 | 25 | Caltrans, CDFW, City of Novato, Marin County, NBWD | | | | | | 0 | Action is considered In-Kind |
| NvC-CCCS-23.1.3.4 | Action Step | Roads/Railroads | Address sediment and runoff sources from road networks and other actions that deliver sediment and runoff to stream channels. | 3 | 10 | City of Novato, Marin County, Marin RCD, NBWD | 149.00 | 149.00 | | | | 298 | Cost based on road inventory for 259 miles at a rate \$1,148/mile |
| NvC-CCCS-23.1.4 | Recovery Action | Roads/Railroads | Prevent or minimize impairment to stream hydrology (impaired water flow) | | | | | | | | | | |
| NvC-CCCS-23.1.4.1 | Action Step | Roads/Railroads | Conduct actions that hydrologically disconnect roads. | 3 | 25 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will vary depending on methods implemented and extent of rehabilitation identified in road assessment. |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|-------------------|-----------------|------------------------------|--|-----------------|-------------------------|--|-------------|---------|----------|----------|----------|-----------------|---|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-23.1.5 | Recovery Action | Roads/Railroads | Prevent or minimize impairment to floodplain connectivity (impaired quality & extent) | | | | | | | | | | |
| NvC-CCCS-23.1.5.1 | Action Step | Roads/Railroads | Minimize new road construction within floodplains, riparian areas, unstable soils or other sensitive areas until a watershed specific road management plan is created and implemented. | 3 | 5 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Action is considered In-Kind. |
| NvC-CCCS-23.1.5.2 | Action Step | Roads/Railroads | Evaluate existing roadways within 200 meters of the riparian corridor, and develop plans to decrease the ongoing impacts associated with these roads. | 3 | 5 | City of Novato, Marin County, Marin RCD, NBWD | | | | | | 0 | Cost accounted for in above action step. |
| NvC-CCCS-25.1 | Objective | Water Diversion /Impoundment | Address the present or threatened destruction, modification, or curtailment of the species habitat or range | | | | | | | | | | |
| NvC-CCCS-25.1.1 | Recovery Action | Water Diversion /Impoundment | Prevent or minimize impairment to stream hydrology (impaired water flow) | | | | | | | | | | |
| NvC-CCCS-25.1.1.1 | Action Step | Water Diversion /Impoundment | Implement passive diversion devices designed to allow diversion of water only when minimum streamflow requirements are met or exceeded (CDFG 2004). | 2 | 10 | CDFW, City of Novato, Marin County, NBWD | | | | | | TBD | Costs will vary depending on methods implemented. |
| NvC-CCCS-25.1.1.2 | Action Step | Water Diversion /Impoundment | Identify and eliminate depletion of summer base flows from unauthorized water uses | 2 | 5 | CDFW, City of Novato, Marin County, NBWD, SWRCB | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-25.1.1.3 | Action Step | Water Diversion /Impoundment | Work with recovery partners to ensure that current and future water diversions (surface or groundwater) do not impair water quality conditions in summer or fall rearing reaches. | 3 | 25 | CDFW, City of Novato, Marin County, NBWD, RWQCB | | | | | | 0 | Operations conducted normally or with minor modifications are considered In-Kind. |
| NvC-CCCS-25.1.1.4 | Action Step | Water Diversion /Impoundment | Work with SWRCB and landowners to improve survival and migration opportunities for all life stages. | 3 | 10 | CDFW, City of Novato, Marin County, Marin RCD, NBWD, NMFS, Private Landowners, SWRCB | | | | | | 0 | Existing programs and outreach are considered In-Kind. |
| NvC-CCCS-25.1.2 | Recovery Action | Water Diversion /Impoundment | Prevent or minimize alterations to sediment transport (road conditions/density, dams etc.) | | | | | | | | | | |
| NvC-CCCS-25.1.2.1 | Action Step | Water Diversion /Impoundment | Implement actions that minimize adverse effects of dams and weirs. | 3 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will vary depending on methods implemented. |
| NvC-CCCS-25.1.2.2 | Action Step | Water Diversion /Impoundment | Re-establish natural sediment delivery processes and implement sediment reduction activities where necessary. | 3 | 10 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will vary depending on methods implemented. |
| NvC-CCCS-25.1.3 | Recovery Action | Water Diversion /Impoundment | Prevent or minimize impairment to passage and migration | | | | | | | | | | |
| NvC-CCCS-25.1.3.1 | Action Step | Water Diversion /Impoundment | Adequately screen water diversions to prevent entrainment of all steelhead life stages in anadromous reaches. | 2 | 15 | CDFW, City of Novato, Marin County, Marin RCD, NBWD, NMFS | | | | | | TBD | Costs will vary depending on methods implemented. Estimate for fish screens is \$64,158/screen. |
| NvC-CCCS-25.2 | Objective | Water Diversion /Impoundment | Address the inadequacy of existing regulatory mechanisms | | | | | | | | | | |

Novato Creek, Central California Coast Steelhead (Coastal San Francisco Bay) Recovery Actions

| Action ID | Level | Targeted Attribute or Threat | Action Description | Priority Number | Action Duration (Years) | Recovery Partner | Costs (\$K) | | | | | Entire Duration | Comment |
|-------------------|-----------------|------------------------------|--|-----------------|-------------------------|---|-------------|---------|----------|----------|----------|-----------------|--|
| | | | | | | | FY 1-5 | FY 6-10 | FY 11-15 | FY 16-20 | FY 21-25 | | |
| NvC-CCCS-25.2.1 | Recovery Action | Water Diversion /Impoundment | Prevent or minimize impairment to stream hydrology (impaired water flow) | | | | | | | | | | |
| NvC-CCCS-25.2.1.1 | Action Step | Water Diversion /Impoundment | Assess, map, and install meters or stream gages on all water diversions (CDFG 2004). | 3 | 10 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | 1.50 | 1.50 | | | | 3 | Cost based on installing a minimum of 3 stream flow gauges at a rate of \$1,000/gauge. Cost does not account for data management or maintenance. |
| NvC-CCCS-25.2.1.2 | Action Step | Water Diversion /Impoundment | Prevent and/or minimize the adverse effects of water diversion on salmonid habitat by establishing a more natural hydrograph, by-passing adequate downstream flows, regulating season of diversion, and promoting and implementing off-stream storage solutions (CDFG 2004). | 2 | 10 | CDFW, City of Novato, Marin County, Marin RCD, NBWD | | | | | | TBD | Costs will vary depending on methods implemented. |

11

MEMORANDUM

To: Board of Directors
From: Tony Arendell, Construction/Maintenance Superintendent TA
Subj: Dominican University Institute for Leadership Studies - The Making of Leaders!
Fall 2015 Leadership Certificate
k:\const sup\2015\bod memos\memo bod du leadership class.docx

RECOMMENDED ACTION: Information Only

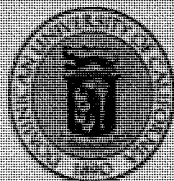
FINANCIAL IMPACT: None

First, I would like to thank the Board for the opportunity to take this course over the past four months (certificate is provided in Attachment 1). It has been helpful in the day-to-day communication between my staff and me. I picked up some valuable skills in coaching and how to build and motivate my team. It also gave me the opportunity to meet and start a dialog with my counterpart at MMWD.

The course consisted of eight one-day classes and a specific studies project presented at the graduation ceremony. The classes consisted of the following subjects.

- 21st Century Leadership
- Coaching
- Increasing Leader's Repertoire
- Thinking Strategically
- High Performance Teams
- Leading Change
- Surmounting Obstacles
- Charting The Future
- Graduation and Project Presentation

An oral report of the project presentation (Attachment 2) will also be provided at the meeting.



BAROWSKY
SCHOOL of BUSINESS

HAVING COMPLETED ALL OF THE REQUIREMENTS FOR
THE MAKING OF LEADERS!™

Tony Arendell

IS HEREBY AWARDED A
LEADERSHIP CERTIFICATE

INSTITUTE FOR LEADERSHIP STUDIES
DOMINICAN UNIVERSITY OF CALIFORNIA

DECEMBER 9, 2015

DR. SAM BELDONA, DEAN
BAROWSKY SCHOOL OF BUSINESS

DR. FRANCO L. VICINO, DIRECTOR
EXECUTIVE EDUCATION

DR. DENISE M. LUCY, EXECUTIVE DIRECTOR
INSTITUTE FOR LEADERSHIP STUDIES

VAC TRUCK SPOILS PIT

Dominican University
The Making Of Leaders

Tony Arendell
December 9, 2015



Vision and Mission

● VISION

- To improve solids/water capture from Vacuum Truck spoils

● MISSION

- By July 2018, design and build a structure to settle the solids out of the water with enough capacity to keep up with Vacuum Truck spoils

Why Build this Facility?

- ◆ Avoid overfilling the Vacuum Truck spoils pit
- ◆ Comply with state regulations for storm water releases
- ◆ Improve efficiency of spoils disposal
- ◆ Minimize need to off-haul spoils resulting in higher operational costs

Strategies to Build Facility

- ◆ Work with the Engineering Department for project design and cost estimate
- ◆ Get the project approved for the FY 2017-18 CIP budget
- ◆ Educate the board and staff of the importance of this project

Project Outcomes

- ◆ Improve process of removing water from spoils
- ◆ Eliminates need for hauling/spraying for water disposal
- ◆ Saves time and resources
- ◆ Better for environment
- ◆ Streamlines existing method


Questions

12

MEMORANDUM

To: Board of Directors

December 31, 2015

From: Chris DeGabriele, General Manager Subj: Notice of Public Hearing – Marin LAFCo Countywide Water Service Study
t:\gm\lafco\notice of public hearing memo.docx**RECOMMENDED ACTION:** Information Only**FINANCIAL IMPACT:** None

Attached is the Notice of Public Hearing from Marin LAFCo, advising that the Public Hearing on the Countywide Municipal Service Study Review on Public Water Services will be held on Thursday, January 14th. The notice advises that the final report follows the earlier presentation by Marin LAFCo and circulation of a draft report independently assessing the capacity and performance of all six public potable water services systems in Marin County, including North Marin Water District. The notice identifies that the final report will be made available one week prior to the scheduled hearing at www.marinlafco.org. It is not yet available so I have not had an opportunity review same. The Board did receive the LAFCo Countywide Water Service Study update at its December 15, 2015 meeting.

NOTICE OF PUBLIC HEARING

MARIN LOCAL AGENCY FORMATION COMMISSION

NOTICE IS HEREBY GIVEN the Marin Local Agency Formation Commission (LAFCO) will hold a public hearing on Thursday, January 14, 2016, in the Council Chamber at the San Rafael City Hall, 1400 Fifth Avenue, San Rafael, CA, at 7:00 p.m., to consider the following matter:

Countywide Municipal Service Review on Public Water Services: Final Report and Determinations

Marin LAFCO will open a public hearing to consider the final report and recommendations therein prepared by the Executive Officer as part of the agency's Countywide Municipal Service Review on Public Water Services. The final report follows the earlier presentation and circulation of a draft report and focuses on independently assessing the capacity and performance of all six public potable water service systems in Marin County relative to current and projected community needs. The report is intended to serve as the source document in informing future actions of Marin LAFCO to update spheres of influence, approve boundary changes, and/or order reorganizations. Public agencies subject to the report are (a) Bolinas Community Public Utility District, (b) Inverness Public Utility District, (c) Marin Municipal Water District, (d) Muir Beach Community Services District, (e) North Marin Water District, and the (f) Stinson Beach County Water District.

Marin LAFCO invites all interested persons to attend and provide testimony to the Commission. The Commission may – and at its sole discretion – continue the hearing to allow for additional testimony or close the hearing and consider taking formal actions on January 14th; the latter includes adopting a resolution making specified determinations on all service and governance factors required under Government Code Section 56430. A copy of the final report will be made available to the public no less than one week prior to the scheduled hearing and available for download at www.marinlafco.org. Comments or questions regarding the final report should be directed to Executive Officer Keene Simonds at (415) 446-4409 or ksimonds@marinlafco.org.

Dated: December 17, 2015

Keene Simonds
Executive Officer

13

MEMORANDUM

ITEM #13

To: Board of Directors
From: Drew McIntyre, Chief Engineer
Subject: North Bay Water Reuse Authority Board Meeting – December 14, 2015
R:\Folders by Job No\7000 jobs\7127\Board Memos\7127 NBRWA Update 12_31_15.doc

December 31, 2015

RECOMMENDED ACTION: Information Only

FINANCIAL IMPACT: None

Supplemental information is provided as follows using item numbers referenced in the attached meeting agenda and draft minutes (Attachment 1).

2. Roll Call

NMWD Board was represented by Director Schoonover.

7. Financial Report for the Period Ending November 30, 2015

The program manager reports that all budget items are tracking normally five months into the FY15/16 budget. Discretionary expenses to date total \$4,116 for meeting room rental and Federal/State Congressional tour expenses. Associate Member dues are used for these expenses (current Associate Members are: Marin Municipal Water District, Marin County and City of American Canyon)

8. Program Development, Federal, and State Advocacy Reports

Ginger Bryant (speaking on behalf of Pilar Onate-Quintana) discussed SB 163 (Hertzberg) that would require half of treated wastewater to be used for beneficial purposes, including landscape watering by 2016 and 100% usage by 2036. SB 163 is undergoing revisions and WaterReuse recently issued a comment letter (Attachment 2) expressing concerns regarding any state mandated ban on ocean discharge of treated wastewater in the foreseeable future. Pilar will report back to the NBWRA Board on this emerging legislation at the January 25, 2016 meeting. It was also mentioned that another NBWRA state capital visit is being scheduled for March 9, 2016.

Ginger Bryant spoke on federal advocacy and recent Phase 1 and Phase 2 activities. Regarding Phase 1 federal grant funding, Brown and Caldwell (B&C) worked with SCWA to submit what is hoped to be the final US Bureau of Reclamation (USBR) Phase 1 Title XVI grant funding request. The \$4.847M grant request was submitted December 10, 2015. An excerpt from the grant submittal, shown in Attachment 3, identifies an increase in potential grant funds for NMWD's Recycled Water Central Project from \$1,487,165 to \$2,750,000. This ~\$1.26M increase in grant funds was made possible by reduced funding requests from Sonoma Valley County Sanitation District. Although the typical annual USBR grant request ceiling is capped at \$4M, it is hoped that USBR will approve the \$4.847M grant request since they are anxious to close out the Phase 1 grants. Regarding ongoing Phase 2 federal outreach efforts, Ginger stated that the next Washington D.C. trip will be January 18-20, 2016 to meet with legislative staff members (see more discussion on Phase 2 projects in Item 10 below).

9. Outreach Program Update

Mark Millan commented that he will be recommending to the TAC a \$500 NBWRA sponsorship for the upcoming annual WaterReuse conference in Santa Rosa March 13-15, 2016. B&C will also be sponsoring a booth to highlight NBWRA projects. It is anticipated that NMWD staff will participate in staffing this booth.

10. North Bay Water Reuse Program Engineering Report

Mike Savage from B&C summarized the current schedule of Phase 2 "Project" vs "Programmatic" level projects. The table provided in Attachment 4 identifies three categories: (1) projects to be considered for environmental review at a "Project Level" and eligible for Title XVI funding (within the planned \$80M total authorization), (2) projects to be considered for environmental review at a "Project Level" but not eligible for Title XVI funding (because they exceed the \$80M total threshold), and (3) future projects outside Phase 2 to be considered for environmental review at a "Programmatic Level." With respect to Title XVI eligible projects, it was agreed that the \$83M total shown in Attachment 4 was close enough to the \$80M funding ceiling and no additional changes are warranted at this time.

Note that Novato Sanitary District has future Water Recycling Plant Expansions planned for Project Level study along with a couple of environmental enhancement projects originating out of joint discussions with Marin County. At a Programmatic Level, expanded seasonal storage of secondary and/or tertiary treated wastewater would be studied. The overall list of Phase 2 projects shown in Attachment 4 will be voted on and approved at the January 25th NBWRA Board meeting.

12. NBWRA Beyond Phase 2

Ginger Bryant led a discussion regarding the potential expansion of NBWRA beyond Phase 2 including changing the focus of NBWRA from expanding recycled water opportunities to a "Total Water Management" approach that would not only include recycled water projects but also groundwater management, water storage and flood plain management projects. As part of the "Beyond Phase 2" discussion it is envisioned that other local agencies might want to join NBWRA as the authority's mission and purpose expands. NMWD staff continues to recommend that NMWD stay the course with being a full fledged NBWRA member through completion of the Phase 1 projects (estimated in 2018) then transitioning to an Associate Membership.



NORTH BAY WATER REUSE PROGRAM

Expanding Water Supplies with Regional Reuse



BOARD OF DIRECTORS MEETING

AGENDA

Monday, December 14, 2015
9:30 A.M.

Novato City Hall Council Chambers
901 Sherman Avenue, Novato, CA 94945

Consultants unable to attend in person may call in: Phone: +1 (602) 567-4030 Access code: 1980; <https://conferencing.brwnccald.com/conference/1980>

- 1. Call to Order (1 minute)**
- 2. Roll Call (1 minutes)**
- 3. Public Comment (3 minutes)**
(Any member of the public may address the Board at the commencement of the meeting on any matter within the jurisdiction of the Board. This should not relate to any item on the agenda. It is the policy of the Authority that each person addressing the Board limit their presentation to three minutes. Any member of the public desiring to provide comments to the Board on an agenda item should do so at the time the item is considered. It is the policy of the Authority that oral comments be limited to three minutes per individual or ten minutes for an organization. Speaker's cards will be available in the Boardroom and are to be completed prior to speaking.)
- 4. Introductions (2 minutes)**
- 5. Board Meeting Minutes of October 26, 2015 (1 minute)**
(The Board will consider approving the minutes from the October 26, 2015 Board meeting.)
- 6. Report from the Program Manager (2 minutes)**
6.a Consultant Progress Reports
(The Board will review the Report from the Program Manager and Consultant Progress Reports.)
- 7. Financial Report for the Period Ending November 30, 2015 (5 minutes)**
(The Board will review the financial report for the period ending November 30, 2015.)

Action
Pages 3 - 5

Information
Pages 6 - 17

Information
Pages 18 - 27

North Bay Water Reuse Authority • c/o Sonoma County Water Agency • 404 Aviation Boulevard, Santa Rosa, CA 95403
707-235-8965 • NBWRA.org

Las Gallinas Valley Sanitary District • Napa County • Napa Sanitation District • North Marin Water District • City of Petaluma • Marin County
Novato Sanitary District • Sonoma County Water Agency • Sonoma Valley County Sanitation District • Marin Municipal Water District • City of American Canyon

ATTACHMENT 1

- Information** **8. Program Development, Federal, and State Advocacy Status Reports (20 minutes)**
(The Board will be updated on the status of Program Development, Federal Advocacy, and State Advocacy.)
- Information** **9. Outreach Program Update (5 minutes)**
(The Board will be updated on the Outreach Program.)
- Information and Discussion** **10. NBWRP Engineering Report (30 minutes)**
Pages 28 – 54
- Status Update
 - Project Lists
 - Cost Summary
 - Agency Allocation of Projects
 - Expanded Phase 2
- Action** **11. Approve Changes to Program to Include Feasibility Analysis of Non-Title XVI Projects and Pursuit of Non-Title XVI Funding (3 minutes)**
Page 55
(The Board will consider approving a changes to the Program to include Feasibility Analysis of Non-Title XVI Projects and Pursuit of Non-Title XVI Funding.)
- Discussion** **12. Joint Board and TAC Work Session: NBWRA Beyond Phase 2 (30 minutes)**
Pages 56 - 77
(The Board and TAC will hold a work session to review the program's goals and objectives and the pros and cons of expanding the program beyond Phase 2 and adding additional members.)
- Action** **13. Consider the Continuation of Joint Board and TAC meetings and Workshops through the Remainder of FY2015/16 (5 minutes)**
Page 78
(The Board will consider the continuation of Joint Board and TAC Meetings and Workshops through the remainder of FY2015/16.)
- 14. Adjournment (1 minute)**

Next Board Meeting
Monday, January 25, 2016, 9:30 A. M. Novato City Hall Council Chambers

(In compliance with the Americans with Disabilities Act of 1990, if you need special assistance to participate in a Board meeting, or you need a copy of the agenda, or the agenda packet, in an appropriate alternative format, please contact the Program Manager at (510) 410-5923. Notification of at least 48 hours prior to the meeting or time when services are needed will assist in assuring that reasonable arrangements can be made to provide accessibility to the meeting or service. A copy of all the documents constituting the agenda packet is available for public inspection prior to the meeting at 500 Davidson Street, Novato, CA 94945. Any person may request that a copy of the agenda or the agenda packet be mailed to them for a fee of \$.10 per page plus actual mailing costs. If you wish to request such a mailing, please contact Chuck Weir, Weir Technical Services, 3026 Ferndale Court, Pleasanton, CA 94588, 510-410-5923, chuckweir@sbcglobal.net. The agenda for each meeting is also available on-line at www.nbwra.org and will be available at the meeting.)

North Bay Water Reuse Authority • c/o Sonoma County Water Agency • 404 Aviation Boulevard, Santa Rosa, CA 95403
707-235-8965 • NBWRA.org

Las Gallinas Valley Sanitary District • Napa County • Napa Sanitation District • North Marin Water District • City of Petaluma • Marin County
Novato Sanitary District • Sonoma County Water Agency • Sonoma Valley County Sanitation District • Marin Municipal Water District • City of Amer.

**North Bay Water Reuse Authority
Board of Directors Meeting
Minutes
October 26, 2015**

1. Call to Order

Chair Rabbitt called the meeting to order at 9:43 a.m. on Monday, October 26, 2015 at the Novato City Hall Council Chambers, 901 Sherman Avenue, Novato, CA 94945. Consultants and others who were unable to attend participated via telephone, 1 (602) 567-4030, passcode 1980; <https://conferencing.brwncaid.com/conference/1980>.

2. Roll Call

| | | |
|-----------------|-----------------------|--|
| PRESENT: | David Rabbitt, Chair | Sonoma County Water Agency |
| | Bill Long, Vice Chair | Novato Sanitary District |
| | Keith Caldwell | Napa County |
| | Rabi Elias | Las Gallinas Valley Sanitary District |
| | Jack Gibson | Marin Municipal Water District |
| | Susan Gorin | Sonoma Valley County Sanitation District |
| | Mike Healy | City of Petaluma |
| | Jason Holley | City of American Canyon (by telephone) |
| | Liz Lewis | Marin County |
| | John Schoonover | North Marin Water District |
| | Jill Techel | Napa Sanitation District |

ABSENT: None

OTHERS

| | | |
|-----------------|-----------------------------|--|
| PRESENT: | Chuck Weir, Program Manager | Weir Technical Services |
| | Kevin Booker | Sonoma County Water Agency |
| | Ginger Bryant | Bryant & Associates |
| | Grant Davis | Sonoma County Water District |
| | Chris DeGabrielle | North Marin Water District |
| | Tim Healy | Napa Sanitation District |
| | Pam Jeane | Sonoma Valley County Sanitation District |
| | Sandeep Karkal | Novato Sanitary District |
| | Mark Millan | Data Instincts |
| | Pilar Oñate-Quintana | The Oñate Group (by telephone) |
| | Jim O'Toole | ESA |
| | Larry Russell | Marin Municipal Water District |
| | Mike Savage | Brown & Caldwell |
| | Paul Sellier | Marin Municipal Water District |
| | Brad Sherwood | Sonoma County Water Agency |
| | Dan St. John | City of Petaluma |
| | Dawn Taffler | Kennedy Jenks Consultants |
| | Jeff Tucker | Napa Sanitation District |
| | Leah Walker | City of Petaluma |
| | Mark Williams | Las Gallinas Valley Sanitary District |

3. Public Comments

There were no comments from the public

4. Introductions

Introductions were not made.

5. Board Meeting Minutes of September 21, 2015.

A motion by Director Long, seconded by Director Caldwell to approve the September 21, 2015 minutes was unanimously approved.

6. Report from the Program Manager

The program Manager described an item that came in too late to be included in the agenda and requested that the Board add it to the agenda as an action item per the emergency provisions of the Brown Act. A motion by Director Schoonover, seconded by Director Long to add Item 6.b, to the agenda, Approval of Reallocation of Phase 1 Construction Funds was unanimously approved.

a. Consultant Progress Reports

The Board reviewed the consultant progress reports for June 2015. The Program Manager highlighted the remaining agenda items.

b. Approval of Reallocation of Phase 1 Construction Funds

The Board reviewed the proposal to reallocate Phase 1 construction funds and administrative funds from SCWA to other Phase 1 participating agencies. A motion by Director Schoonover, seconded by Director Elias was unanimously approved.

7. Financial Report for the Period Ending September 30, 2015

The Board reviewed the Financial Report and noted expenses for Fiscal Year 2015/16 are tracking within budget.

8. Program Development, Federal, and State Advocacy Update

Pilar Oñate-Quintana discussed state issues including bills of interest to NBWRA, a summary of the October 8, 2015 State staff tour, and plans for a new Water Bond. The bond has a value of \$4.895 billion with \$400 million for recycled water and habitat related projects.

Ginger Bryant discussed program development and federal issues, including the 2016 Omnibus Appropriations Bill, the 2016 Authorizations Bill, and Senate Bill 1894, Feinstein, California Emergency Drought Relief Act of 2015. The Feinstein bill includes the provisions of RE-Act.

9. Outreach Program Update.

Mark Millan provided an update for the Board. He provided a demonstration of the new www.westernwaterpriorities.org website and distributed business cards that can be used to publicize the efforts. He encouraged everyone to sign up for the email list as well as to connect via Facebook and Twitter.

10. Status Report – North Bay Water Reuse Program Phase 2 and Related Issues

The Program Manager, Mike Savage, and Ginger Bryant discussed the following topics:

Phase 2

- Meeting Schedule
- Phase 2 Feasibility Study Status Report
- Phase 2 Program Expansion and Budget Impacts
- Other Potential Budget Impacts

Related Issues

- NBWRA Beyond Phase 2
- Plans for Work Study Session

The Board was particularly interested in future meeting schedules and wanted to ensure that the TAC would still be responsible for day to day operations of the program and that the Board would focus on policy issues. Board members were supportive of the workshop concepts discussed and looked forward to the first workshop at the next meeting on December 14, 2015. That workshop will focus on a review of the program's goals and objectives and the pros and cons of expanding the program beyond Phase 2 and adding additional members. As an action item, the Board will review and consider the proposed joint Board and TAC meetings and workshops through the remainder of FY2015/16 at the December 14, 2015 Board meeting.

11. Approve a modification to the Brown and Caldwell Agreement to use the remaining \$40,931 from Triple Bottom Line in Task 2.4 for other expanded efforts in Task 2.4 and move \$25,000 from Task 5, Grants to Task 1.1, Workshops

Several Board members expressed a desire that this item be reviewed and approved by the TAC as has been the practice in the past. As a result, the Board took no action on this item and requested that the TAC consider it at their meeting which will follow the Board meeting.

12. Adjournment

Chair Rabbitt adjourned the meeting at 12:05 p.m. The next meeting will be Monday, December 14, 2015 at 9:30 a.m. at Novato City Hall Council Chambers.

Minutes approved by the Board _____.

Charles V. Weir
Program Manager



December 11, 2015

The Honorable Robert Hertzberg
California State Senate
State Capitol, Room 4038
Sacramento, CA 95814

Dear Senator Robert Hertzberg:

On behalf of WaterReuse California (WRCA) I want to thank you for your leadership on water recycling and, through your introduction of SB 163, for initiating a policy discussion about increased use of recycled water through the treatment and reuse of wastewater that would otherwise be discharged to the ocean. WRCA wants to work with you on increasing recycling, but does not believe a state mandated ban on ocean discharge can be implemented in the foreseeable future.

The WRCA mission statement is to maximize the beneficial use of all types of recycled water and - consistent with statewide recycling goals - we view the wastewater discharged to the ocean as a source of potential new recycled water. Many of our member agencies along the coast already capture much of the potential discharge and are working on many fronts towards redirecting ocean discharge for potable reuse, environmental benefits such as transitional wetlands and other projects.

However, we urge you to consider the substantial regulatory, financial and feasibility factors that we believe pose barriers to compliance with a ban on ocean discharge. Detailed below is the history and status of issues related to the regulatory environment, project funding and public acceptance barriers and we would ask that you consider:

- The regulatory uncertainty of potable reuse must be fully resolved through the adoption of statewide regulations for both surface water augmentation and direct potable reuse (DPR) before some agencies can utilize such systems to capture and reuse ocean discharge.
- In other areas where potable reuse is neither feasible nor planned, the infeasibility of constructing sufficient storage to capture the volume of water released by California's large storms is a clear barrier to implementation. It would be both impractical and hugely expensive to have that much coastal storage.

- In many areas of the state, the only alternative to discharge or storage would be irrigation, and irrigating in the winter when the ground is saturated means all the recycled water runs-off, which is prohibited by regional boards.
- Non-potable, "purple pipe" projects, while providing key benefits in different communities in California, cannot efficiently and economically be expanded to accommodate the volume of water contemplated in SB 163.
- Billions of dollars in state and local funding would be needed for new advanced water treatment plants, expansions of existing plants and tremendous storage capacity to achieve a blanket requirement that ocean discharge be eliminated.

Additionally, we note that some agencies intend to use discharge into the ocean (and bays) for critical environmental purposes – such as transitional wetlands – and that the value of such uses should not be lost in any forthcoming discussions regarding your legislation.

Potable Reuse Regulatory Progress Since 2010

Since the passage of SB 918 (Pavley) in 2010, the first bill on potable reuse in California, a great deal of progress has been made in making potable reuse a major component of California's water supply. This includes:

- Statewide groundwater Indirect Potable Reuse (IPR) regulations were adopted by the Drinking Water Division (DDW) of the State Water Resources Control Board (SWRCB) in 2014. As a result we have seen approximately 20 additional groundwater IPR projects initiated, which when approved, built and funded will provide drinking water for 1.6 million Californians.
- DDW is working on the development of surface water augmentation regulations to allow local water supply reservoirs to be augmented with advanced treated water. Many planned projects, each with its unique local circumstances are under consideration.
- DDW is preparing a report to the Legislature due in December 2016 on the feasibility of developing statewide regulations for Direct Potable Reuse (DPR). While we expect the report to be submitted on time, DDW is not expected to immediately adopt statewide DPR regulations. The permitting of these projects is initially expected to happen on a case-by-case basis and then be followed by the adoption of DPR regulations.
- The WaterReuse Research Foundation (WRRF) initiated 26 independent DPR-related research projects totaling over \$11.5 million to evaluate and demonstrate the feasibility of DPR opportunities. This independent research is being provided to the Expert Panel advising DDW on its DPR report to the Legislature.

While this progress is exceptional, we still do not have a clear pathway for approval of DPR projects, which we believe would be necessary to significantly reduce ocean discharges in those coastal communities without readily accessible groundwater basins or a surface water reservoir of sufficient capacity.

Funding for Potable Reuse Projects

In order to implement SB 163, funding in the billions would be needed from state and local sources. Every project is different, but in general groundwater IPR or surface water augmentation projects using the three-step purification process (microfiltration, reverse osmosis and UV light with advanced oxidation) range in cost from \$820 AF to \$2,000 an AF. The higher estimate would include the conveyance of the water to the groundwater basins or surface water reservoirs and the construction of a brine disposal system. The lower estimate assumes the brine would be discharged through an existing ocean outfall (*Opportunities and Economics of Direct Potable Reuse, Raucher and Tchobanoglous, 2014*). While we don't know what the DPR regulations will require; additional, expensive treatment may be mandated.

In addition, development of potable reuse projects will require a cooperative effort between water suppliers and ocean dischargers. The most likely projects would result in delivery of recycled water to the nearest local water supplier, but only if there is a need for the project and it is cost-effective. Customers are experiencing rate increase fatigue, particularly low income customers that have a limit to what they can afford. Therefore, public agencies are driven to provide the most cost-effective water supplies and environmental solutions.

Public Acceptance of Potable Reuse Water

One of the primary missions of WRCA is to promote potable reuse in California. While we have made a great deal of progress since 2010, some communities do not even have non-potable recycled programs and generally are less willing to consider potable reuse as a water supply option.

WRCA, the Water Reuse Research Foundation and some individual member agencies have done extensive polling on potable reuse and DPR in particular. In general, without knowing any additional information about DPR, these types of projects initially poll in the 40% support range. Once the public is made aware of the extensive treatment process support rises to around 58%. IPR projects, with their "environmental buffer," generally poll more favorably.

While we are waiting for the surface water augmentation regulations to become public, early drafts indicate that these regulations may allow projects only in larger reservoirs and other smaller reservoir projects might be considered DPR for purposes of the regulations. With the public generally less comfortable with DPR projects, this is a major concern for our state's potable reuse future. WRCA is actively working with DDW on this issue.

Summary

WRCA agrees with the objectives behind your bill and thinks the time is right to maximize the use of wastewater that is currently discharged to the ocean for use as

recycled water. To that end, WRCA is working on the regulatory, research and public opinion front to address the existing barriers to potable reuse and DPR in California, noting that even indirect potable reuse projects in California has taken extensive, ongoing public outreach to overcome what the media often calls the “yuck factor” and “toilet to tap.”

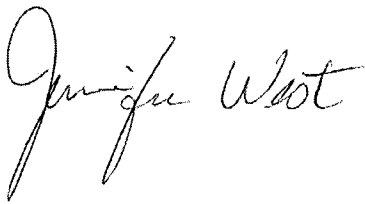
While generally speaking, Southern California is much further ahead of the rest of the state in terms of public acceptance of potable reuse, but it is not immune to these issues. Through its “no discharge” mandate, SB 163 in effect forces an inappropriate “one size fits all” potable reuse solution on all coastal communities in California.

Further, we do not believe SB 163 as written can be implemented without the full completion of the potable reuse regulations, a massive infusion of state and local monies and much more support throughout all parts of California for potable reuse projects.

We encourage you and your staff to avail yourselves of the opportunity to visit agencies along the coast to learn of the different circumstances they face as they seek to maximize recycled water use and minimize discharge. We would be happy to facilitate such opportunities for your office as the SB 163-related conversations continue.

Please do not hesitate to contact me at (916) 669-8401 or (916) 496-1470 if you have questions regarding information contained in this letter or need more information about potable and non-potable reuse projects in California.

Sincerely,

A handwritten signature in black ink that reads "Jennifer West". The signature is written in a cursive, flowing style.

Jennifer West
Managing Director

| Project | Member Agencies | Project Cost | Previous Federal Funding Received for This Project | Additional Funding Requested for This Project |
|--|-----------------|---------------------|--|---|
| Novato Central Service Area Treatment Plant Expansion and Distribution Project | Novato SD | \$2,018,000 | \$0 | \$500,000 |
| Novato Central Service Area Treatment Plant Expansion and Distribution Project | NMWD | \$11,930,000 | \$0 | \$2,750,000 |
| LGVSD-MMWD Recycled Water Project | LGVSD & MMWD | \$5,424,000 | \$0 | \$847,150 |
| SVCSD Wastewater Treatment Plant Improvements | SVCSD | \$3,118,800 | \$0 | \$750,000 |
| Grant Administration for 2016-2018 | SCWA | \$0* | \$0 | \$0 |
| TOTAL | | \$22,490,800 | \$0 | \$4,847,150 |

* \$0 dollars in additional funding. SCWA will utilize funds previously obligated under other NBWRP Phase 1 sub-projects to conduct all administrative tasks related to these project, as well as, final cooperative agreement closeout.

| Item No. 10 | | | | | | | |
|---|---------------------------|--|---------------------------------------|-------------------------------|--------|------------------------------------|--------------------|
| Agency | Project Type | Project Title | Total Project Capital Costs (\$mil) | Title XM Project Level ER/ ES | | Non- Title XM Project Level ER/ ES | Programmatic Level |
| Novato SD | Treatment | Novato SD WRP Capacity - 1st Expansion (+0.85 MGD) | \$4.8 | \$4.8 | \$6.2 | | |
| | | Novato SD WRP Capacity - 2nd Expansion (+0.85 MGD) | \$4.8 | | | \$4.8 | |
| | Seasonal Storage | Option 1: Site Near Highway 37 (Tertiary) 150 AF | \$5.6 | | | | \$5.6 |
| | | Option 2: Site Near Highway 37 (Secondary) 150 AF | \$8.0 | | | | \$8.0 |
| | | Option 3: Hamilton Site (Secondary) 150AF | \$14.2 | | | | \$14.2 |
| | Environmental Enhancement | Marin County Lower Novato Creek Project - Distribution | \$0.9 | \$0.9 | | | |
| | | Marin County Lower Novato Creek Project - Restoration | \$21.5 | | | | |
| | | Turnout to Transitional Wetlands | \$0.6 | \$0.6 | | | |
| | SVCS | Seasonal Storage | Option 1: Mulas Site (Tertiary) 49 AF | \$2.4 | | \$6.2 | |
| Option 2: Robledo Site (Tertiary) 49 AF | | | \$2.6 | \$2.6 | | | |
| Distribution | | Napa Road Pipeline | \$3.6 | \$3.6 | | | |
| | | | | \$3.4 | \$3.4 | | |
| SCWA | Groundwater Management | Valley of the Moon ASR | \$3.6 | \$7.0 | | | |
| | | Sonoma ASR | \$3.6 | | \$3.6 | | |
| | | Sonoma Valley Groundwater Management and Recharge Study | TBD | | | | TBD |
| Petaluma | Treatment | Increase EOWRF Capacity | \$9.0 | \$9.0 | \$30.6 | | |
| | Seasonal Storage | Option 1a: Site Southeast of EOWRF (Secondary) 300 AF | \$14.3 | | | | \$14.3 |
| | | Option 1b: Site Southeast of EOWRF (Secondary) 150 AF | \$7.3 | | | | \$7.3 |
| | Distribution | Urban Recycled Water Expansion | \$11.4 | \$11.4 | | | |
| | | Agricultural Recycled Water Expansion Phase 1 | \$4.2 | \$4.2 | | | |
| | | Agricultural Recycled Water Expansion Phase 2 | \$6.0 | \$6.0 | | | |
| | | Agricultural Recycled Water Expansion Phase 3 | \$6.5 | | | | \$6.5 |
| Napa SD | Treatment | Soscol WRF Increased Filter Capacity | \$2.2 | \$2.2 | \$33.2 | | |
| | Operational Storage | Additional Soscol WRF Covered Storage | \$2.9 | \$2.9 | | | |
| | | Napa State Hospital Storage Tank | \$7.4 | | | | \$7.4 |
| | Seasonal Storage | Option 1a: Raise Existing Pond Levees (Secondary) 300 AF | \$9.9 | | | \$9.9 | |
| | | Option 1b: Raise Existing Pond Levees (Secondary) 1,100 AF | \$30.2 | | | | |
| | | Option 2: Somky Ranch Site (Secondary) 300 AF | \$15.3 | | | | |
| | | Option 3a: Jameson Ranch Site (Tertiary) 600 AF | \$17.3 | \$17.3 | | | |
| | | Option 3b: Jameson Ranch Site (Tertiary) 300 AF | \$11.8 | | | | |
| | | | | | | | |
| | Distribution | MST Northern Loop | \$6.9 | \$6.9 | | | |
| | | MST Eastern Extension | \$3.9 | \$3.9 | | | |
| | | | \$242 | \$83 | \$83 | \$15 | \$66 |

ATTACH

ATTACHMENT 4



14

FOR ACCESSIBLE
MEETING INFORMATION
CALL: (707) 543-3350
ADD: (707) 543-3031



TECHNICAL ADVISORY COMMITTEE

MONDAY, JANUARY 4, 2016

9:00AM

Utilities Field Operations Training Center
35 Stony Point Road, Santa Rosa, CA

1. Check In
2. Public Comment
3. Recap from December 7, 2015 TAC Meeting and Approval of Minutes
4. Water Supply Conditions and Temporary Urgency Change Petition
5. Sonoma Marin Saving Water Partnership –
 - i. Water Use Relative to 2013 Benchmark
 - ii. SWRCB Proposed Regulatory Framework for Extended Regulation for Urban Water Conservation
6. SCWA Draft FY 2016/17 Budget
7. Biological Opinion Status Update
8. Items for next agenda
9. Check Out

Draft Minutes of Technical Advisory Committee
35 Stony Point Road, Santa Rosa, California
December 7, 2015

Attendees: Rocky Vogler, City of Santa Rosa
Linda Hall, City of Santa Rosa
Toni Bertolero, Town of Windsor
James Smith, Town of Windsor
Paul Piazza, Town of Windsor
Mary Grace Pawson, City of Rohnert Park
Mark Bautista, City of Rohnert Park
Mike Healy, City of Petaluma
Leah Walker, City of Petaluma
Craig Scott, City of Cotati
Dan Takasugi, City of Sonoma
Dan Muelrath, Valley of the Moon Water District
Chris DeGabriele, North Marin Water District
Drew McIntyre, North Marin Water District
Larry Russell, Marin Municipal Water District
Mike Ban, Marin Municipal Water District
Grant Davis, SCWA
Pam Jeane, SCWA
Mike Thompson, SCWA
Jay Jasperse, SCWA
Brad Sherwood, SCWA
Don Seymour, SCWA
Lynne Rosselli, SCWA
Ann DuBay, SCWA
Carrie Pollard, SCWA

Public Attendees: Brenda Adelman, RRWPC
David Keller, FOER
Bob Anderson, United Wine Growers

1. Check-in
Chair Chris DeGabriele called the meeting to order at 9:09 a.m.
2. Public Comment
Brenda Adelman commented on an article forwarded to members regarding endocrine disrupters.
3. Water Supply Conditions and Temporary Urgency Change Petition
Grant Davis, SCWA, reported on water levels; Lake Mendocino is at 57% capacity, Lake Sonoma is at 66% capacity. Pam Jeane, SCWA, reported we are no longer operating under an Urgency Change Order. Another change petition is expected to be filed in January. PG&E was granted a variance for lower PVP releases and an extension has been granted on their change order. Meetings are being held regarding minimum Eel River/PVP stream flows. Penstock work continues. Questions followed from the committee.
4. Sonoma Marin Saving Water Partnership -
 - i. Water Use Relative to 2013 Benchmark

Chris DeGabriele, North Marin Water District, reviewed the table sent to the members via email.

- ii. Governor's E. O. Extending Emergency Urban Water Conservation Regulations through October 2016 if Drought Conditions Persist beyond January 2016

Sent to the members via email. Comments followed from the public.

- iii. Recent Outreach

SCWA has advised irrigation be turned off due to the rain we have received. Petaluma has put out the message to use less water and save on sewer bills. Santa Rosa is getting ready to kick off the low flow toilet program funded by a \$2.5 million grant. Windsor is reminding residents to turn off irrigation. Workshops were held in November to promote water saving by storing rain water. An additional workshop will be held in February. The drought newsletter will continue to be sent throughout the winter by SCWA.

- 5. Consider WAC Support Letter for Safe Medicine Disposal Ordinance

Chris DeGabriele asked for a recommendation that a letter from WAC be sent supporting the ordinance. The recommendation will be sent to the WAC with some additional information added.

- 6. Biological Opinion Status Update

Pam Jeane, SCWA, reviewed the Biological Opinion Status Update distributed to the committee and interested parties. Questions and comments followed from the committee and the public.

- 7. Items for Next Agenda

January 4 TAC Meeting

Water Supply Conditions and Temporary Urgency Change Order
Sonoma Marin Saving Water Partnership
Biological Opinion Status Update

- 8. Check Out

Next TAC meeting is January 4, 2016
Next WAC/TAC meeting is February 1, 2016

Meeting was adjourned at 9:56a.m.

State Water Resources Control Board Conservation Standard Tracking for the Sonoma-Marín Saving Water Partnership

Table 1: Monthly Water Use Relative to 2013 Benchmark

| Water Retailer | November 2015 (Gallons) | 2013 Benchmark (Gallons) | Relative to 2013 Benchmark | Conservation Standard | November 2015 GPCD* |
|--------------------|----------------------------|-----------------------------|-------------------------------|--------------------------|------------------------|
| Cal Am | 17,042,007 | 22,987,000 | 26% | 25% | 63 |
| Cotati | 17,139,763 | 23,591,612 | 27% | 20% | 78 |
| Marin Municipal | 530,583,183 | 681,029,482 | 22% | 20% | 94 |
| North Marin | 115,462,923 | 229,000,000 | 50% | 24% | 63 |
| Petaluma | 177,914,646 | 238,845,506 | 26% | 16% | 97 |
| Rohnert Park | 105,868,990 | 115,000,000 | 8% | 16% | 81 |
| Santa Rosa | 353,463,091 | 486,628,234 | 27% | 16% | 69 |
| Sonoma | 37,293,647 | 49,008,055 | 24% | 28% | 107 |
| Valley of the Moon | 49,864,979 | 74,000,859 | 33% | 20% | 74 |
| Windsor | 65,869,476 | 89,332,169 | 26% | 16% | 80 |
| SMSWP Total | 1,470,502,705 | 1,986,435,918 | 26% | 19% | 83 |

* GPCD is provided as information only

Table 2: Aggregate June 2015 to Current Month Relative to 2013 Benchmark

| Water Retailer | Aggregate June 2015 to Date (Gallons) | 2013 Benchmark (Gallons) | Relative to 2013 Benchmark | Conservation Standard |
|--------------------|---|-----------------------------|-------------------------------|--------------------------|
| Cal Am | 132,650,679 | 181,662,000 | 27% | 25% |
| Cotati | 140,570,530 | 189,319,431 | 26% | 20% |
| Marin Municipal | 4,163,939,140 | 5,280,099,782 | 21% | 20% |
| North Marin | 1,339,585,289 | 1,976,000,000 | 32% | 24% |
| Petaluma | 1,386,153,861 | 1,851,409,122 | 25% | 16% |
| Rohnert Park | 777,656,446 | 950,000,000 | 18% | 16% |
| Santa Rosa | 3,062,546,832 | 4,128,687,184 | 26% | 16% |
| Sonoma | 326,604,172 | 458,225,311 | 29% | 28% |
| Valley of the Moon | 445,645,884 | 618,645,227 | 28% | 20% |
| Windsor | 579,976,004 | 765,896,183 | 24% | 16% |
| SMSWP Total | 12,355,328,837 | 16,218,282,239 | 24% | 19% |

December 21, 2015

**Proposed Regulatory Framework for
Extended Emergency Regulation for Urban Water Conservation**

Background:

On April 1, 2015, Governor Brown issued the fourth in a series of executive orders on actions necessary to address California's drought. On May 5, 2015, the State Water Resources Control Board (State Water Board) adopted an Emergency Regulation to address specific provisions of the April 1 Executive Order, including a mandatory 25 percent statewide reduction in potable urban water use between June 2015 and February 2016. To reach the statewide 25 percent reduction mandate, the Emergency Regulation assigns each urban water supplier a conservation tier that ranges between 4 and 36 percent based residential per capita water use for the months of July – September 2014.

At the time the State Water Board adopted the current Emergency Regulation some urban water suppliers had proposed further refinement to the conservation tiers to reflect a range of factors that contribute to water use. State Water Board Resolution No. 2015-0032 directed staff to work with stakeholders to further develop and consider these factors, including but not limited to temperature, growth, use of drought resilient supplies, and others for adjustment to the Emergency Regulation should it need to be extended into 2016.

On November 13, 2015, Governor Brown issued Executive Order B-36-15 (EO B-36-15) calling for an extension of urban water use restrictions until October 31, 2016, should drought conditions persist through January 2016. Between August and November 2015 State Water Board staff convened a small group of individuals representing a variety of water interests to further explore potential modification of the Emergency Regulation. The State Water Board also held a public workshop on December 7, 2015, to solicit input on elements of the existing Emergency Regulation, if any, that should be modified. The stakeholder process and workshop led to development of several proposals for modification of the Emergency Regulation, which are discussed below, along with staff recommendations.

Staff recommendations are based on the criteria that modifications to the Emergency Regulation be transparent, intelligible, equitable, reasonable, provide sufficient water savings statewide, and be feasible to implement and enforce. As directed by the Governor in EO B-36-15, this proposal would extend until October 31, 2016 restrictions to achieve a statewide reduction in urban potable water usage.

Climate adjustment:

Stakeholder Proposal: Water suppliers in warmer climates would be granted a reduced conservation standard based on their service area evapotranspiration (ET) relative to statewide average ET. The adjustments would be calculated by multiplying the deviation from average ET by the water supplier's conservation standard and would range from a 0-15 percentage point decrease to suppliers existing conservation requirement. As proposed, no supplier would have their standard increased.

Staff Recommendation: Incorporate a climate adjustment in the Emergency Regulation that reduces the conservation requirement by up to 4 percentage points for water suppliers located in

the warmest regions of the State. The climate adjustment would be based on each urban water supplier's approximate service area ET for the months of July through September as compared to statewide average ET for the same months. The adjustment would range from a 2-4 percentage point decrease in an urban water supplier's conservation requirement depending on service area ET as follows:

| Deviation from Average ET | Reduction in Conservation Standard |
|---------------------------|------------------------------------|
| >20% | 4% |
| 10 to 20% | 3% |
| 5 to <10% | 2% |

Default service area ET will be based on the California Irrigation Management Information System (CIMIS) Mapped ET Zone for which the supplier's service area has the greatest overlap. Each Urban Water Supplier will have the opportunity to refine its service area ET using specific data from CIMIS stations within its service area, provided each station used has a continuous period of record of at least 5 years.

Staff estimates that this adjustment will result in 1.4 percentage point reduction in statewide water savings from that currently required.

Example Calculation of Climate Adjustment

| | | |
|---|-------------|--------|
| Original Conservation Requirement | 32% | |
| Statewide Average ET Jul-Sep | 6.13 | inches |
| Service Area Average ET Jul-Sep (Zone 17) | 8.4 | inches |
| Service Area % Deviation from Average ET = $1 - (6.13/8.4)$ | 0.27 or 27% | |
| Climate Adjustment | -4% | |
| Adjusted Conservation Requirement | 28% | |

Growth adjustment:

Stakeholder Proposal: Each urban water supplier's 2013 baseline water use would be increased to account for growth in new service connections since 2013. The volume of water per connection in 2013 would be calculated (based on total use divided by number of connections) and multiplied by the number of connections added since 2013. This volume of water could be added to the 2013 baseline to account for new growth, resulting in a decrease to the supplier's conservation volume requirement but not its conservation standard.

Staff Recommendation: Provide a mechanism to adjust urban water supplier conservation standards to account for water efficient growth since 2013. The adjustment will be equal to the ratio of the additional volume of water used since 2013 to the baseline water use for 2013, multiplied by the water supplier's conservation standard. The volume of water added due to growth will be calculated as the sum of:

December 21, 2015

1. Number of new residential connections since 2013 multiplied by 165 gallons (55 gallons per person per day multiplied by three people) multiplied by 270 days.
2. Area of new residential landscaped area (square feet) served by connections since 2013 multiplied by 55% of total service area ET (inches) for the months of February through October multiplied by a conversion factor of 0.623 (converting inches to gallons).
3. Number of new commercial, industrial, and institutional (CII) connections since 2013 multiplied by the average commercial industrial, and institutional water use per connection during February through October 2015.

Staff estimates that this adjustment will result in about a one percentage point reduction in statewide water savings compared to the current requirements, assuming that growth has increased by 4% since 2013 for every urban water supplier.

Example Calculation of Growth Adjustment

| | | |
|--|----------------|----------|
| # of new residential connections since 2013 | 4,000 | |
| Residential landscaped area served by connections since 2013 | 10,000,000 | sq. feet |
| Total ET February through October | 44 | inches |
| Volume of water attributable to new residential connections = $[4000 * 165 * 270] + [10,000,000 * 44 * 0.55 * 0.623]$ | 328,966,000 | gallons |
| # of new commercial, industrial, and institutional connections since 2013 | 700 | |
| Average use per CII connection Feb-Oct 2015 | 900,000 | gallons |
| Volume of water attributable to new CII connections = $700 * 900,000$ | 630,000,000 | gallons |
| Total volume of water attributable to growth since 2013 | 958,966,000 | gallons |
| Baseline 2013 total water production Feb-Oct | 16,000,000,000 | gallons |
| Gallons of water attributable to growth | 958,966,000 | gallons |
| Percentage change in potable water production due to growth | 6% | |
| Original Conservation Requirement | 36% | |
| Adjusted Conservation Requirement = $.36 * [1 - 0.06]$ | 34% | |

Drought Resilient Sources of Supply Credit:

Stakeholder Proposal Suppliers would receive a credit for desalinated seawater or indirect potable re-use (IPR) water. The credit would come in the form of a one-to-one reduction from the calculated amount of water that needs to be saved under the Emergency Regulation. A supplier could deduct all water derived from desalination or IPR from their total savings requirement. San

Diego County Water Authority proposes a similar credit for Colorado River water received through long-term transfers of conserved water. No supplier would be allowed to have an effective conservation rate below 8%.

Staff Recommendation: Provide a one-tier (four percentage point) reduction to the conservation standard of urban water suppliers using new drought resilient water supplies. The credit would apply to urban water suppliers that certify, and provide documentation upon request, that at least 4 percent of its potable supply is comprised of indirect potable reuse of coastal wastewater (the creation and use of which does not injure another legal user of water or the environment) or desalinated seawater developed since 2013. Staff does not recommend extending this credit to Colorado River water received through long-term transfer of conserved water.

Staff estimates that this credit will result in about a 0.6 percentage point decrease in statewide water savings.

Non-potable Recycled Water Use Credit:

Stakeholder Proposal: This proposal would apply to suppliers that meet a large portion of irrigation demand with non-potable recycled water. These suppliers would be able to reduce their 2016 monthly potable water production by the ratio of non-potable recycled water use to total potable water production multiplied by their total water production and their conservation. Reducing 2016 total potable water production would have the effect of reducing the required volume of water saved.

Staff Recommendation: Staff does not recommend providing additional credit for non-potable recycled water use. Under the current Emergency Regulation, non-potable recycled water is not counted in total potable water production. Suppliers' conservation standards are based on residential use of potable water, and while suppliers have been generally expected to target outdoor irrigation as a means of achieving savings, high use of recycled water should not, by itself, prevent a supplier from meeting those standards with reductions from residential and non-residential customers. These suppliers have already realized the benefit of providing recycled water by not having that water counted as part of their total production and not having to reduce use of that water. Urban water suppliers that cannot meet their conservation standard due to a disproportionate share of recycled water use may pursue relief through the existing alternate compliance process on case by case basis.

Groundwater Credits:

Stakeholder Proposal: This set of proposals would provide credit for "sustainable" groundwater management and groundwater augmentation. Suppliers would provide verification that the groundwater supply is formally certified to meet certain eligibility requirements and then would be eligible to deduct certain groundwater use from their total potable production. In effect, the use of eligible groundwater would be counted the same as conserved water. There are four proposed credit scenarios: 1) Groundwater Banking; (2) Conjunctive Use; (3) "Sustainable" Groundwater Management; and (4) Adjudicated Basins. The proposals include requirements that would govern the use of the credits under each scenario.

Staff Recommendation: Staff does not recommend providing credits for groundwater use or management since the effect of such credits are not well-defined and are generally inconsistent with goal of conserving the state's remaining surface and groundwater supplies during the drought. While groundwater augmentation with surface water is a critical element of drought resilience, it is materially different than creation of new drought-resilient sources of supply, such as through indirect potable reuse of wastewater or seawater desalination. Using seawater and wastewater that, for example, would otherwise have been discharged to the ocean to create supply adds to existing surface and groundwater supplies, whereas groundwater augmentation uses water that was already part of existing freshwater resources. Moreover, the proposed groundwater management credits do not adequately demonstrate how other users of a groundwater basin, whether adjudicated or not, would be impacted from pumping by the supplier receiving a credit. Suppliers whose basins are replenished with imported water would place additional strain on those supplies by using more water under a credit system. Suppliers whose basins fill without imports may impact others by increasing pumping under a credit system. Even self-sufficient, adjudicated basins are not guaranteed to maintain all uses during an extended severe drought, where the next opportunity for recharge is unknown. Additionally, there is no credible estimate of how much credit would accrue for groundwater management and how that credit would impact statewide savings. Credit for sustainable groundwater management may be appropriate for a permanent regulation, and certainly will be addressed by the Sustainable Groundwater Management Act as that legislation is implemented, but it is not adequately transparent, intelligible, implementable, or reasonable for an Emergency Regulation of limited duration, the chief aim of which is to preserve existing surface and groundwater supplies through conservation while extreme drought conditions persist.

Regional Compliance Approach:

Stakeholder Proposal: This proposal would allow suppliers to jointly comply with their aggregated conservation standards as a single entity. Regions would be allowed to form, on a voluntary basis, based on the criteria for forming a SBx7-7 regional alliance, per Water Code Section 10608.28. A lead agency for the region would report the Regional Conservation Standard monthly to the State Water Board on behalf of the region. Each urban retail water supplier would also continue to report their individual monthly water use data. If a group as whole did not meet its regional conservation target, the suppliers would revert back to their individual requirements.

Staff Recommendation: Staff does not recommend providing an option for regional compliance because it will impede timely compliance and enforcement action by the Board and has the potential to reduce individual water supplier accountability. While a regional approach could help water suppliers provide a consistent message about a regional target to their customers, residents and businesses need to conserve differing amounts to achieve a supplier's reduction target, so the benefits of this approach are not well substantiated. There is no reason that suppliers (and their regional or wholesale partners) cannot develop consistent messaging under the current Emergency Regulation, such as limits on outdoor watering, nor does the current emergency regulation inhibit regionally-grouped suppliers or wholesalers from working together on messaging to encourage conservation. In addition, there are multiple drawbacks to the proposed regional approach. First, it would impede the Board's enforcement and compliance efforts, by disallowing the Board from using its enforcement tools to timely address the shortcomings of an individual supplier if that supplier's region was meeting its target. In the case where a region dropped out of compliance late

in the 270 day life of the regulation, the Board would have little time to institute corrective actions for the individual suppliers. Second, it could encourage regional agencies to focus efforts on additional conservation savings in high-performing communities rather than on steps to change the conservation behaviors of poorer performing communities in order to meet the regional target. Finally, the regional approach would undermine the direct accountability for water supply managers established through the existing regulation. Staff encourages suppliers to work together on messaging and outreach, but believes the drawbacks of a regional approach outweigh any potential benefits.

Elimination of Commercial Agriculture Exclusion:

Stakeholder Proposal: The current Emergency Regulation allows water supplied for commercial agricultural use to be excluded from total potable production, if certain conditions are met. The proposal is to eliminate the exclusion or to change the definition of what constitutes commercial agricultural use to prevent exclusion of water attributable to noncommercial agricultural use or non-agricultural use that may be excluded improperly.

Staff Recommendation: **Staff recommends modifying the Commercial Agriculture Exclusion to require certification that customers whose water use is subtracted under the exclusion produce a minimum of \$1,000 per year in revenue from agricultural sales and are not subtracting water used on ornamental landscapes.** This change would limit use of the exclusion for properties with minimal agricultural sales or mixed commercial agricultural and ornamental landscape use. The \$1,000 threshold is consistent with the US Department of Agriculture's definition of a farm.¹

Staff estimates the existing agricultural exclusion has resulted in about an 11,000 acre feet reduction in conserved water since June 2015. Modifying the commercial agriculture exclusion as proposed could result in a slight increase of conserved water.

Exemption for regions without drought conditions and no exports/imports:

Stakeholder Proposal: This proposal would allow isolated hydrogeological regions that do not have drought conditions and do not import or export water to be excluded from the conservation standard element of the Emergency Regulation. Suppliers would apply to the State Water Board for an exemption from the conservation standard and provide verification that water resources in these regions are not available to benefit other regions.

Staff Recommendation: **Staff does not recommend exempting or relaxing conservation requirements for isolated hydrogeologic regions.** The current Emergency Regulation contains a reserved four percent tier for suppliers that can demonstrate multiple years of supply and no use of imported water and groundwater. Staff continues to believe the four percent tier is adequate and appropriate for an extended Emergency Regulation given the uncertainty of the state's surface and groundwater suppliers during the drought.

Revisions for suppliers with significant seasonal or transient populations:

¹ See <http://www.ers.usda.gov/topics/farm-economy/farm-household-well-being/glossary.aspx>, accessed December 11, 2015.

Stakeholder Proposal: The Emergency Regulation assigned conservation tiers based on R-GPCD during the months of July, August, and September 2014. The proposal is to re-assign tiers based on 12 months of R-GPCD data, because some areas, mainly the desert regions, have the highest population during the winter months.

Staff Recommendation: Staff does not recommend changing the process for assigning conservation tiers to account for year round residential per capita water use because it would reduce the regulation's current emphasis on saving water where outdoor use is highest. In addition, this proposal would in effect provide allowances for properties that are unoccupied for part of the year but irrigated year-round. However, staff proposes to update each water suppliers R-GPCD values using the most up to date July-September 2014 data that had been provided as of January 1, 2016. Water suppliers have also been encouraged and allowed to correct any inaccurate data and provide modified population information to account for monthly changes in population.

A Cap on Credits and Adjustments:

Staff recommends that all credits and adjustments be capped to allow up to a maximum of a four percentage point decrease to any individual water supplier's conservation standard (tier).

Staff Recommendations on Other Elements of an Extended Emergency Regulation:

Staff recommends maintaining other elements of the current Emergency Regulation in the extended Emergency Regulation. These elements include the alternate compliance approach, the statewide prohibited end-uses, the monthly reporting requirements for urban water suppliers, and the conservation and reporting requirements for small suppliers. Staff proposes that small suppliers again be required to report after six months of conservation under a readopted emergency regulation.

Staff also recommends, based on feedback from both suppliers and the general public, adding a prohibition against homeowners' associations interfering with certain conservation actions of their association members in violation of existing law.

Next Steps:

- Comments are due on this proposed regulatory framework by January 4, 2016
- A draft Emergency Regulation will be released for public comment in mid-January 2016
- State Water Board consideration of an extended emergency regulation is anticipated in early February 2016.

Input Requested: The State Water Board is interested in receiving feedback on this proposed regulatory framework. Please submit comments with the subject line: "Comments on Proposed Regulatory Framework" by email to: Kathy Frevert at Kathy.Frevert@waterboards.ca.gov by January 6, 2016.

15

**NOTICE OF MEETING OF
NORTH BAY WATERSHED ASSOCIATION**

Notice is hereby given that a meeting of the North Bay Watershed Association will be held as follows:

Date: Friday, January 8, 2016

Time: 9:30 a.m. – 11:30 a.m.

Location: Marin Community Foundation,
5 Hamilton Landing, Suite 200,
Novato, CA 94949

AGENDA

| <u>Item</u> | <u>Recommendation</u> |
|---|------------------------------|
| 1. Call to Order (Jack Gibson, Chair) | |
| 2. Public Comment | |
| 3. Approval of the Agenda (1 min.) | Approve |
| 4. Approval of Minutes | Approve |
| 5. Treasurer's Report (1 min.) | Accept |
| 6. New Executive Director Introduction (10 min.) * Judy Kelly | Information |
| 7. San Francisco Bay Restoration Authority (30 min.) Guest Speaker: Amy Hutzell, State Coastal Conservancy | Information |
| 8. Baylands Goals (45 min.) Guest Speaker: Letitia Grenier, SFEI | Information |
| 9. Project Approval (10 min.) - Watershed Classroom- Friends of Petaluma River -\$20 k * Judy Kelly | Action |
| 10. Items of Interest | |
| 11. Items for Next Agenda | |

Next Meeting Information:

Next Meeting: February 5, 2016
Petaluma (Lucchesi) Community Center
320 N. McDowell Boulevard
Petaluma, CA, 94954

NORTH BAY WATERSHED ASSOCIATION

Minutes for the meeting of the North Bay Watershed Association (NBWA) Board of Directors.

Date: December 4, 2015
Time: 9:30 a.m.
Location: Petaluma (Lucchesi) Community Center
320 N. McDowell Boulevard
Conference Room 2
Petaluma, CA 94954

Directors Present: Directors present included:

| <u>Board Member</u> | <u>Agency/Organization</u> | <u>Board Member</u> | <u>Agency/Organization</u> |
|---------------------|---------------------------------------|---------------------|---|
| Jack Baker | North Marin Water District | Juliana Inman | Napa County Flood Control & Water Conservation District |
| Keith Caldwell | Napa Sanitation District | Paul Jensen | City of San Rafael |
| Megan Clark | Las Gallinas Valley Sanitary District | Eric Lucan | City of Novato |
| Frank Egger | Central Marin Sanitation Agency | Pam Meigs | Ross Valley Sanitary District |
| Jack Gibson | Marin Municipal Water District | Brant Miller | Novato Sanitary District |
| Mike Healy | City of Petaluma | Kate Sears | County of Marin |

Directors present represented 12 out of the 18 agencies signatory to the Association MOU.

Board Actions:

1. **Call to Order.** Jack Gibson, Chair, called the meeting to order at 9:40 a.m.
2. **Public Comment.** None.
3. **Approval of the Agenda.** (See Handout) The Board unanimously approved the agenda.
4. **Approval of the Minutes of the Board Meeting held November 6, 2015.** (See Handout) The Minutes of the Board Meeting held on November 6, 2015 were unanimously approved.
5. **Treasurer's Report.** (See Handout) The Treasurer's Report was accepted as presented by Harry Seraydarian.
6. **Game of Floods Preview.** Chris Choo, Marin County Public Works, provided a PowerPoint and began with some pictures of Marin flooding in 2014 and noted that Marin is the second most vulnerable county in the Bay Area. She then presented a visual illustrating sea level rise in portions of San Pablo Bay for 1 foot of SLR (King Tide now) and 3 feet of SLR (100 year flood). Chris described the efforts of Coastal Marin-Collaboration: Sea-Level Marin Adaptation Response Team" (C-SMART) and then introduced a new effort in Eastern Marin called BayWAVE. Chris presented a graphic for the process for both efforts showing the steps from vulnerability assessments, adaptation planning, and implementation and monitoring. She provided more detail on vulnerability asset and community profiles and the use of the "Our Coast Our Future" online viewer. She also provided examples of West Marin numbers for buildings parcels, and roads affected. She then introduced Roger Leventhal, Marin County Flood Control, who presented the Richardson Bay Shoreline Study and the "Game of Floods". Roger explained the shoreline study which includes a vulnerability assessment and adaptation options. Roger provided background on the development of "scenarios" and provided a visual showing how 12 miles of shoreline was divided into seven reaches. He highlighted impacts under certain scenarios in different reaches and then described the major adaptation strategies and components for protection, accommodation, and managed retreat (which was not addressed in study). Roger walked through a number of examples of protection options both hard (sea walls, levees, flood wall & pump station, tidal gates) and soft (horizontal ecotone levees, wetland/shoreline vegetation, tidal wetlands and eco levees, engineered beaches, offshore structures) and presented pros and cons for each. Roger also covered infrastructure and lifestyle changes with a number of examples (elevate buildings, floodable development, new elevated road). He then presented some cost estimates for the various options. Roger then explained how the Game of Floods was used in Southern Marin and presented the latest version which will be "North Bay Island". He identified the types of communities, game steps, and approach to costs that will be used in the game. The NBWA Board Members had a number of questions. What is the website for the "Our Coast Our Future" online viewer? (Point Blue- <http://data.prbo.org/apps/ocof/>) How will funding for San Francisco Bay Restoration Authority be allocated? (Four sub-regions similar to IRWM approach.) Is there funding for implementation? (Approximately \$14m in recent Prop 84 round approved by DWR.) Are sheet piles feasible for Corte Madera Marsh for short term-10 years? (Yes, Marin study was for

long term.) Will Ross Valley be included in vulnerability assessment? (Yes.) If you dredge where do you put material? (Two pilots underway in Marin for ecotone levees.) Does Marin process include planners? (Yes – intent is to breakdown “silos” including jurisdictional barriers.)

7. **Russian River Watershed Association Update.** Andy Rodgers, RRWA provided a PowerPoint and noted that RRWA is the “younger sister” of NBWA and though it used the same MOU it has evolved differently. Andy then reviewed some facts about the Russian River watershed (Reservoirs: Lake Sonoma and Lake Mendocino) and then presented the RRWA mission and identified the members (11 cities, counties and special districts). He also explained the RRWA structure: Board of Directors (meets 5 times/year); Working Group (8x/year); Administration/Executive Director (consulting firm); and noted the focus on regulatory compliance (stormwater is a large portion) in the annual workplan. Andy then highlighted the RRWA website (rebuilding now), partner agencies, and some elements of their outreach and education efforts. He then elaborated on examples such as: monthly environmental column; outreach on fats, oils and grease; bulk purchases on outreach materials (handed out RRWA pencils); high school video contest; interactive map for watershed awareness; Urban Creek Care Guide; creek signs; and special events (Steelhead Festival, Creek Week). Andy then provided examples of advocacy (comment letters on rules, legislation, and grant funding). He also described some specific initiatives: stormwater training; pesticide alternatives (Our Water Our World); landscape guidelines and workshops; demonstration gardens; plant list; a collaboration with Daily Acts on landscape guidelines; and safe medicine disposal. Andy ended with a summary of elements in their 2016-2017 work plan and a description of the Russian River Regional Monitoring Program. The NBWA Board Members had a number of questions. What is Daily Acts? (A national group that started in graywater and is focusing on turf now.) Is the safe medicine disposal just a Bay Area effort? (National effort now, though Alameda County was one of the first counties to take on this issue.) When you work with homeless people do you move them or just clean up? (Just starting now – focusing on awareness and funding.) What is RRWA’s role in the North Coast IRWM? (Just getting engaged now; will be on the panel for January meeting on stormwater.) Any education on pesticides from vineyards? (Both counties do this now.) What is RRWA budget? (\$430k from members for general benefit and special projects.) Are MS-4 permittees members of RRWA? (Yes, all under one permit.)

8. **2016 Conference Update.** Harry Seraydarian presented a PowerPoint to update the Board. The date is April 22, 2016 at the Embassy Suites in Napa. He noted the theme was modified – The Future of Water is Now: Innovation, Integration, Adaptation. Harry also confirmed that we would have a short panel of high school speakers and were working on a third keynote: Ms. Jo Ellen Darcy, Assistant Secretary for Civil Works, USACE. Harry also highlighted the sponsors to date (\$20k out of \$50k target) and noted a “Save the Date” had been sent out in November and Registration will be available online in early December. \$85 Early Registration Fee before January 31, 2016 (after February 1st \$95).

9. **Items of Interest.**

- * Bay Area is preparing for Prop 1 Grant Funding – Bay Area will apply for \$6.5 million for involvement of disadvantaged communities, economically distressed areas, and under-represented communities. Stay tuned for guidelines from the State.

10. **Items for Next Agenda.**

- * San Francisco Bay Restoration Authority, Amy Hutzler, State Coastal Conservancy
- * Baylands Goals, Leticia Grenier, San Francisco Estuary Institute

Jack Gibson, Chair, adjourned the meeting at 11:30 a.m.

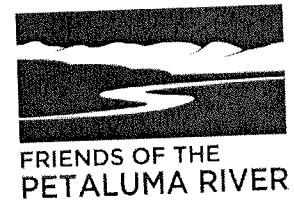
SUBJECT TO BOARD APPROVAL

Submitted By: Elizabeth O. Preim-Rohla
Assistant to the Executive Director

NEXT MEETING INFORMATION:

January 8 – Marin Community Foundation, 5 Hamilton Landing, Suite 200, Novato, CA 94949

February 5 – Petaluma (Lucchesi) Community Ctr., 320 N. McDowell Blvd., Petaluma, CA 94954-Conf. Rm. 2



December 20, 2015

North Bay Watershed Association

Re: Scope of Work: NBWA Sponsorship of Friends of the Petaluma River and the Watershed Classroom Program

Friends of the Petaluma River launched the Watershed Classroom program in 2012 in partnership with Petaluma City Schools with support from the Sonoma County Water Agency. Now in its third year of implementation the program incorporates 32 educators and approximately 1500 students teaching and learning about the Petaluma Watershed. See Appendix 1 for a complete list of projects. The goal of the program is to engender a sense of stewardship in local youth over their local watershed through hands-on, project-based learning. The program provides educational resources to the community through the Watershed Classroom website, watershedclassroom.org, that include a multi-layered interactive google-based Watershed Atlas of the Petaluma Watershed, a Watershed Timeline and links to watershed education tools as well as updates on work students are doing in the Watershed. The Watershed Atlas was created by ECON, now part of West Yost Associates, with support from the City of Petaluma, the Sonoma County Water Agency and the Sonoma Resource Conservation District.

This scope of work outlines the work that Friends of the Petaluma River will accomplish using funds pledged by the North Bay Watershed Association to support the Watershed Classroom program. Support from the NBWA will fund the development of additional layers of the Watershed Atlas, equipment for water quality testing, and a replicability study. This program promotes stewardship of the Petaluma Watershed through education and engagement. The program and website are an avenue for collaboration between local, regional, state and federal agencies involved in natural resources management, public education, infrastructure, sciences, health, transportation and more. It is also an avenue for meeting state storm water permitting requirements around public outreach and outreach to school-aged youth specifically. This would provide a clear way to track and measure students who are learning about key public policy, environmental and resource management issues.

Scope of Work

Friends will contract with West Yost Associates to develop additional layers of the Watershed Atlas, expand upon existing layers and refresh embedded information in order to ensure smooth operability of the application.

Friends staff will purchase and maintain water quality monitoring kits that will test for 9 constituents that will allow students to measure and monitor the health of the Petaluma River and feeder creeks. Kits are available for the use of participating educators with FOPR staff helping to facilitate water quality testing by training educators and supporting students.

Staff will conduct a replicability study to determine how the program can be transferred to neighboring watersheds in order to maximize the reach of watershed education using hands-on, project-based learning practices.

Task 1: Compile Data for new Watershed Atlas Layers

FOPR proposes to expand information available through existing layers (more water quality monitoring locations), and introduce approximately 3-4 additional layers to highlight climate change impacts, conservation efforts, habitat, storm water outfalls. Information will be gathered by West Yost, which will work with a consortium of agencies working in the watershed. Additional layers will link to current sources of information and include seasonal pictures of high stress areas.

Task 2: Embed new Watershed Atlas Layers & Refresh Applications

FOPR will contract with West Yost Associates to embed the data culled in Task 1 into additional layers. FOPR will also work with the web developer to refresh embedded applications to ensure all plug-ins for the Atlas are functioning properly.

Task 3: Purchase and maintain Water Quality Monitoring Kits

FOPR currently has 8 Water Quality Monitoring Kits with testing materials for about 60 tests for each of the nine constituents being monitored: Air and water temperature, dissolved oxygen, phosphates, nitrates, turbidity, pH, conductivity and salinity. With support we would be able to purchase supplies for six more kits, to give each participating school two kits, and make sure supplies are well stocked. Staff support will also allow FOPR to train and assist teachers and students in the field using the kits, ensure that the kits are stocked and reflect user best practices.

Task 4: Replicability Study

Staff will put together a plan to make the program replicable in other watersheds. Friends will conduct outreach to organizations working in neighboring watersheds to introduce the program, gauge support and interest, and address specific needs in replicating the program. Staff will create a template for other programs to use in order to introduce the program in their watershed. FOPR will engage with West Yost to explore the use of a template to allow the Watershed Atlas to be available for interested watersheds. Program staff will also work with government and agency representatives to introduce the program as an avenue to meet storm water permitting requirements in outreach and education, facilitating a partnership with the Watershed Classroom and permitted entities as well as partnerships with interested watershed organizations and permitted entities as a potential funding source.

NBWA Sponsorship

As a sponsor of the Watershed Classroom program NBWA will have their logo displayed on the Watershedclassroom.org website with a link to the organization, a presence at the Watershed Classroom Forum in April/May and regular reports from FOPR staff regarding the rollout and success of the tasks outlined above. FOPR staff would debrief NBWA staff regularly at JTC meetings and the Board of NBWA when needed, approximately once or twice a year to keep them informed and engaged in the project. This will also provide the opening for NBWA agencies and organizations to become involved in the Watershed Classroom and grow the program into adjacent watersheds.

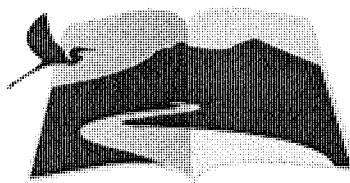
This proposal is based on funding for the Watershed Classroom in the amount of \$20,000. If additional funding becomes available in 2016, Friends could include the following deliverables and truly maximize NBWA's support in growing and strengthening the program:

- Forum/Watershed Fair open to the public to highlight student projects and give an overview of work being done in the Watershed
- Website Updates to make the Watershed Classroom website more interactive and engaging for users and the public by allowing teachers and student to directly upload work, post pictures, etc.
- Additional Watershed Atlas Updates
 - Layer outlining wildlife corridors in the Watershed
 - Layer showing impact of Watershed Classroom projects in the Watershed
 - Layer showing habitat for local and important/protected species
- A 'What Can You Do' handout that details potential projects students can take on to mitigate any negative impacts from poor water quality

Fee Estimate Summary & Deliverables

| Task | Fee Estimate | Dates of Work | Deliverable |
|--|--------------------|--------------------|---|
| Task 1: Compile Data for new layers - Subcontract with WestYost - Administrative costs | \$7,000 \$500 | February - June | - 5-7 additional water collection sites on the Atlas with pictures and qualitative information about the site. - Approximately 3-4 new layers outlining: <ul style="list-style-type: none"> • 14-16 river cleanup locations with pictures, chart of trash collected totals • habitat for endangered/protected species • climate change effects from seawater rise • storm water outflows |
| Task 1 Total | | \$7,500 | |
| Task 2: Embed new layers into Atlas - Subcontract with WestYost | \$1,500 | May - August | - Link for NBWA website to the Atlas - NBWA logo added to the Atlas as a sponsor |
| Task 2 Total | | \$1,500 | |
| Task 3: Purchase & Maintain Water Quality Monitoring Kits 1 kit includes supplies for measuring one set of tests 9 constituents - updates for 8 existing kits - 6 new kits; \$900 = approximate cost for 1 kit | \$2,400 \$5,400 | February - October | - 14 water quality monitoring kits available for loan to schools throughout the watershed and NBWA region - 3-4 data points for constituents at each of the monitoring locations |

| | | | |
|--|--------------------|----------------|---|
| - Admin costs for updating and compiling kits, training users and managing outcomes | \$500 | | |
| Task 3 Total | | \$8,300 | |
| Task 4: Replicability Study | | | |
| - Administrative costs - contractual fees to explore template for reproduction of Atlas | \$1,500 \$1,000 | June | - Replication template - Partnership with 2-3 watershed organizations interested in replicating - Storm water management curriculum to meet permitting requirements |
| Task 4 Total | | \$2,500 | |
| TOTAL ESTIMATED COSTS: \$19,800 | | | |



Watershed Classroom

2015-16 Participating Projects

Geography & Peace, Casa Grande High School

9th / 12th Grades - English and Social Studies

- Todd Siders
- Kiri Brackett

Acts of Caring, McDowell Elementary & Cherry Valley Elementary

2nd / 3rd Grades - Language Arts/Science /Social Studies/ Visual arts/ Math

- Genie Praetzel
- Gena Richman
- Liza Eichert

First Graders Becoming Stewards of Their Watershed, Grant Elementary

1st Grade - Science, Reading, Writing, Math

- Tami Jimenez
- Julia Megna

Biodiversity in Our Changing Environment, Casa Grande High School

10th Grade/ Biology/US History/ 10th English

- **Michal Buchmann**
- Kim Tay
- Leroy Lounibos
- Tom Kinney
- Kelly Holly
- Kevin Harrington

Creeks Close Up, Petaluma High School

9-12 (mostly 9) Physical Science and 11-12 AP Environmental Science

- **Lee Boyes**
- Kris Camacho
- Susan Smith
- Rachel Yannes

Ebb and Flow of the Petaluma River: The History of the Petaluma River and the Development of Petaluma, Casa Grande High School

11th Grade, History, English & Spanish 3

- **Paula Biancalana**
- Jolene Thinnes
- Maria Walker
- Amy Hendricks

Environmental Health in Our Watershed, Petaluma High School

9th/ 10th Grade, Biology & Honors Biology

- **Linda Judah**
- Kris Camacho

Invasive Species in a Watershed, Grant Elementary

5th Grade, Science, Math, Language Arts, Social Studies

- **Keith Blascow**

Liquid Gold: Understanding California's Most Precious Natural Resource, Carpe Diem, Sonoma Mountain and San Antonio High Schools

10th - 12th Grades, English, Science, History

- **Jessica Dennen**
- Jessica Morilla

Native Plant Study, Live Oak Charter

5th Grade, Botany, Ecological Studies, Language Arts

- **Lois Wildgrube**

Water Quality Monitoring, McNear Elementary

4th Grade, Biology, Community engagement, Math, Physical Education

- **Eric Norstad**
- Amy Turko

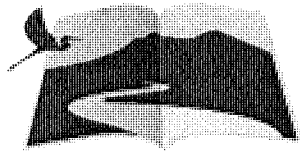
Watersheds, Casa Grande High School

9th - 12th Grades, Earth Sciences, AP Environmental Studies

- **Todd Adams**
- **Sten Mander**

Watershed Photography, Casa Grande High School
 9th - 12th Grades, Art and Photography

- **Josey Richter**



Watershed Classroom

Watershed Atlas - Water Quality Monitoring Layer Testing Kit Equipment Proposal

- PH** - PH Plastic Strip 0.0-14.0 - \$13.20 (600 tests) - Fisher Scientific
- Turbidity** - Secchi Disk - \$20.00 (re-usable) Nova Tech -
- Nitrate** - ELOS AQUA TEST KIT- NITRATE - \$26.00 (50 tests)
- Phosphate** - ELOS AQUA TEST KIT- PHOSPHATE - \$27.99 (150 tests)
- Salinity** - Instant Ocean SeaTest Hydrometer - \$14.99 (re-usable) - Marine Depot
- Dissolved Oxygen** - Salifert Dissolved Oxygen Test Kit - \$24.39 - (40 tests)(scale = 2-14mg/l) - Marine Depot
- Conductivity** - HM Digital Waterproof EC / TDS / Temp Combo Meter - \$66.99 (re-usable) - Marine Depot
- Thermometer** - Digital Temperature Monitor - \$9.98 - Home Depot
- Goggles** - 3M Chemical Splash Impact Goggle - \$2.97 x 15 (\$45) - Home Depot
- Gloves** - Latex gloves - \$10.99 (100 count)
- Tool Box** - Heavy Duty - \$25.00 (to assemble the kit)

16

DISBURSEMENTS - DATED DECEMBER 17, 2015**ITEM #16**

Date Prepared 12/15/15

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 |
|-----|-------------------------------|--|-----------|
| 1 | Able Tire & Brake | Tires (4) (Compressor - \$213 & '04 Chevy C1500 - \$341) & Front End Alignment ('04 Chevy C1500) (\$90) | \$644.20 |
| 2 | All Star Rents | Core Drill Rental for AEEP Electrical Installation | 138.63 |
| 3 | AT&T | Voice & Leased Lines | 739.81 |
| 4 | Backflow Distributors | Backflow Repair Parts | 498.45 |
| 5 | Bank of Marin | Bank of Marin Loan Principal & Interest (Pymt 50 of 240) | 46,066.67 |
| 6 | | Cafeteria Plan: Uninsured Medical Reimbursement | 783.00 |
| 7 | Bentley, David L. | Exp Reimb: Dec ACWA Conference (Indian Wells) | 1,182.63 |
| 8 | Bold & Polisner | Oct Legal Fees: Petaluma Blvd So (\$124), AEEP Caltrans Reimb B1 (\$426), AEEP Caltrans Reimb B3 (\$130), Audit Letter (\$93), Brown Act (\$93), Connection Fee (\$123), Gallagher Well #2 (\$111), Giacomini Rd Home (\$123), Marin CC Golf (\$37), Novato Creek Water Rights (\$117), Office Relocation (\$265), Potter Valley Relicensing (\$273), Water Conservation (\$123) | 2,034.00 |
| 9 | Brenntag Pacific | Sodium Hydroxide (46,020 lbs) (Balance Remaining on Contract \$9,510) | 4,591.90 |
| 10 | Burlington Safety Lab | Retest Electrical Gloves (2) | 44.55 |
| 11 | California State Disbursement | Wage Assignment Order | 859.87 |
| 12 | Cassidy, Lisa | Novato "Toilet" Rebate Program | 200.00 |
| 13 | | Vision & Uninsured Medical Reimbursement | 629.00 |
| 14 | Clipper Direct | Commuter Benefit Program (2) | 46.00 |
| 15 | Cummings Trucking | Rock (82 yds) (\$2,972) & Sand (32 yds) (\$1,680) | 4,652.69 |

| Seq | Payable To | For | Amount |
|-----|-----------------------------|---|-----------|
| 16 | DeGabriele, Chris | Exp Reimb: Birthday Lunch | 110.00 |
| 17 | Diggs, James | Retiree Exp Reimb (December Health Ins) | 966.79 |
| 18 | Digital Prints & Imaging | Vellum (40 - 24" x 36") (Lab) | 130.07 |
| 19 | Drazina, Mary Ann | Novato "Toilet" Rebate Program | 200.00 |
| 20 | Environmental Science Assoc | Prog Payment #41: RW Expansion Project (Bal Remaining on Contract \$21,943) | 9,260.68 |
| 21 | Figone, Jeffrey & Theresa | Refund Deposit/ New Development/ WC Restriction- Novato | 1,000.00 |
| 22 | Gazzano, Carol Lee | Novato "Cash for Grass" Rebate Program | 400.00 |
| 23 | Goodpaster, Stacie | Exp Reimb: Lab Filters for DI System | 39.26 |
| 24 | Goodrich, Ron | Novato "Cash for Grass" Rebate Program | 400.00 |
| 25 | Grainger | Saws (2) (\$231), Torches (2) (\$176), Fuel Cylinder (2), Chain Hooks (4) (\$408) & Rope (600') (\$153) | 981.43 |
| 26 | Groeniger | Box lids (7) (\$396), Flanges (18) (\$196), Nipples (22) (\$215), Coupling & 2" Plugs (10) | 893.59 |
| 27 | Hickey, Kevin | Refund Deposit/ New Development/ WC Restriction- Novato | 1,000.00 |
| 28 | IDI-Dupont | Parts for Chlorine Dioxide Generator (STP) (Balance Remaining on Contract \$5,672) | 1,118.37 |
| 29 | | Vision Reimbursement | 20.55 |
| 30 | Kauer, Robert | Overpayment on Closed Account | 135.08 |
| 31 | Lincoln Life | Deferred Compensation PPE 12/15/15 | 13,837.14 |
| 32 | | Childcare Reimbursement | 416.66 |
| 33 | Marin County Tax Collector | Annual Hazardous Material Inventory Permit Fee (4) | 6,285.00 |
| 34 | Marin Landscape Materials | Tarps to Mix Concrete (6) (\$137), Mason Mix, Erosion Control Waddles (3) (\$108), Stakes, Quik Mix (42 bags) (\$228), Sand (4 yds.) (\$196), Soil (3 yds.) (\$114) & Bricks (24) | 984.24 |
| 35 | Marin County Treasurer | PR-6 Revenue Bond Interest | 1,650.00 |

| Seq | Payable To | For | Amount |
|-----|--------------------------------|---|------------|
| 36 | Marin County Ford | Seat Pad (\$127) ('10 F150), Tailgate Plastic Covers & Screws ('10 F150) (\$209), Floor Mats ('08 F350 4 x 4) (\$321), Oil Filters, Air Filters, Wiper Blades (2) & Oil (7 qts) ('14 F150) (\$73) & Transfer Case Shifter Boot (\$90) | 820.66 |
| 37 | Marin County | Annual Encroachment Permit | 490.00 |
| 38 | Mauch, Susan | Overpayment on Closed Account | 143.43 |
| 39 | McLellan, WK | Repave on County Moratorium Road @ 160 Crest Rd (Balance Remaining on Contract \$518) | 5,444.46 |
| 40 | | Cafeteria Plan: Uninsured Medical Reimbursement | 569.69 |
| 41 | Mello, John | Retiree Exp Reimb (December Health Ins) | 895.35 |
| 42 | Michael Baker International | Final Payment: Stafford Dam Emergency Action Plan (Total Project Cost \$89,898) | 5,074.84 |
| 43 | Miller Pacific Engineering | Atherton Tank Recoat Pavement Design (Balance Remaining on Contract \$74,199) | 1,997.00 |
| 44 | Mitchell, Russ & Associates | RW Central Area Expansion Design Work | 5,000.00 |
| 45 | Montero, David | Novato "Toilet" Rebate Program | 100.00 |
| 46 | Moore, Doug | Retiree Exp Reimb (December Health Ins) | 895.35 |
| 47 | Moore-Arauz, Kristie | Novato "Cash for Grass" Rebate Program | 200.00 |
| 48 | Nann, Penny | Novato "Toilet" Rebate Program | 200.00 |
| 49 | Nationwide Retirement Solution | Deferred Compensation PPE 12/15/15 | 1,900.00 |
| 50 | New Pig | All Purpose Towels for Spills (18 pks) (STP) | 306.00 |
| 51 | NMWD SRF Loan Account | STP State Revolving Fund Annual Loan Principal & Interest | 574,460.90 |
| 52 | North Bay Gas | Carbon Dioxide, Welding Gas (\$131), Migwelder Wire (2lbs), Carbon Dioxide Dip Tube, Nitrogen (\$98) & Nov Cylinder Rental | 385.63 |
| 53 | NMWD Employee Association | Dues (10/15-11/30/15) | 935.00 |
| 54 | Novato Disposal Service | Novato Trash Removal | 432.54 |
| 55 | Novato Development LLC | Overpayment on Closed Account | 112.46 |

| Seq | Payable To | For | Amount |
|-----|--------------------------------|---|-----------|
| 56 | Novato Chevrolet | Steering Column Bearing & Seatbelt, Lower Seat Foam & Cover ('04 Chevy C1500) (\$431) | 463.41 |
| 57 | O'Reilly Auto Parts | Diesel Engine Oil (17 gal) (\$259) & Washer Fluid (6 gal) | 276.17 |
| 58 | Pace Supply | Valve Key (2) (\$358), Bolts (16), Plugs (2), Corp Stop (20) (\$833), Foam Swabs (2), Meter Spuds (40) (\$470), 4" Spool (\$297), Elbows (2), Service Saddle (4) (\$179), Corp Stops (3) (\$606) & Valves (3) (\$1,255) | 4,099.97 |
| 59 | Patrone, Shirley | Novato "Toilet" Rebate Program | 200.00 |
| 60 | PES Environmental | Prog Payment #2: Groundwater Exploration @ Gallagher & Osborn Ranches (Balance Remaining on Contract \$34,381) | 18,479.79 |
| 61 | Peterson Trucks | Batteries (2) & Core Deposits (2) ('15 Int'l 5 Yd Dump) | 218.55 |
| 62 | Pini Hardware | O.M. Counter Box, Window Squeegee, Photo Battery, Softsoap Refill (56oz), Filter Bags (5), Shovels (6) (\$218), Couplings (18), PVC Caps (24), Adaptors (2), Ant Bait, Mouse Traps (Front Office), Roll Pins (3) & Caulk Tubes (6) (10oz), Measuring Container (1qt), Cleaner & | 426.66 |
| 63 | | Cafeteria Plan: Childcare Reimbursement | 208.33 |
| 64 | | Cafeteria Plan: Uninsured Medical & Childcare Reimbursement | 286.80 |
| 65 | Roger, Joseph | Engineering Services: Water Pipe to be Installed Under Novato Creek Bridge | 2,220.00 |
| 66 | Sebastopol Bearing & Hydraulic | Side Bound Latches for Flatbed | 58.06 |
| 67 | Sequoia Safety Supply | Earplugs (600) (\$97), Lens Wipes (300) (\$65), Ibuprofen (300), Safety Glasses (12) & Safety Gloves (24) | 289.04 |
| 68 | Shirrell Consulting Services | November Dental Expense | 8,891.01 |
| 69 | Sokolowski, Frank | Novato "Washer" Rebate Program | 50.00 |
| 70 | South Bay Foundry | 6" Valve Caps (43) | 808.94 |
| 71 | Staples Business Advantage | Label Maker | 38.14 |
| 72 | SWRCB Accounting Office | FY15 Recycled Water System Annual Fee | 7,114.50 |

| Seq | Payable To | For | Amount |
|-----|----------------------------------|--|----------------------------|
| 73 | Streakwave Wireless | 2 Radios & Antennas-Link School Rd Pump Station to Crest Tank | 575.22 |
| 74 | Sullivan, Ellis | Novato "Washer" Rebate Program | 50.00 |
| 75 | TelePacific Communications | Telephone Charges (Nov) | 572.21 |
| 76 | Thatcher Company of California | Ferric Chloride (10 tons) (STP) | 4,834.29 |
| 77 | Ultra Scientific | Mineral Samples (3) (Lab) | 220.35 |
| 78 | Univar | Sodium Hypochlorite (OM) (412 gal) | 260.62 |
| 79 | US Bank | Nov Safekeeping Fee-Treasury Securities | 83.25 |
| 80 | US Postal Service | Postage | 1,000.00 |
| 81 | Vali Cooper & Associates | Progress Pymt #20: Construction Management Services for AEEP Reaches A-D MSN B3 Project (Balance Remaining on Contract \$55,718) | 38,241.60 |
| 82 | Verizon California | Leased Line | 876.71 |
| 83 | Verizon Wireless | Cellular Charges: Data (\$111) & Airtime (\$109) (19) | 220.27 |
| 84 | Visse, Joseph | Novato "Washer" Rebate Program | 50.00 |
| 85 | Waste Management | Misc Debris | 231.52 |
| 86 | Yamagata, Kyle | Novato "Washer" Rebate Program | 50.00 |
| 87 | | Cafeteria Plan: Uninsured Medical Reimbursement | 1,666.74 |
| 88 | ZSI Automation & Control Systems | Assess & Document STP PLC Network | 8,098.38 |
| | | TOTAL DISBURSEMENTS | <u>\$804,464.10</u> |

| Seq | Payable To | For | Amount |
|-----|------------|-----|--------|
|-----|------------|-----|--------|

The foregoing payroll and accounts payable vouchers totaling \$804,464.10 are hereby approved and authorized for payment.



Auditor-Controller

12/15/15

Date



General Manager

12/15/2015

Date

DISBURSEMENTS - DATED DECEMBER 24, 2015

Date Prepared 12/22/15


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 12/15/15 | \$126,802.12 |
| EFT* | US Bank | Federal & FICA Taxes PPE 12/15/15 | 49,833.72 |
| EFT* | State of California | State Taxes & SDI PPE 12/15/15 | 8,892.12 |
| EFT* | US Bank | November Bank Analysis Charge (Lockbox \$912, Credit Card Processing \$647 & Other \$568) (Less Interest Credit of \$139) | 1,987.98 |
| 1 | Accounting Unit, Department of Toxic Substances Control | Annual Hazardous Waste Manifest Verification Fee | 157.50 |
| 2 | All Star Rents | Tractor Rental (1 Day) (Chevron Car Wash) | 312.44 |
| 3 | Alpha Analytical Labs | Lab Testing (Pt. Reyes & Novato) | 1,957.00 |
| 4 | Athens Administrators | Replenishment for Checks Written (Venegas) | 156.25 |
| 5 | AT&T | Leased Line | 33.28 |
| 6 | Backflow Distributors | Freeze Protection Cover Bags (6) | 421.17 |
| 7 | Banghart, Rick | Novato "Hot Water Recirculation System" Rebate Program | 75.00 |
| 8 | Bergamini, Doris | Novato "Toilet Rebate" Program | 300.00 |
| 9 | Buck's Saw Service | Replacement Cut Off Saw (\$1,264) & Stroke Oil (2) (6.4oz) | 1,295.42 |
| 10 | | Vision & Cafeteria Plan: Uninsured Medical Reimbursement | 711.80 |
| 11 | Cel Analytical | Lab Testing | 473.00 |
| 12 | Clean Waste | Brief Relief Urine Bags (300) | 306.00 |
| 13 | CSW/Stuber-Stroeh Engineering | Prog Pymt#33: Marin Sonoma Narrows AEEP Project (Bal Remaining on Contract \$6,902) | 12,744.00 |

| Seq | Payable To | For | Amount |
|-----|--------------------------------|---|----------|
| 14 | Dezwarte, Marcia | Novato "Washer Rebate" Program | 50.00 |
| 15 | Dowden, John | Novato "Cash for Grass" Rebate Program | 400.00 |
| 16 | Emerson, William | District Share of \$1,250 Cost to Seal Portion of Road to Pt Reyes Tank Site | 250.00 |
| 17 | Environmental Express | Standards (5) (Lab) | 212.22 |
| 18 | Fotchman, L | Refund Overpayment on Open Account | 870.11 |
| 19 | Grainger | Grate Hook (26") (\$52), Adjustable Wrench, Sledge Hammer & Handle & Fluid Evacuator & Grease Gun (\$305) | 435.36 |
| 20 | Harrington Industrial Plastics | Sodium Chlorite Valve | 148.34 |
| 21 | InfoSend | November Processing Fee for Water Bills (\$1,451) & Postage (\$4,247) | 5,697.92 |
| 22 | Jossart, Gregg | Novato "Washer Rebate" Program | 50.00 |
| 23 | Layton, Janie | Novato "Washer Rebate" Program | 50.00 |
| 24 | | Childcare Reimbursement | 208.33 |
| 25 | McLellan, WK | Repave on County Moratorium @ 370 School Rd (Balance Remaining on Contract \$1,588) | 1,251.60 |
| 26 | Office Depot | Cover Stock (2) | 78.41 |
| 27 | Pace Supply | Fire Check Assembly (\$1,303), Bolt (14), Valve (\$406), Tapping Sleeves (2) (\$951) & Caps (15) | 3,064.99 |
| 28 | Parkinson Accounting Systems | November Accounting Software Support | 97.50 |
| 29 | Parker, Ralph | Overpayment on Closed Account | 37.47 |
| 30 | Peterson Trucks | Batteries (3) (\$433) & Core Deposits (3) ('02 Int'l 5 Yd Dump) (\$272) | 705.74 |
| 31 | Pridemore, Steven | Novato "Cash for Grass Rebate" Program | 400.00 |
| 32 | Ramudo, Pablo | Exp Reimb: ACWA Fall Conference Registration (12/1-12/3) | 1,836.45 |
| 33 | | Cafeteria Plan: Uninsured Medical & Vision Reimbursement | 527.00 |

| Seq | Payable To | For | Amount |
|----------------------------|-------------------------------|--|----------------------------|
| 34 | Sequoia Safety Supply | Jackets (2) | 127.42 |
| 35 | State Water Resources Control | RW-S PH1A-SRF (\$65,599) & RW-S PH1B-SRF Loan Principal & Interest (\$166,575) | 232,173.86 |
| 36 | Stiveson, Dixie | Novato "Toilet Rebate" Program | 300.00 |
| 37 | Stompe, Brad | Exp Reimb: Bagels, Pizza (\$54) for Safety Meeting & Bridge Toll | 86.36 |
| 38 | | Cafeteria Plan: Uninsured Medical Reimbursement | 115.24 |
| 39 | Syserco | Service on HVAC Controller | 736.00 |
| 40 | Teeters & Schact | Repair & Recover Bench Seat ('08 F350 4x4) | 1,418.00 |
| 41 | Telstar Instruments | Annual On-Site Flow Meter Calibration (O.M.) | 1,175.00 |
| 42 | Thomas Scientific | Safety Gloves (Lab) | 162.03 |
| 43 | Tiscornia, David | Novato "Waher Rebate" Program | 50.00 |
| 44 | Township Building Services | November Janitorial Services | 1,822.84 |
| 45 | Verizon California | Leased Line | 161.59 |
| 46 | Water Education Foundation | Membership Dues (DeGabriele) (1/16-12/16) (Budget \$140) | 140.00 |
| 47 | Wiley Price & Radulovich | Venegas Claim | 2,311.88 |
| 48 | Zenith Instant Printing | Ultra High Efficiency Toilet Forms (50) | 37.06 |
| TOTAL DISBURSEMENTS | | | <u>\$463,647.52</u> |

The foregoing payroll and accounts payable vouchers totaling \$463,647.52 are hereby approved and authorized for payment.

For  Date 12/21/15

 Date 12/21/2015

DISBURSEMENTS - DATED DECEMBER 31, 2015

Date Prepared 12/29/15

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 .

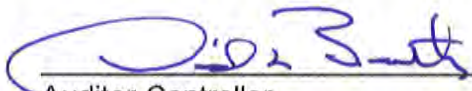
| <u>Seq</u> | <u>Payable To</u> | <u>For</u> | <u>Amount</u> |
|------------|------------------------------------|--|---------------|
| 1 | Aberegg, Michael | Drafting Services: RW Central Service Area East & Norman Tank (Balance Remaining on Contract \$18,735) | \$3,355.00 |
| 2 | Accelerated Technologies Labs | Technical Support for Upgraded LIMS System (12/15-12/16) | 5,551.89 |
| 3 | ACWA | Annual Agency Dues (DeGabriele) (Budget \$17,340) (1/16-12/16) | 16,955.00 |
| 4 | ADTS | Annual Drug & Alcohol Testing Compliance Program (11 Employees) | 836.00 |
| 5 | Allied Heating & Air Conditioning | Boiler & Hot Water Heater Replacement (Front Office) | 29,664.00 |
| 6 | Alpha Analytical Labs | Lab Testing | 144.00 |
| 7 | American Family Life Ins | Dec Employee Contribution for Accident, Disability & Cancer Insurance | 3,877.60 |
| 8 | A.S.T.I. | Backflow Testing (54) | 5,425.00 |
| 9 | Athens Administrators | Jan Workers' Comp Admin Fee | 1,000.00 |
| 10 | AT&T | Leased Line | 33.28 |
| 11 | AT&T | Data Lines | 440.17 |
| 12 | Automation Direct | Network Switch for Construction Office | 174.00 |
| 13 | Battle Born Media (Novato Advance) | Subscription Renewal (DeGabriele) (9/15-8/16) (Budget \$50) | 49.00 |
| 14 | Bay Area Barricade Service | Marking Paint (72-17oz cans) (\$284) & Visqueen (20'x100') (\$112) | 396.21 |
| 15 | Borges & Mahoney | Chlorine Feed Vacuum Regulator (\$546), Chlorine Injector Kit (2) (\$575) & Labor (\$494) (STP) | 1,615.60 |
| 16 | Buckeye Nursery | Replacement Plants for Demo Garden | 38.97 |


| Seq | Payable To | For | Amount |
|-----|-------------------------------|---|----------|
| 17 | California State Disbursement | Wage Assignment Order | 859.87 |
| 18 | Calpico | Cathodic Protection Grounding Clamps (400) | 1,264.40 |
| 19 | CDW-Government | Battery Backups for Reception Area Computers (2) | 212.55 |
| 20 | Comcast | Dec Office Internet Connection | 149.02 |
| 21 | Core Utilities | Consulting Services: November IT Support (\$5,000), Program Two SCADA Radios (\$225), Troubleshoot O.M. Lift Station Signal Problem (\$250) & PRTP Lag Well Problems (\$175), Resolve Epay Import Problem (\$225), Website Maintenance (\$425), Add Customer Billing History to Website (\$900), Revise Website to Display in Multiple Languages (\$800) & Resolve PCI Compliance Problem (\$225) | 8,225.00 |
| 22 | Corner Office | Front Office Desk Furniture (Solar & Atkinson) (Budget \$5,350) | 5,052.02 |
| 23 | Costco Membership | Annual Membership Dues (DeGabriele) (1/16-12/16) (Budget \$110) | 110.00 |
| 24 | Dell Computers | Replacement Laptop (\$726) (Bentley) & Replacement PC's (\$1,436) (Clark & Ladd) | 2,162.60 |
| 25 | Environmental Express | Standard & Endo Broth (\$88) (Lab) | 132.41 |
| 26 | Evoqua Water Technologies | Service on Deionization System (Lab) | 307.00 |
| 27 | Golden Gate Petroleum | Gas (\$2.26/gal) & Diesel (\$2.24/gal) | 839.13 |
| 28 | Grainger | Folding Table for Construction Crew PC's (60" x 29") (\$223), Tap Handle, Pulsation Dampener & Timer Day Relay (\$72) (Less Credit of \$184 for Returned Tool) | 149.54 |
| 29 | Groeniger | Box Lids (3) (\$170), Flange, Hydrant Extension (\$100), Nipple, Couplings (26) (\$354) & 4" Valve (\$490) | 1,169.57 |
| 30 | Irish & Son Welding | Welding Services | 720.00 |
| 31 | Jim-n-i Rentals | Steel Plate Rental (2 Weeks) (Chevron Car Wash) | 257.64 |
| 32 | Kaiser Foundation Health Plan | DMV/Dot Physical (Castellucci) | 115.00 |

| Seq | Payable To | For | Amount |
|-----|---|--|------------|
| 33 | Larsengines | Replacement 3000 Watt Portable Generator ('06 Int'l 4300 Crew) | 2,367.43 |
| 34 | McLellan, WK | Misc Paving | 4,400.70 |
| 35 | McInnis Park Golf Center | Food & Gratuity for Holiday/Retirement Party | 4,498.66 |
| 36 | McKernan, Lillian | Refund Overpayment on Closed Account | 171.84 |
| 37 | McMaster-Carr Supply | 5" Wall Louver | 48.13 |
| 38 | Mutual of Omaha | Jan Group Life Ins Premium | 836.56 |
| 39 | Neopost USA | December Postage Meter Rental | 85.92 |
| 40 | Pape Machinery | Heater Fan Motor Switches (2) | 88.65 |
| 41 | Peterson Trucks | Alternator ('06 Int'l 4300 Crew) (\$200) & Oil Filters | 245.73 |
| 42 | PG&E | Electric Bill for 25 Giacomini Rd (11/11-12/10/15) | 14.08 |
| 43 | Plasencia, Veronica | Overpayment on Closed Account | 85.06 |
| 44 | Point Reyes Prop Mgmt Assn | Dec HOA Fees (25 Giacomini Rd) | 75.05 |
| 45 | Ryder Novato Invest | Overpayment on Closed Account | 10.07 |
| 46 | Self-Insurance Plans (CA Dept Industrial Relations) | Self-Insured Workers' Comp Annual Assessment | 2,945.83 |
| 47 | Shamrock Materials | Controlled Density Fill (15 cu yds) (Chevron Car | 1,690.08 |
| 48 | Shirrell Consulting Services | December Dental Insurance Admin Fee | 288.15 |
| 49 | Sonoma County Water Agency | November Contract Water | 136,684.11 |
| 50 | SPG Solar | November Energy Delivered Under Solar Services Agreement | 8,062.05 |
| 51 | SRT Consultants | Prog Payment #9: Taste & Odor Control Strategy (Balance Remaining on Contract \$242) | 5,390.00 |
| 52 | Streakwave Wireless | Radio Antenna (Linking School Road P/S to | 242.92 |
| 53 | State Water Resources Control Board | Water Distribution Certification Test Fee (Ochoa \$30 & Barrilleaux \$50) | 80.00 |

| Seq | Payable To | For | Amount |
|----------------------------|------------------------|---|----------------------------|
| 54 | Syar Industries | Asphalt | 728.09 |
| 55 | Tamagno Green Products | Sludge Removal (STP) (102 yds) | 2,550.00 |
| 56 | The Transmitter Shop | Recondition Tank Level Transmitters (\$895) & Add Surge Suppressors | 1,491.00 |
| 57 | Verizon California | Leased Lines | 491.91 |
| 58 | White & Prescott | Engineering Services Support: Ravicz Water Line Easement (Balance Remaining on Contract \$16,230) | 135.00 |
| TOTAL DISBURSEMENTS | | | <u>\$264,988.49</u> |

The foregoing payroll and accounts payable vouchers totaling \$264,988.49 are hereby approved and authorized for payment.

 12/29/15
 Auditor-Controller Date

 12/29/2015
 General Manager Date

MEMORANDUM

December 31, 2015

To: Board of Directors
From: Alicia Manzoni, Consumer Services Supervisor
Subject: Meter Reading Accuracy
\\nmwdsrv1\administration\cons srvc\letters\dmc summary 2015.doc

RECOMMENDED ACTION: None - Information Only

FINANCIAL IMPACT: None

North Marin Water District's Field Service Representatives read 127,019 meters from December 1, 2014 to November 30, 2015. When tallying misreads versus meters read over the past 12 months, we found that the reading error rate was 0.31% (391 misreads) or, stated positively, a 99.69% accuracy rate.

In comparison to other water utilities, East Bay Municipal Utility District claims their accuracy rate is 99.6%, San Jose Water reports 99.90% and MMWD reports 99.99%.

Our FSR's do make an effort to read each meter accurately. We strive to be accurate and our FSR's do a good job. We utilized the services of two temp meter readers during the absence of a regular FSR due to industrial injury, which reduced the 2015 accuracy rate. Chris Frazer was hired in May 2015 as a full time FSR. Now that we have 3 full time FSR we will strive to increase our meter reading accuracy.

| | 2012 | 2013 | 2014 | 2015 |
|--------------------------|---------|---------|---------|---------|
| Meters Read ¹ | 126,626 | 128,890 | 128,642 | 127,019 |
| Misreads | 150 | 157 | 241 | 391 |
| Accuracy Rate | 99.88% | 99.88% | 99.81% | 99.69% |

¹ Meters read varies based on cycles included from year to year.



THE CITY OF
NOVATO
CALIFORNIA

922 Machin Avenue
Novato, CA 94945
415/899-8900
FAX 415/899-8213
www.novato.org

Mayor
Pat Eklund
Mayor Pro Tem
Denise Athas
Councilmembers
Pam Drew
Josh Fryday
Eric Lucan

City Manager
Michael S. Frank

RECEIVED

DEC 28 2015

North Marin Water District

Chris DeGabriele
General Manager
North Marin Water District
P.O. Box 146
Novato, CA 94948

December 22, 2015

Dear Chris,

On behalf of the City of Novato, we want to extend our sincere appreciation to you and your Board for working in partnership with the City for so many years exploring the redevelopment of your current headquarters site. As one of the most visible entrances to Downtown Novato, many City Councils have had the desire to redevelop your site along with the bus yard for retail and commercial uses.

With the State's elimination of Novato's Redevelopment Agency, what was already a complex challenge becomes even more difficult. I completely understand your Agency's need to move forward with short and long term planning and improvements to your headquarters. As you can imagine, the City is not in a position to compensate your agency.

City staff is hopeful, however, that with the recovering economy, private sector interest in your site might result in options that would enable your organization to seriously consider relocating. We hope that you and the District will continue to be open to dialog with developers like BlackPoint Group Inc. about their potential interest in buying your property and redeveloping it for private sector commercial uses.

Thank you again for what has been many years of patience on your part. I have asked Chris Stewart, our Economic Development Manager, to continue to be in contact with you and your organization to facilitate any opportunities that may surface prior to final decisions or facility improvements made by NMWD.

Happy holidays and best wishes.

Sincerely,

Michael S. Frank
City Manager

From: ACWA <acwabox@acwa.com>
Sent: Tuesday, December 15, 2015 9:46 AM
To: Chris DeGabriele
Subject: Local Government Coalition Files Constitutional Amendment



Dec. 15, 2015

Local Government Coalition Files Constitutional Amendment

Measure Would Create New Optional Funding Mechanism Local Agencies Could Use to Fund Stormwater Capture and Flood Control Projects and Establish Conservation-Based Rates or Lifeline Rates

A coalition including ACWA, the California State Association of Counties and the League of California Cities has filed a constitutional amendment that would create a new, optional funding method local agencies could use at their discretion to finance stormwater, flood control and other water-related projects and pursue conservation-based water rates or lifeline rates for low-income households.

The measure, which was submitted to the Attorney General's office on Dec. 14 for title and summary as a potential statewide ballot initiative, is designed to enhance the ability of local agencies to finance stormwater capture and flood control infrastructure, provide more flexibility for the voluntary establishment of conservation-based rates, and to allow agencies, at their discretion, to implement lifeline rates for low-income households. The measure as submitted is available on the Attorney General's website [here](#).

Specifically, the measure would amend Article X of the California Constitution to create the optional mechanism, which local agencies would not be required to utilize. It includes strict accountability and transparency requirements for any local agency that chooses to avail itself of the new funding method.

Article X of the state Constitution deals specifically with management of the state's water supplies. The proposed amendment seeks to create an optional funding method in Article X while at the same preserving the ability for public agencies to continue establishing rates under existing law found in Article XIII D. The proposal is structured to maximize the discretion of local agencies to set rates that work for their constituencies.

Next Steps

Now that the proposed measure has been filed, the coalition has 30 days to submit any changes. Coalition

members will make a determination in the coming months whether to proceed with the measure.

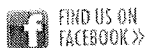
The coalition also intends to pursue a legislative strategy in early 2016 as well to preserve all options. ACWA's State Legislative Committee will review and consider any legislative proposals that emerge in early 2016.

In addition, an ACWA Board-level advisory committee is providing guidance to staff on the proposed initiative. The State Legislative Committee's Article X measure working group has been reviewing language.

Questions

ACWA members may direct questions to ACWA Deputy Executive Director for Government Relations Cindy Tuck at 916-441-4545 or cindy@acwa.com.

Leadership | Advocacy | Information | Service
www.acwa.com



We hope you enjoy receiving email notices and updates from ACWA.
At any time you can unsubscribe or update your email preferences [here](#).
910 K Street, Ste. 100 • Sacramento, CA 95814



nonprofit software

**The California Water Conservation, Flood Control
And Stormwater Management Act of 2016**

SECTION 1. Title

This measure shall be known as the California Water Conservation, Flood Control and Stormwater Management Act 2016

SECTION 2. Findings, Declarations and Purposes

- A. California's historic drought and the likelihood that climate change will increase the severity of droughts and heavy floods mean California must provide local communities with the tools to further encourage conservation and discourage excessive use of water; to effectively manage and increase water supplies; to capture, clean and eliminate pollution from local water sources; and to better protect people and property from the dangers of floods.
- B. Effective local management of water supplies includes authorizing local agencies to design rates to encourage water conservation and discourage excessive use of water.
- C. Local agencies should also invest in infrastructure to capture and clean water polluted by toxic chemicals and trash; recycle and reuse rainwater and stormwater runoff; and to prevent toxic stormwater and urban runoff from contaminating sources of drinking water, including rivers, lakes, streams, and groundwater, and polluting beaches, coastal waters, and wetlands.
- D. California must also improve local flood control by better capturing and managing storm and flood waters and upgrading storm drains, sewer and drainage systems to protect properties from floods and increase local supplies of water available for public use.
- E. Existing state laws governing the funding of local water supplies, clean water, water conservation and resource management, and floodwater protection were not developed with California's current water realities in mind.
- F. An alternative method for funding critical local water supplies, water quality, water conservation and resource management, and flood protection projects is needed.
- G. This measure establishes an alternative funding method that authorizes local agencies to:

- i. Set rates for customers to encourage water conservation, prevent waste, and discourage excessive use of water.
- ii. Levy fees and charges, subject to ratepayer protest, for flood control and for management of stormwater to protect coastal waters, rivers, lakes, streams, groundwater and other sources of drinking water from contamination.
- iii. Use fees and charges to reduce water, and sewer fees and charges for low-income customers.

H. Any local agency that utilizes this alternative funding method for water service and sewer service should be required to adhere to strict accountability, transparency and ratepayer protections. This includes:

- i. Providing local ratepayers with a description of the need for the proposed fee or charge and the projects and purposes projected to be funded by any proposed fee or charge in advance of any public hearing or consideration of the fee or charge;
- ii. Posting the description of the proposal on the agency's Internet website with all applicable exhibits;
- iii. Providing local ratepayers a notice of the date and time of the public hearing the local agency will hold on the proposed fee and charges;
- iv. If written protests against the fee or charge are presented by a majority of persons to whom the local agency sent the notice about the proposal then the local agency shall not impose, increase or extend the fee or charge;
- v. All money must be spent for the local purpose for which the fee or charge was imposed and cannot be taken by state government;
- vi. Revenues derived from the fee or charge shall not exceed the reasonable cost to the local agency of providing the water or sewer service or be used for any purpose other than that for which it was imposed;
- vii. The manner in which the costs are allocated to a fee payor shall bear a fair or reasonable relationship to the fee payor's burden on or benefits received from the water service or sewer service;
- viii. The initiative power of voters may be used to repeal or reduce the fee or charge in the future with the filing of a petition calling for an election on the question;
- ix. Independent annual audits shall be made available to the public showing how all funds are spent.

I. This new funding method will allow local agencies to invest in the water supplies, water quality, flood protection and water management and conservation programs we need, while guaranteeing a high level of accountability and ratepayer protections.

SECTION 3. Section 8 is hereby added to Article X of the California Constitution to read as follows:

SEC. 8 Water and Sewer Service

(a). Alternative funding method. This section provides alternative procedures and requirements for funding water service and sewer service independent of any other procedures and requirements in this Constitution for funding these services.

(1) A local agency that adheres to the procedures and requirements of this section, including the strict accountability requirements to protect local ratepayers, may use at its discretion, the provisions of this section instead of any other procedures or requirements in this Constitution for funding the cost of providing water service and sewer service only if undertaken voluntarily and at the sole discretion of the local agency.

(2) The revenues derived from the fees or charges imposed in accordance with this section may only be used by the local agency that imposed, increased or extended the fee or charge, and like other fees or charges imposed, increased or extended by local agencies, the Legislature is prohibited from reallocating, transferring, borrowing, appropriating, restricting the use of, or otherwise using the proceeds of such fees or charges.

(b) Definitions. As used in this section:

(1) "Fee" or "charge" means any levy other than an ad valorem tax, a special tax, or an assessment, imposed by an agency upon a parcel or upon a person as an incident of property ownership, including a user fee or charge for water service or sewer service having a direct relationship to property ownership.

(2) "Local agency" means any city, county, city and county, including a charter city or county, special district, or any other local or regional governmental entity.

(3) "Property ownership" shall be deemed to include tenancies of real property where tenants are directly liable to pay the fee or charge.

(4) "Sewer service" means any system of public improvements, facilities, projects, or services for the collection, conveyance, conservation, drainage, disposal, recycling or treatment of stormwater, flood water, dry weather runoff, sewage or waste to: (A) conserve and protect sources of drinking water, such as rivers, lakes, streams and groundwater, or the environment, such as beaches, coastal waters, and wetlands, from toxic chemicals, biological contaminants, and other pollutants; (B) protect public health and safety; (C) reduce the risk of flooding of public or private property; or (D) comply with federal or state laws, rules, and regulations.

(5) "Water service" means any system of public improvements, facilities, projects or services intended to provide for the production, management, storage, supply, treatment, recycling, conservation or distribution of water from any source.

(c) Requirements for new, increased or extended fees or charges. A fee or charge for water service or sewer service shall not be imposed, increased, or extended by a local agency pursuant to this section unless it meets all of the following requirements:

(1) Revenues derived from the fee or charge shall not exceed the reasonable cost to the local agency of providing the water service or sewer service.

(2) Revenues derived from the fee or charge shall not be used for any purpose other than that for which the fee or charge was imposed.

(3) The manner in which the costs of the water service or sewer service are allocated to a fee payor shall bear a fair or reasonable relationship to the fee payor's burden on or benefits received from the water service or sewer service.

(d) Conservation fee or charges; low-income households. A local agency that imposes, extends, or increases a fee or charge pursuant to this section may do either or both of the following:

(1) Allocate the cost of water service or sewer service through a rate structure reasonably designed to encourage water conservation and resource management in furtherance of the policy established in section 2;

(2) Increase the amount of a fee or charge to derive revenues that do not exceed the reasonable cost of reducing such fee or charge for lower-income households.

(e) Notice, public hearing and majority protest. A local agency shall comply with the procedures of this subdivision in imposing, increasing, or extending a fee or charge for water service or sewer service pursuant to this section:

(1) The local agency shall provide written notice by mail of the new fee or charge or the proposed increase in or extension of an existing fee or charge to the fee payor listed in the local agency's billing, or customer service records or other appropriate records. If the fee or charge is or will be imposed on a parcel, the local agency shall provide written notice to the record owner as provided in paragraph (4). The local agency may include the notice in the agency's regular billing statement for the fee or charge to the person at the address to which the agency customarily mails the billing statement for water service or sewer service. If the customer is billed only electronically, the agency shall provide notice by mail.

(2) The notice required by paragraph (1) shall include the amount of the fee or charge proposed to be imposed on the recipient of the notice or the basis upon which the amount of the fee or charge will be calculated, together with the date, time and location of the public hearing on the fee or charge. The notice also shall state that if written protests against the fee or charge are presented by a majority of persons to whom the local agency sent the notice required by paragraph (1), then the local agency shall not impose, increase or extend the fee or charge.

(3) The notice required by paragraph (1) shall include a general description of the services, facilities and improvements projected to be funded with the proceeds derived from the new fee or charge or proposed increase in, or extension of the fee or charge. A more complete description of the projected services, facilities and improvements, including any applicable exhibits, shall be made available at an accessible location and on the local agency's Internet website.

(4) If the local agency desires to preserve any authority it may have to record or enforce a lien on the parcel to which service is provided, the local agency shall also mail notice to the record owner's address shown on the last equalized assessment roll if that address is different than the billing address.

(5) The local agency shall conduct a public hearing upon the proposed fee or charge not less than 45 days after mailing the notice required by paragraph (1). At the public hearing, the local agency shall consider all oral and written protests against the fee or charge. If written protests against the fee or charge are presented by a majority of persons to whom the local agency sent the notice required by paragraph (1), then the local agency shall not impose, increase or extend the fee or charge. One written protest per service address shall be counted in calculating a majority protest pursuant to this paragraph.

(f) Burden of proof. The local agency bears the burden of proving by a preponderance of the evidence that the amount of a fee or charge for water service or sewer service is no more than necessary to cover the reasonable costs of the water service or sewer service, and that the manner in which those costs are allocated to a payor bear a fair or reasonable relationship to the payor's burden on, or benefits received from, the water service or sewer service. A fee or charge levied pursuant to and in compliance with this section is not a tax

(g) Initiative power for fees or charges. Notwithstanding any other provision of this Constitution, including, but not limited to Sections 8 and 9 of Article II, the initiative power shall not be prohibited or otherwise limited in matters of reducing or repealing any fee or charge for water service or sewer service adopted, increased or extended pursuant to this section. The power of the initiative to affect such fees or charges shall be applicable to all local agencies and neither the Legislature nor any local government charter shall impose a signature requirement higher than that applicable to statewide statutory initiatives.

(h) Mandatory audit. Any local agency that approves a fee or charge for water service or sewer service in accordance with this section shall cause to be prepared an independent financial audit of the receipt and expenditure of the revenues derived from the fee or charge. Such an audit may be part of a comprehensive audit of the agency's finances, but the audit shall identify the revenues received and expended in accordance with this section with sufficient clarity to help ratepayers compare the use of the funds to the description provided in paragraph (3) of subdivision (e).

SECTION 4. Severability

If the provisions of this act, or any part thereof, are for any reason held to be invalid or unconstitutional, the remaining provisions shall not be affected, but shall remain in full force and effect and to this end the provisions of this act are severable.

SECTION 5. Conflicting Measures

It is the intent of the people that in the event that this measure and another measure relating to the establishment of an alternative method of imposing, increasing, or extending fees or charges to fund water service or sewer service appear on the same statewide election ballot, the provisions of the other measure or measures shall be deemed to be in conflict with this measure, and if approved by the voters, this measure shall take effect notwithstanding.

SECTION 6. Liberal Construction

The provisions of this act shall be liberally construed in order to effectuate its purposes and the intent of the voters to provide local agencies alternative procedural and substantive requirements for imposing fees and charges for water service and sewer service from those otherwise found in the Constitution.

Marin Voice: Sustainability is lesson of state's drought

Assemblyman Marc Levine (Alan Dep/Marin Independent Journal)

By Marc Levine

POSTED: 12/27/15, 2:54 PM PST | 5 COMMENTS

California is in the midst of a historic drought, which in a climate change world is a hint of what's to come. The consequences are tremendous as communities thirst for drinking water, environmentally sensitive areas are in danger of irreparable harm, farmlands lay fallow, and business models are drastically changed.

The potential for El Niño rains may bring us short-term relief, but may also create a false sense of water security. We simply cannot rely on El Niño to solve California's water problems.

California's current water system was built on the flawed premise that we'll always have an abundance of water. We just need to capture it, store it, transport it, and turn the tap.

Based on that premise, our water system bends nature to meet our unyielding needs.

This approach is unsustainable and must change as water is anything but plentiful. And El Niño may not bring enough rain when and where it is needed most.

Fortunately, there are great lessons learned from other nations that faced similar challenges and developed effective responses.

Australia survived its worst drought on record by reusing water, reducing usage and finding new sources of water. Its drought lasted more than 10 years.

In Israel, the reality is that there is never enough water. To provide a sustainable water supply, Israel relies on recycling, conservation and innovative technologies. Israel treats 80 percent of its wastewater (400 billion liters a year). All of that treated water is reused as irrigation water for agriculture and public works.

These nations made water sustainability their top priority. California is charting a similar course.

To begin with, California voters approved a historic water bond to provide \$7.545 billion for water projects and programs. As chair of the Assembly Committee on Water, Parks, and Wildlife, I held a hearing a few months ago to oversee how these bond dollars are being spent. The committee will hold another hearing in January.

Please visit <http://awpw.assembly.ca.gov> for more information about how you can participate.

The path we take to manage water these next few years is critical to our communities, environment and businesses. Climate change means our new reality may include long droughts where our limited precipitation likely comes as rain and not snow.

Even if El Niño delivers the rain we need this winter, this is a one-year solution that we cannot count on in the future.

We must capture water where and when it rains. Greater local self-reliance through improved stormwater capture, groundwater storage and recycled water will help the entire state. Fortunately, improvements in satellite imagery allow us to better predict storms to capture runoff, prevent flooding, and make California drought resilient.

Advertisement

California is managing groundwater for the first time in our history. In some regions, the capacity for

groundwater storage is greater than most lakes or reservoirs. Yet in many of those places, the ground has subsided because groundwater was depleted and not recharged.

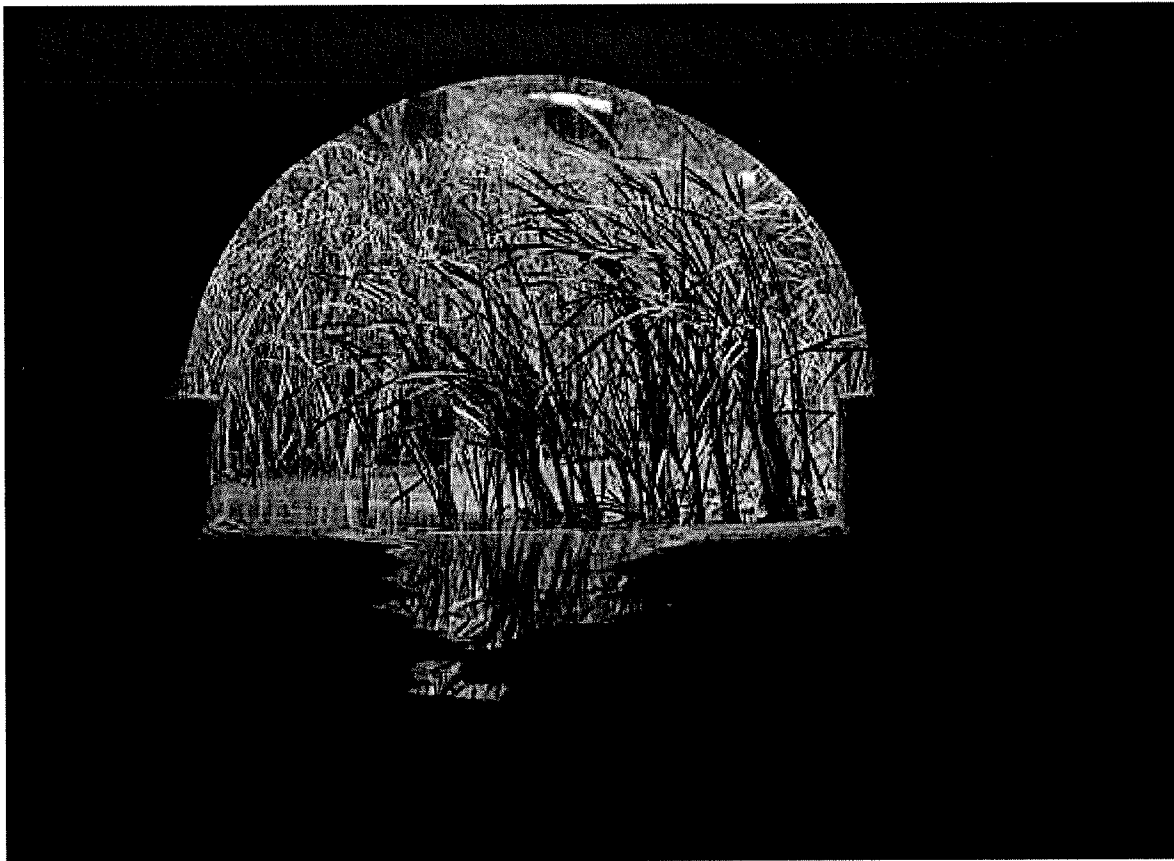
Banking water in the ground during wetter times allows us to leave more water in-stream during dry years. This will ultimately help the environment and relieve urban pressure on the water system.

Californians need market-based information for our water marketplace. We should know how much water is in our reservoirs and basins, and how much our communities are using, conserving, or worse, wasting. We also need to know the details about how and when water is sold. Imagine a water dashboard with all of this real-time information at the ready.

With increased groundwater storage, use of innovative technologies, and real-time information, California can develop a water system that is sustainable and will help us through the inevitable long droughts that are in California's future.

Assemblyman Marc Levine of Greenbrae is the chair of the Assembly Committee on Water, Parks and Wildlife. He has represented Marin and Sonoma counties in the Assembly since 2012.

Flood tax measures loom for Novato, San Rafael



A reflection of a trickle of water photographed under the bridge at Redwood Boulevard near Scottsdale Pond in Novato. Expanding Scottsdale Pond is one of the flood control steps being considered. Robert Tong — Marin Independent Journal

By Nels Johnson, *Marin Independent Journal*

POSTED: 12/18/15, 6:14 PM PST | UPDATED: 17 HRS AGO 9 COMMENTS

Voters in San Rafael and Novato may face flood control tax measures in the new year.

County officials allocated \$265,000 to cover “pre-election polling,” funding strategies and cost and fee studies associated with flood control measures in the Gallinas and Novato watersheds.

Although flood tax measures are tentatively aimed at the November 2016 ballot, when other measures, including a county preschool and child health care tax, may also appear, no decisions have been made, officials said.

In Novato, “We have \$20 million to \$30 million in short-term projects,” Supervisor Judy Arnold said. “We haven’t arrived at cost per home yet, which is why we are doing the polling and funding strategy” work, she added.

Scott Lyle, a county principal civil engineer, said short-term projects under review for Novato include floodplain restoration along upper Novato Creek; tide gates and pump station work; bypassing floodwater

around Nave Gardens; expanding Scottsdale Pond, and various bayland and tidal marsh improvements.

“These types of projects will be the focus of the polling and any recommended revenue plan,” Lyle said, adding the Novato Watershed Policy Advisory Committee “recommended taking steps necessary to prepare for a November 2016 election.”

In the San Rafael area, the Gallinas Watershed Policy Advisory Committee “recommended pre-election polling to gauge public interest for a special tax measure to raise revenue for projects throughout the Gallinas Watershed,” Lyle told county supervisors in a report. “Staff plans to return to your board and the San Rafael City Council in early March with poll results and if recommended, to finalize the ballot language and to officially initiate the election process.”

Various studies have targeted projects ranging from Santa Venetia levee and drainage work to Upper Gallinas Creek restoration, he noted.

“Godbe Research will be assisting the Gallinas watershed program in gauging public interest in a menu of possible projects, the specific elements of which have not yet been finalized,” Supervisor Damon Connolly said. “The county and city of San Rafael are working together to reach out to the community to see what projects would have value to them,” he said. “We have held stakeholder group meetings, community meetings and advisory board meetings and now it’s time to reach out in a more targeted way to the broader community.”

Surveys of voter sentiment and project preferences, along with development of strategies, project cost and fee information, will cost \$130,000 for the Gallinas program and \$135,000 for the Novato program.

Advertisement

House of Reps tightens Coast Guard bill

By Samantha Kimmey

12/17/2015

The House of Representatives approved updated legislation last week that forces a sale of the 30-acre Coast Guard housing complex in Point Reyes Station to Marin County, Rep. Jared Huffman announced Friday. The updated legislation, a rider to the broader Coast Guard Reauthorization Act, includes stronger language in support of the sale than previous versions. Back in May, the legislation said the Coast Guard must give the county the first chance to buy the property, but it now simply states the agency “shall convey” the property to Marin, purchased at fair market value and for use as affordable housing. The new version of the rider also lets Marin pick the real estate appraiser for the property. “This is the strongest mandate to date: it requires by law that the Coast Guard transfer its Point Reyes Station housing site to Marin County for affordable housing,” Rep. Huffman said in a statement. The legislation now heads to the Senate. Since the Coast Guard decided to house its employees elsewhere, the Community Land Trust Association of West Marin, county officials and locals have been advocating for the site—which includes 36 townhouses, a tennis court and a playground—to be turned into affordable housing.