Section V

Supplemental Documents

Table of Contents

State of California
Department of Forestry and Fire Protection

RESPONSIBILITY ACKNOWLEDGEMENT

Plan Number: 1-25NTMP- -SON **Plan Name**: Berry's Knotfarm NTMP

Include all signatures that may apply or as required, use additional pages as needed. When more than one Licensed Timber Operator is on the plan, please provide a detailed description of timber operation responsibilities for each.

CONTACT

Multiple types may be checked for the same contact.

Type:
- ☐ Registered Professional Forester
- ☒ Timberland Owner
- ☐ Plan Submitter
- ☐ Other (describe):_____
- ☐ Licensed Timber Operator
- ☒ Timber Owner
- ☐ On Site Contact (if different than LTO please provide in description box below)

Name: Bruce Berry Lic. No.:_____ Phone: (707) 484-5261

Address: PO Box 91 City: Cazadero State: CA Zip: 95421

Email: Bruce@berrysmill.com

I hereby agree to abide by the terms and specifications of the above harvest plan as outlined in the California Forest Practice Act and Public Resources Code. I understand and agree to fulfill my roles and responsibilities as they pertain to this plan.

Signature: Bruce Berry Date: 1/2/25

RESPONSIBILITIES DESCRIPTION

It is recommended that each contact provide a detailed description of the plan roles and responsibilities. Attach a map(s) if it adds clarity. Examples include but are not limited to: specific road points, assigned units, or actions such as falling and bucking, and/or yarding and loading, and/or hauling, and/or road maintenance, and where/when those actions will take place for the plan.

Responsibilities in addition to those listed in 14CCR 1035 includes maintenance of all appurtenant roads between NTO harvests.

1035 Plan Submitter Responsibility

The plan submitter, or successor in interest, shall:

(a) Ensure that an RPF conducts any activities which require an RPF.

(b) Provide the RPF preparing the plan or amendments with complete and correct information regarding pertinent legal rights to, interests in, and responsibilities for land, timber, and access as these affect the planning and conduct of Timber Operations.

(c) Sign the THP certifying knowledge of the plan contents and the requirements of this section.

(d) (1) Retain an RPF who is available to provide professional advice to the LTO and Timberland Owner upon request throughout the active Timber Operations regarding:

(A) the plan,

(B) the Forest Practice Rules, and

(C) other associated regulations pertaining to Timber Operations,

(2) The plan submitter may waive the requirement to retain an RPF to provide professional advice to the LTO and Timberland Owner under the following conditions:

(A) the plan submitter provides authorization to the Timberland Owner to provide advice to the LTO on a continuing basis throughout the active Timber Operations provided that the Timberland Owner is a natural person who personally performs the services of a professional forester and such services are personally performed on lands owned by the Timberland Owner;

(B) the Timberland Owner agrees to be present on the logging area at a sufficient frequency to know the progress of operations and advise the LTO, but not less than once during the life of the plan; and

(C) the plan submitter agrees to provide a copy of the portions of the approved THP and any approved operational amendments to the Timberland Owner containing the General Information, Plan of Operations, THP Map, Yarding System Map, Erosion Hazard Rating Map and any other information deemed by the Timberland Owner to be necessary for providing advice to the LTO regarding Timber Operations.

(3) All agreements and authorizations required under 14 CCR § 1035(d)(2) shall be documented and provided in writing to the Director to be included in the plan.

(e) Within five working days of change in RPF responsibilities for THP implementation or substitution of another RPF, file with the Director a notice which states the RPF's name and registration number, address, and subsequent responsibilities for any RPF required fieldwork, amendment preparation, or operation supervision. Corporations need not file notification because the RPF of record on each document is the responsible person.

(f) Provide a copy of the portions of the approved THP and any approved operational amendments to the LTO containing the General Information, Plan of Operations, THP Map, Yarding System Map, Erosion Hazard Rating Map and any other information deemed by the RPF to be necessary for Timber Operations.

(g) Notify the Director prior to commencement of Site Preparation operations. Receipt of a burning permit is sufficient notice.

(h) Disclose to the LTO, prior to the start of operations, through an on-the-ground meeting, the location and protection measures for any archaeological or historical sites requiring protection if the RPF has submitted written notification to the plan submitter that the plan submitter needs to provide the LTO with this information.

COUNTY ASSESSOR'S PARCEL MAP

MUNIZ RANCHO T7N R11W

Parcel Map No. 6554

REC. 10-03-1979 IN BK.295, MAPS, PGS. 38

TAX RATE AREA 156-032

099-09

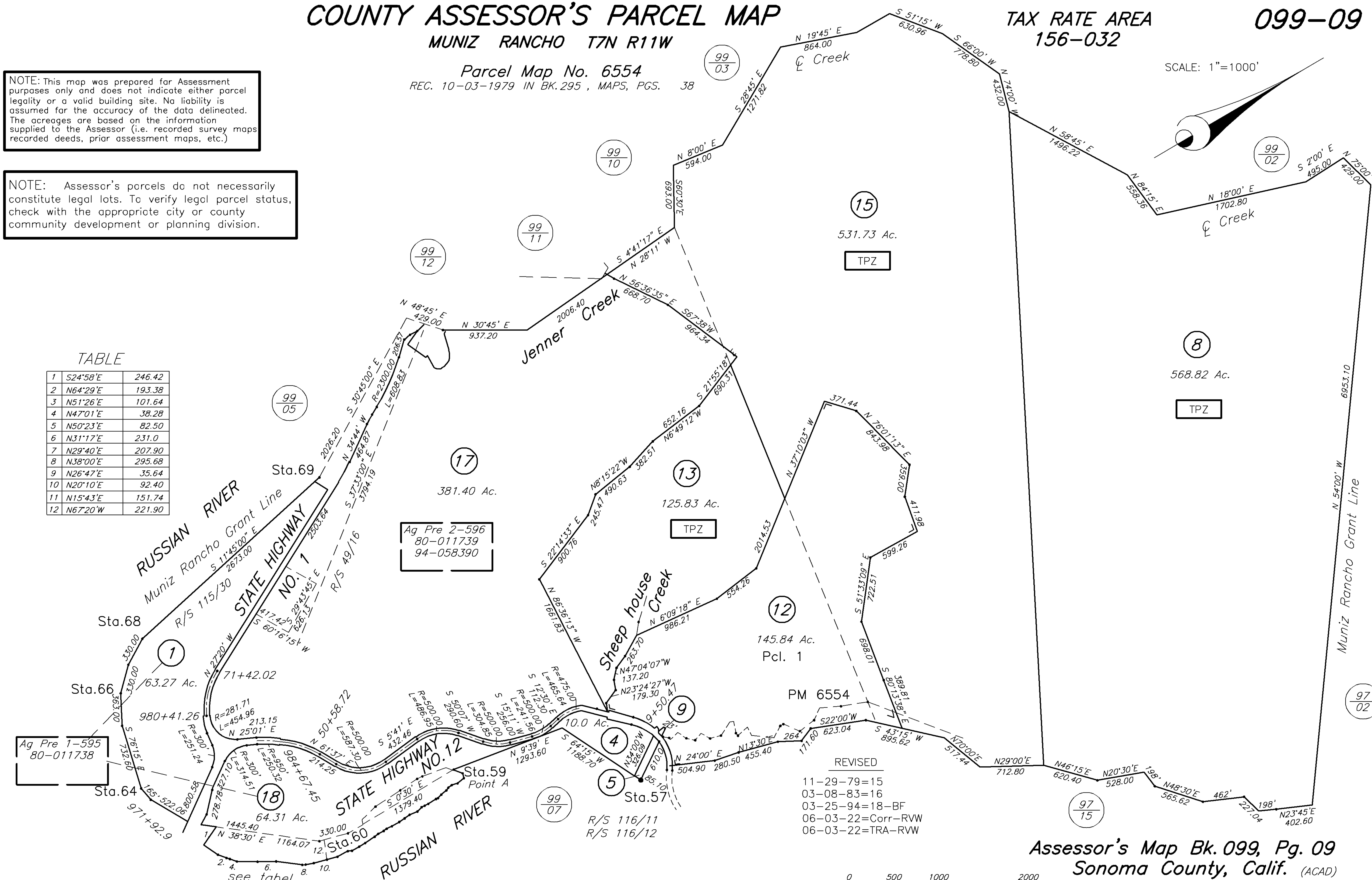
SCALE: 1"=1000'

NOTE: This map was prepared for Assessment purposes only and does not indicate either parcel legality or a valid building site. No liability is assumed for the accuracy of the data delineated. The acreages are based on the information supplied to the Assessor (i.e. recorded survey maps recorded deeds, prior assessment maps, etc.)

NOTE: Assessor's parcels do not necessarily constitute legal lots. To verify legal parcel status, check with the appropriate city or county community development or planning division.

TABLE

1	S24°58'E	246.42
2	N64°29'E	193.38
3	N51°26'E	101.64
4	N47°01'E	38.28
5	N50°23'E	82.50
6	N31°17'E	231.0
7	N29°40'E	207.90
8	N38°00'E	295.68
9	N26°47'E	35.64
10	N20°10'E	92.40
11	N15°43'E	151.74
12	N67°20'W	221.90



REVISED
11-29-79=15
03-08-83=16
03-25-94=18-BF
06-03-22=Corr-RWW
06-03-22=TRA-RWW

0 500 1000 2000

Assessor's Map Bk.099, Pg. 09
Sonoma County, Calif. (ACAD)

KEY 07-23-15 KB

12/4/2025

Order No.
Escrow No. 43796-RDM
Loan No.

WHEN RECORDED MAIL TO:

Mr. and Mrs. Robert C. Mann
Mr. and Mrs. Oscar F. Mann
1 Circle Drive
Jenner, CA 95450

Recorded At Request Of
FIRST AMER T CO
at 20 min. past 10 A M.
NOV 6 1979 Cr
OFFICIAL RECORDS
SONOMA COUNTY CALIF.
Bernice J. Hedman
$ 8.00 PD. Recorder

BOOK 3649 PAGE 279
V 38816

SPACE ABOVE THIS LINE FOR RECORDER'S USE

MAIL TAX STATEMENTS TO:

Same as above.

A. P. Nos. 99-090-1, 2 and 3
. P. Nos. 99-090-07 and 10

DOCUMENTARY TRANSFER TAX $ 357.50
X ..... Computed on the consideration or value of property conveyed; OR
..... Computed on the consideration or value less liens or encumbrances remaining at time of sale.

Signature of Declarant or Agent determining tax — Firm Name
FIRST AMERICAN TITLE INSURANCE COMPANY

GRANT DEED

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,

Loren M. Berry and Beatrice B. Berry, his wife,

hereby GRANT(S) to Robert C. Mann and Darlene D. Mann, his wife, as Community Property, as to an undivided 1/2 interest; and Oscar F. Mann and Elizabeth M. Mann, his wife, as Community Property, as to an undivided 1/2 interest,

the real property in the ~~City or~~ Unincorporated Area
County of Sonoma, State of California, described as

Legal description attached hereto and made a part hereof.

DOCUMENTARY TRANSFER TAX
PAID $ 357.50

Dated October 29, 1979

STATE OF CALIFORNIA
COUNTY OF Sonoma } ss.

On October 30, 1979
before me, the undersigned, a Notary Public in and for said State, personally appeared Loren M. Berry and Beatrice B. Berry

known to me to be the person S whose name S are subscribed to the within instrument and acknowledged that they executed the same.

WITNESS my hand and official seal.

Signature R. D. Musante
R. D. Musante

Loren M. Berry
Loren M. Berry

Beatrice B. Berry
Beatrice B. Berry

OFFICIAL SEAL
R.D. MUSANTE
NOTARY PUBLIC - CALIFORNIA
SONOMA COUNTY
My Commission Expires Aug. 6, 1982

(This area for official notarial seal)

MAIL TAX STATEMENTS AS DIRECTED ABOVE

1002 (10/69)

12/4/2025

DESCRIPTION:

All that real property situate in the unincorporated area, County of Sonoma, State of California, described as follows:

PARCEL ONE:

That certain tract of land situated in said County and State, being a portion of the Rancho Muniz, and bounded and described as follows:

COMMENCING at an alder tree 12 inches in diameter, on the right bank of Russian River, and on the left bank of a creek known as the "Sheep Rancho" Creek and station number 57 of Official Survey of the Muniz Rancho; thence running (variations magnetic 16° 05' East) along the meanderings of the right bank of the Russian River, the following courses and distances, from course No. 57 to course No. 69 both inclusive, according to the official survey of said Muniz Rancho; South 64° 15' West 85.1 feet more or less to the Southwesterly corner of those certain lands conveyed to Keeler by Deed recorded in book 738 of Official Records, page 314, Sonoma County Records, said point being the Point of Beginning of the land to be herein described; thence from said point of beginning continuing along the courses hereinbefore referred to South 64° 15' West 1188.70 feet; South 9° 39' West, 19.60 chains; South 0° 30' East, 20.90 chains; South 15° West, 5.00 chains; South 38° 30' West, 21.90 chains; South 61° West, 7.91 chains; South 80° West, 2.50 chains; North 76° 15' West, 11.10 chains; North 62° West, 5.50 chains; North 44° 15' West, 5.00 chains, North 31° 15' West, 5.00 chains; North 11° 45' West, 40.50 chains, North 30° 45' West, 30.70 chains to the mouth of a creek; thence leaving the said Russian River, North 48° 45' East, 6.50 chains; North 30° 45' East 14.20 chains to the center of a creek; thence up the center of said creek to a point from which a 1/2" iron pipe tagged L.S. 3890 bears North 56° 36' 35" East; thence North 56° 36' 35" East to said 1/2" iron pipe; thence continue North 56° 36' 35 East 668.70 feet to a 1/2" iron pipe tagged L.S. 3890; thence North 67° 38' 00" East 964.34 feet to a 1/2" iron pipe tagged L.S. 3890; thence South 21° 55' 18" East 690.31 feet to a 1/2" iron pipe tagged L.S. 3890; thence South 6° 49' 12" East 652.16 feet to a 1/2" iron pipe tagged L.S. 3890; thence South 17° 05' 58" East 382.51 feet to a 1/2" iron pipe tagged L.S. 3890; thence South 8° 15' 22" East 490.63 feet to a 1/2" iron pipe tagged L.S. 3890; thence South 39° 52' 42" East 245.47 feet to a 1/2" iron pipe tagged L.S. 3890; thence South 22° 14' 33" East 900.76 feet to a 1/2" iron pipe tagged L.S. 3890; thence South 86° 36' 13" East 1661.83 feet to a 1/2" iron pipe found tagged L.S. 2798, in the Northerly right of way State Highway 116 as said pipe is shown on Record of Survey filed in Book 116 of Maps, at Page 11; thence along said right of way North 44° 45' 36" East (North 44° 47' 10" E) 14.72 feet to a 1/2" iron pipe tagged L.S. 2798 being North 45° 14' 24" West, 30.00 feet from centerline station 12+50.00; thence South 45° 14' 24" East, 80.00 feet to a 1/2" iron pipe tagged L.S. 2798 in the southeasterly right of way

CON'T:

of said Highway 116; thence along said right of way northeasterly 650 feet more or less to a 6" x 6" concrete highway monument; thence South 60° 29' 17" East, 113.13 feet; thence North 59° 37' 10" East 37.53 feet to the lands of Keeler hereinbefore referred to, thence Southeasterly and along the Southwesterly Boundary of said lands of Keeler to the point of beginning.

EXCEPTING THEREFROM, however, a strip of land 50 feet in width, conveyed to County of Sonoma for road purposes, by Samuel Rien, by deed dated June 7, 1877, and recorded June 7, 1877, in Book 59 of Deeds page 588,Sonoma County Records.

ALSO EXCEPTING a strip of land 50 feet in width, conveyed to County of Sonoma, for road purposes, by Andrew Markham, by Deed dated February 3, 1879 and recorded October 8, 1879, in Book 68 of Deeds, page 587, Sonoma County Records.

ALSO EXCEPTING a strip of land 40 feet in width, conveyed to County of Sonoma, for road purposes, by Andrew Markham by Deed dated September 17, 1918 and recorded September 19, 1918, in Book 363, of Deeds, page 212, Sonoma County Records.

ALSO EXCEPTING THEREFROM a strip of land for road purposes, conveyed to County of Sonoma, by Sarah Jane Markham Noonan, et al, by Deed dated December 8, 1931 and recorded December 14, 1931, in Book 315 of Official Records, page 46, and as conveyed to County of Sonoma, by Sarah Jane Markham Noonan, by Deed dated November 28, 1932 and recorded November 29, 1932 in Book 328 of Official Records, page 291.

ALSO EXCEPTING THEREFROM the 0.04 acre and 0.09 acre tracts described in the Quit Claim Deed to the State of California, dated February 27, 1951 and recorded May 24, 1951, in Book 1051 of Official Records, page 203, and in the 0.10 acre and 0.06 acre tracts described in the Grant Deed to the State of California, dated February 27, 1951 and recorded May 24, 1951, in Book 1051 of Official Records, page 211, Sonoma County Records.

ALSO EXCEPTING THE 1.12 acre tract conveyed to Lawrence R. Von Arx and wife, by Deed dated September 30, 1955 and recorded November 4, 1955 in Book 1391 of Official Records, page 92, Sonoma County Records.

ALSO EXCEPTING the 0.40 of an acre conveyed to the Jenner Fireman's Social Club, by Deed dated March 5, 1957 and recorded March 14, 1957 in Book 1507 of Official Records, page 431, Sonoma County Records.

ALSO EXCEPTING the 6.00 acre tract conveyed to Audrey Griffith by Deed recorded October 15, 1965, in Book 2162 of Official Records, page 698,Sonoma County Records.

CONT'D

EXCEPTING THEREFROM that property which is described as follows:

LYING within the Muniz Rancho being a portion of the lands conveyed by decree to E.J.Willig, recorded in Book 2394 of Official Records, Page 376, Sonoma County Records, being a parcel of land more particularly described as follows:

BEGINNING at a 1/2" iron pipe and tag on the Southeasterly side of Highway 116 said 1/2" iron pipe and tag lying 30 feet southeasterly from a railroad spike marking engineer station 12+50.00 as delineated on that certain Record of Survey recorded in Book 116 of Maps, Page 12, Sonoma County Records; thence from said point of beginning South 45°12'50" East 20.00 feet to a 1/2" iron pipe and tag; thence continuing along the southeasterly line of said Highway 116, North 43° 16' 55" East 279.63 feet to a 1/2" iron pipe and tag; thence continuing along the southeasterly line of Highway 116 on a curve to the right through a delta angle of 37°39'20" with a radius of 564.08 feet, for a length of 370.72 feet to a point (from which a 6" x 6" concrete monument bears North 87°18'25" East 0.58 feet); thence leaving the southeasterly line of said Highway 116, and along the southerly line of those certain lands conveyed to the State of California by deed recorded in Book 1051 of Official Records, Page 211, Sonoma County Records, South 60° 29' 17" East 113.13 feet to a 6" x 6" concrete monument; thence continuing along the southerly line of said State of California lands North 59°37'10" East 37.53 feet to a point on the southwesterly line of those certain lands conveyed to Keeler by deed recorded in Book 738 of Official Records, Page 314, Sonoma County Records; thence along the southwesterly line of said Keeler lands South 33° 13' 29" East 10.03 feet to a point; thence continuing along said southwesterly line South 39° 16' 44" East 43.40 feet to a point on the ordinary high water mark, as determined from photograph dated 27 January, 1966, said ordinary high water mark also shown on said Record of Survey recorded in Book 116 of Maps, Page 12; thence along the northerly high-water mark of the Russian River the following courses:

South 78° 08' West 201.51 feet
North 89° 31' West 147.97 feet
South 46' 43' West 119.02 feet
South 06° 22' West 56.02 feet
South 25° 15' East 228.11 feet
South 44° 30' West 76.01 feet
South 72° 28' West 57.00 feet
South 39° 50' West 48.01 feet
South 80° 21' West 146.98 feet
South 36° 57' West 13.00 feet
South 35° 32' West 82.02 feet
South 66° 04' West 86.00 feet
South 19° 11' West 21.01 feet
South 36° 39' West 120.03 feet
South 09° 44' West 20.01 feet
South 84° 55' East 62.02 feet
South 04° 51' West 110.04 feet
South 25° 59' West 285.08 feet
North 01° 24' East 234.90 feet
South 77° 53' West 31.00 feet
South 28° 50' West 61.02 feet
North 04° 01' East 129.95 feet
North 22° 32' West 77.96 feet
South 07' 15' West 250.56 feet
South 03° 30' East 187.72 feet

CON'T:

thence South 12° 00' West 38.00 feet more or less, to a point that bears East 65 feet, more or less, from a 1/2" iron pipe and tag designated as station "cut" as delineated on said record of survey recorded in Book 116 of Maps, Page 12, Sonoma County Records; thence leaving the ordinary high water mark of the Russian River West 65 feet, more or less to said 1/2" iron pipe and tag designated as station "cut" said 1/2" iron pipe and tag lying on or near the easterly line of said Highway 116; thence in a northerly direction along the easterly line of said Highway 116, 785 feet more or less to a 1/2" iron pipe and tag as delineated on said record of survey; thence continuing along the southeasterly line of said Highway 116, North 44° 47' 10" East 318.52 feet to the point of beginning. Basis of bearing California Coordinate System Zone 2 Station "Cut" to station "Ricco" bearing of North 55° 05' 05" East as delineated on that certain record of survey recorded in Book 111 of Maps, page 10, Sonoma County Records.

Road

RESERVING THEREFROM an easement for road purposes, over and across that portion of the lands herein, as more particularly designated as "50 Foot Road Easement", upon Parcel Map No. 6554, filed October 3, 1979, in Book 295, of Maps, page 38, Sonoma County Records.

PARCEL TWO:

COMMENCING at a point on the easterly line of the Muniz Rancho Grant, South 0° 30' East 12.63 feet from Station "M58" as said station is described in that certain survey of R.C. Matthewson, July and August 1859, and North 51° 02' East 83.66 feet from the northwest corner of Island No. 2, as shown in survey of A. L. Cox, May 1877, said point also further described as being South 24° 52' East 112.73 feet from a 6" x 6" concrete monument, marking point "A" as said point "A" is also described in above Cox survey; thence along the westerly line of said Island No. 2, South 51° 02' West, 83.66 feet; thence South 10° 29' West 280.5 feet; thence South 4° 43' West, 64.68 feet; thence South 3° 30' East 227.7 feet; thence South 2° 45' East 330.00 feet: thence South 13° 35' East 210.54 feet; thence South 67° 55' East 56.64 feet to the aforedescribed Muniz Rancho Grant line; thence along said grant line, South 0° 30' East, 191.0 feet; thence South 15° 00' West, 276.00 feet to a 6" x 6" concrete monument, which is the point of beginning of the within described tract of land; thence from said point of beginning, continuing along the easterly line of aforedescribed Muniz Rancho, the following courses and distances: South 15° 00' West 54.0 feet; South 38° 30' West 1164.07 feet; thence leaving said Muniz Rancho Grant line, South 24° 58' East, 246.42 feet to the most southerly corner of said Island No. 2; thence along the easterly line of said Island, the following courses and distance: North 64° 29' East, 193.38 feet; North 51° 26' East, 101.64 feet; North 47° 01'

CON'T:

PARCEL TWO CON'T:

East 38.28 feet; North 50° 23' East 82.5 feet: North 31° 17' East, 231.0 feet: North 29° 40' East, 207.9 feet: North 38° 00' East, 295.68 feet: North 26° 47' East 35.64 feet; North 20° 10' East, 92.4 feet; North 15° 43' East, 151.74 feet thence leaving said easterly line, North 67° 20' West, 221.9 feet to the point of beginning.

PARCEL THREE:

BEGINNING at a point on the easterly line of the Muniz Rancho Grant, South 0° 30' East, 12.63 feet from Station "M58" as said station is described in that certain survey of R.C. Mathewson, July and August 1859 and North 51° 02' East, 83.66 feet from the northwest corner of Island No. 2, as shown in survey of A.L. Cox, May 1877 said point also further described as being South 24° 52' East, 112.73 feet from a 6" x 6" concrete monument marking point"A" as said point "A" is also described in above Cox survey; thence from said point of beginning along the westerly line of said Island No. 2 the following courses and distances: South 51° 02' West, 83.66 feet; South 10° 29' West, 280.5 feet; South 4° 43' West 64.68 feet South 3° 30' East, 227.7 feet; South 2° 45' East, 330.0 feet; South 13° 35° East, 210.54 feet; South 67° 55' East, 56.64 feet to the above described Muniz Grant line; thence leaving the westerly line of the Island aforedescribed and following along said Grant line South 0° 30' West, 191.0 feet; thence South 15° 00° West 276.0 feet, to a 6" x 6" concrete monument; thence leaving the Grant line, South 67° 20' East, 221.9 feet to the easterly line of said Island No. 2: thence along said easterly line the following courses and distances: North 15° 43' East 121.5 feet; North 1° 48' East 132.0 feet; North 26° 13' East, 48.18 feet; North 0° 33' East, 91.08 feet; North 0° 31' West, 80.52 feet; North 3° 08° West, 125.4 feet: North 8° 51' West, 50.82 feet; North 2° 23' East, 69.3 feet; North 5° 42' West 40.92 feet; North 4° 48' East, 65.34 feet; North 0° 48' East, 95.04 feet: North 3° 42' West, 71.28 feet; North 5° 27' West, 67.88 feet; North 7° 47' East 95.04 feet: North 14° 33' West 67.96 feet: North 4° 48' East 38.28 feet; North 3° 24' East, 44.88 feet; North 1° 56' West, 100.98 feet; North 8° 44' East, 24.42 feet; North 16° 26' West, 54.78 feet; North 9° 06' West 72.60 feet; North 23° 48' West, 38.94 feet: North 5° 33' West, 46.20 feet; North 13° 42' East, 68.64 feet; North 9° 00' West, 91.74 feet; North 74° 43' West, 55.44 feet; South 51° 02' West, 114.34 feet to the point of beginning.

Road

EXCEPTING THEREFROM a strip of land 40 feet in width conveyed to County of Sonoma, for road purposes, by Deed dated May 7, 1910 and recorded May 20, 1910, in Book 264 of Deeds, page 45, Sonoma County Records.

A. P. Nos. 99-090-1, 2, 3, &
99-090-7 & 10 (ptn)

V 38816

NOTICE OF PREPERATION (NOP) TO HARVEST TIMBER

A Nonindustrial Timber Management Plan (NTMP) or Amendment has been submitted to the California Department of Forestry and Fire Protection (CAL FIRE). CAL FIRE Forest Practice will be reviewing the proposed timber operation for compliance with State law and rules of the California Board of Forestry and Fire Protection. The following briefly describes the proposed timber operation and where and how to get more information. Prior to submission of the NTMP or Amendment, this Notice, including a map as described in 14 CCR §1090.2(g) shall be posted at a conspicuous location that is easily visible to the public and near the Plan site. Notwithstanding other Rules, the notices required by 14 CCR 1032.10 shall be completed prior to submission of the NTMP, and compliant within counties with special Rules.

This Notice applies to (select one): ☒ Nonindustrial Timber Management Plan

☐ Amendment for an approved NTMP

NTMP#: The Plan will be given a number when accepted for filing. _

NOTE: incorrect, incomplete, or inconsistent information within the NTMP or Amendment and this Notice may result in a Return to the Plan Submitter

Applicant Information: The Plan Submitter name(s) must match those listed in the NTMP or Amendment.

1. Plan Submitter(s): Bruce Berry

2. The name of the NTMP: Berry's Knotfarm NTMP

Project Summary: Acres of the area to be included in the NTMP, county, legal description, silviculture methods, must match those listed in the NTMP or Amendment.

3. The acreage of the area to be included in the NTMP: 1099 4. County: Sonoma

5. Legal Description of the Public Land Survey System (Section, Township, Range, Baseline and Meridian)

Sections 5, 7, 8, 9, 17, 18, T7N, R11W Mount Diablo Base and Meridian

6. Location of the proposed timber operation with approximate direction and approximate distance of the timber operation from the nearest community or well-known landmark:

The proposed timber operation is located approximately .5 miles northeast from the town of Jenner.

7. The name of, and distance from, the nearest perennial blueline stream flowing through or downstream from the Plan area:

The Plan area is adjacent to Sheephouse Creek to the east and Jenner Gulch to the west. Sawmill Gulch flows through the Plan area.

8. List proposed Silvicultural method(s):

Silvicultural methods proposed are selection, group selection, and special treatment area.

Additional Information: Please provide the names and mailing addresses of all property owners within three hundred (300) feet of the NTMP or Amendment boundary per 14 CCR §1090.2(e).

Public Information: In accordance with the timeline stated under Public Resources Code Section 4593.7, written public comments may be submitted for the NTMP or Amendment for CAL FIRE to consider.

The review times allowed for CAL FIRE to review the proposed timber operation are variable. To ensure CAL FIRE receives submitted comments please read the following.

The estimated earliest possible date CAL FIRE may approve this NTMP or Amendment is: _February 28, 2025__

(This estimated date is 45 calendar days from receipt of the NTMP or Amendment by CAL FIRE)

NOTE: The estimated earliest approval date is probably not the actual approval date. Normally, there is more time available for public comment submittals. Please check with CAL FIRE Forest Practice to determine the actual date that the public comment period closes.

Anyone may review or purchase a copy of the NTMP or Amendment from the CAL FIRE Review Team office shown below. The copying cost is **37 cents** for each page, $2.50 minimum per request.

Questions, concerns, and public comments regarding this NTMP, Amendment, or Notice should be directed to the CAL FIRE Review Team office shown below to incorporate into an Official Response Document.

Please include the Nonindustiral Timber Management Plan number on all correspondence.

Direct comments to the *CAL FIRE Forest Practice Program Manager* of the marked submitted office below:

☒ Santa Rosa (Coast District)	☐ Redding (Northern District)	☐ Fresno (Southern District)
135 Ridgway Avenue Santa Rosa, CA 95401 (707) 576-2959 SantaRosaPublicComment@fire.ca.gov	6105 Airport Road Redding, CA 96002 (530) 224-2445 ReddingPublicComment@fire.ca.gov	1234 East Shaw Avenue Fresno, CA 93710 (559) 222-3714 FresnoPublicComment@fire.ca.gov

NOTE: To view the contents of this NTMP or Amendment or submit public comments online go to the CAL FIRE Forest Practice permit website "CalTREES" at https://caltreesplans.resources.ca.gov/caltrees/

NOTICE OF PREPERATION (NOP) TO HARVEST TIMBER

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This Notice applies to (select one): ☒ Nonindustrial Timber Management Plan

☐ Amendment for an approved NTMP

NTMP#: 1-25NTMP-00001-SON

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Applicant Information: The Plan Submitter name(s) must match those listed in the NTMP or Amendment.

1. Plan Submitter(s): Bruce Berry

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Sections 5, 7, 8, 9, 17, 18, T7N, R11W Mount Diablo Base and Meridian

6. Location of the proposed timber operation with approximate direction and approximate distance of the timber operation from the nearest community or well-known landmark:

The proposed timber operation is located approximately .5 miles northeast from the town of Jenner.

7. The name of, and distance from, the nearest perennial blueline stream flowing through or downstream from the Plan area:

The Plan area is adjacent to Sheephouse Creek to the east and Jenner Gulch to the west. Sawmill Gulch flows through the Plan area.

8. List proposed Silvicultural method(s):

Silvicultural methods proposed are selection, and special treatment area.

Additional Information: Please provide the names and mailing addresses of all property owners within three hundred (300) feet of the NTMP or Amendment boundary per 14 CCR §1090.2(e).

Public Information: In accordance with the timeline stated under Public Resources Code Section 4593.7, written public comments may be submitted for the NTMP or Amendment for CAL FIRE to consider.

The review times allowed for CAL FIRE to review the proposed timber operation are variable. To ensure CAL FIRE receives submitted comments please read the following.

The estimated earliest possible date CAL FIRE may approve this NTMP or Amendment is: _January 22, 2026__

(This estimated date is 45 calendar days from receipt of the NTMP or Amendment by CAL FIRE)

NOTE: The estimated earliest approval date is probably not the actual approval date. Normally, there is more time available for public comment submittals. Please check with CAL FIRE Forest Practice to determine the actual date that the public comment period closes.

Anyone may review or purchase a copy of the NTMP or Amendment from the CAL FIRE Review Team office shown below. The copying cost is **37 cents** for each page, $2.50 minimum per request.

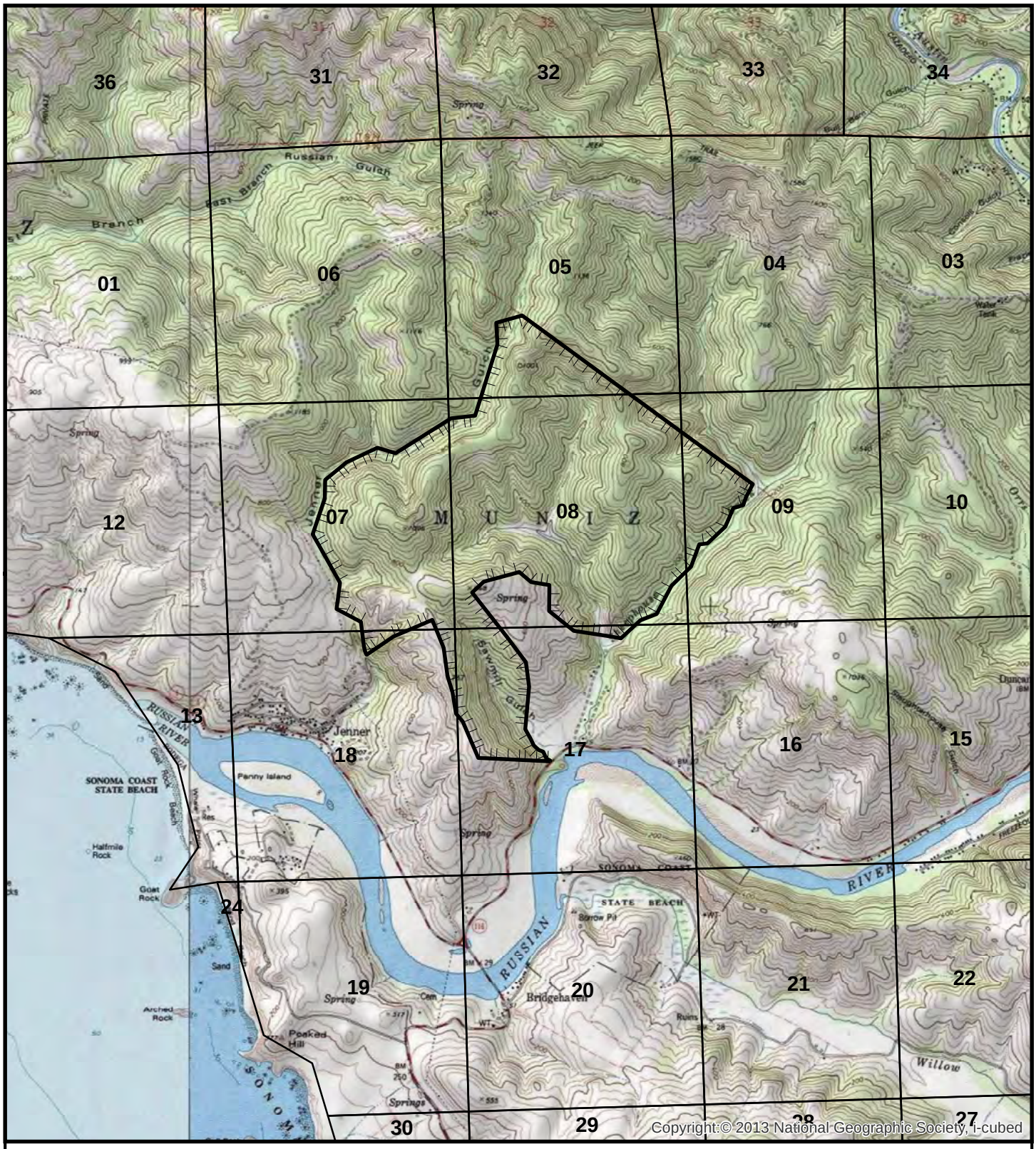
Questions, concerns, and public comments regarding this NTMP, Amendment, or Notice should be directed to the CAL FIRE Review Team office shown below to incorporate into an Official Response Document.

Please include the Nonindustiral Timber Management Plan number on all correspondence.

Direct comments to the *CAL FIRE Forest Practice Program Manager* of the marked submitted office below:

☒ Santa Rosa (Coast District)	☐ Redding (Northern District)	☐ Fresno (Southern District)
135 Ridgway Avenue Santa Rosa, CA 95401 (707) 576-2959 SantaRosaPublicComment@fire.ca.gov	6105 Airport Road Redding, CA 96002 (530) 224-2445 ReddingPublicComment@fire.ca.gov	1234 East Shaw Avenue Fresno, CA 93710 (559) 222-3714 FresnoPublicComment@fire.ca.gov

NOTE: To view the contents of this NTMP or Amendment or submit public comments online go to the CAL FIRE Forest Practice permit website "CalTREES" at https://caltreesplans.resources.ca.gov/caltrees/



Berry's Knotfarm NTMP
General Location

1:48,000

0 4,000 Feet

Portions of Muniz Rancho
Sections 5, 7, 8, 9, 17, 18, T7N R11W MDB&M
Duncans Mills, CA Quadrangle

Legend

NTMP Boundary

Environmental Resource Solutions, Inc. December 8, 2025

List of Neighbors Within 300 feet of Berry's Knotfarm NTMP Boundary

Name	Mailing Address	City	State	ZIP
Sonoma Co Ag Preservation & Open Space District	39611 Oak Glen Rd #12	Yucaipa	California	92399
William Guido Ricioli Trust	2200 Laughlin Rd	Windsor	California	95493
County of Sonoma	2555 Mendocino Ave	Santa Rosa	California	95403
State Of California	650 Howe Ave	Sacramento	California	95825
Robert & Mary Mann Trust	29876 King Ridge Rd	Cazadero	California	95421
Mark Mann Trust	8450 Starr Rd	Windsor	California	95492
Dennis & Sharon Wieland	2014 24th Street	Sacramento	California	95818
Hamid & Nellie Emami	1859 Fern Hollow Drive	Diamond Bar	California	91765
Marilyn Puget	2140 Woodlake Drive	Ukiah	California	95482
Scott Smith Trust	10 Hop Ranch Court	Santa Rosa	California	95403

PROOF OF PUBLICATION

(2015.5 C.C.P.)

STATE OF CALIFORNIA

County of Sonoma

I am a citizen of the United States and a resident of the county aforesaid: am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer of The Press Democrat, a newspaper of general circulation, printed and published DAILY IN THE City of Santa Rosa, County of Sonoma; and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Sonoma, State of California, under the date of November 29, 1951, Case number 34831, that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates to wit:

The Press Democrat - Legal Notices

07/30 - 07/30/2024

I certify (or declare) under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct

Dated 07/30/2024

at Santa Rosa, California

Stefanie Puckett

Public Notice

A Non-Industrial Timber Management Plan (NTMP) located in Sonoma County, in portions of sections 5, 7, 8, 9, 17, 18 of the Duncan's Mills Quad – Township 7 North, Ranges 11 West, MDB&M, is being prepared for Bruce Berry. The plan area is located approximately .5 miles Northeast of Jenner, CA, and drains into Jenner Gulch, Sawmill Gulch, and Sheephouse Creek, which flow into the Russian River, which flows into the Pacific Ocean. Information regarding surface domestic water use downstream of the plan area is requested. Information responses are requested within 10 days of this notice and may be made to: Environmental Resource Solutions, Inc., 1221 Gravenstein Hwy South, Sebastopol, CA 95472. Phone (707) 566-7510.
Email: ERSinfo@eresourcesolutions.com

210877 - Pub July 30, 2024 1ti.

June 25, 2024

APNs: 099-090-013, 099-090-015, 099-090-008

Landowners's Name: Bruce Berry

Address: PO Box 91, Cazadero, CA 95421

Subject: Request for Information on surface Domestic Water Supplies

Mark Mann Trust
8450 Starr Rd
Windsor , California 95492

Dear Landowner,

Environmental Resource Solutions, Inc. is currently preparing a Non-Industrial Timber Management Plan (NTMP) for the property of Bruce Berry. The project area is located within 1,000 feet of your property and is legally described as portions of Duncans Mills Quad, Sections 5, 7, 8, 9, 17 & 18 Township 7 North, Range 11 West.

The plan area consists of approximately 1098 acres located east of the town of Jenner CA. Water from the project area flows into Sawmill Gulch, Sheephouse Creek & Jenner Gulch which flow into the Russian River and into the Pacific Ocean. A map showing the location of the proposed NTMP is attached.

We are requesting any information you may have regarding surface domestic water supply sources or use located on or near watercourses downstream of the project area, whether owned by you or by another party. We are requesting advisement on surface domestic water use from landowners having supplies within 1,000 feet of the project area whose ownership adjoins or includes watercourses which receive surface drainage from the plan area. This request for information is required by the Forest Practice Act, Title 14, California Code of Regulations 1032.10.

The proposed NTMP prescribes the harvesting method as single tree and group selection silviculture utilizing tractor and cable yarding methods. The NTMP will be designed to protect downstream beneficial uses of water of all watercourses that receive drainage from the proposed timber operations. If you have further questions regarding this proposed plan, please contact us at the address at the bottom of the page.

Your response within ten days of the post-marked date of this letter is requested and will be greatly appreciated.

Sincerely,

Harlan Tranmer, RPF #2850
1221 Gravenstein Hwy South
Sebastopol, CA 95472
(707) 566-7510
htranmer@eResourceSolutions.com

Attachment: **NTMP Boundary Map**

N

1:48,000

0 4,000 Feet

General Location Map
Berry's Knotfarm NTMP

Portion of Muniz Rancho
Portions of Projected Sections 5,7,8,9,17,18
T7N, R 11W
MDB&M
Duncans Mills, CA Quadrangle

Legend

NTMP Boundary

Environmental Resource Solutions, Inc.

ENVIRONMENTAL RESOURCE SOLUTIONS, INC.
Forestry & Land Management

February 18, 2025

APNs: 099-090-013, 099-090-015, 099-090-008

Landowners's Name: Bruce Berry

Address: PO Box 91, Cazadero, CA 95421

Subject: Request for Information on surface Domestic Water Supplies

H A Reynolds
PO Box 12
Willits, California 95490

Dear Landowner,

Environmental Resource Solutions, Inc. is currently preparing a Non-Industrial Timber Management Plan (NTMP) for the property of Bruce Berry. The project area is located within 1,000 feet of your property and is legally described as portions of Duncans Mills Quad, Sections 5, 7, 8, 9, 17 & 18 Township 7 North, Range 11 West.

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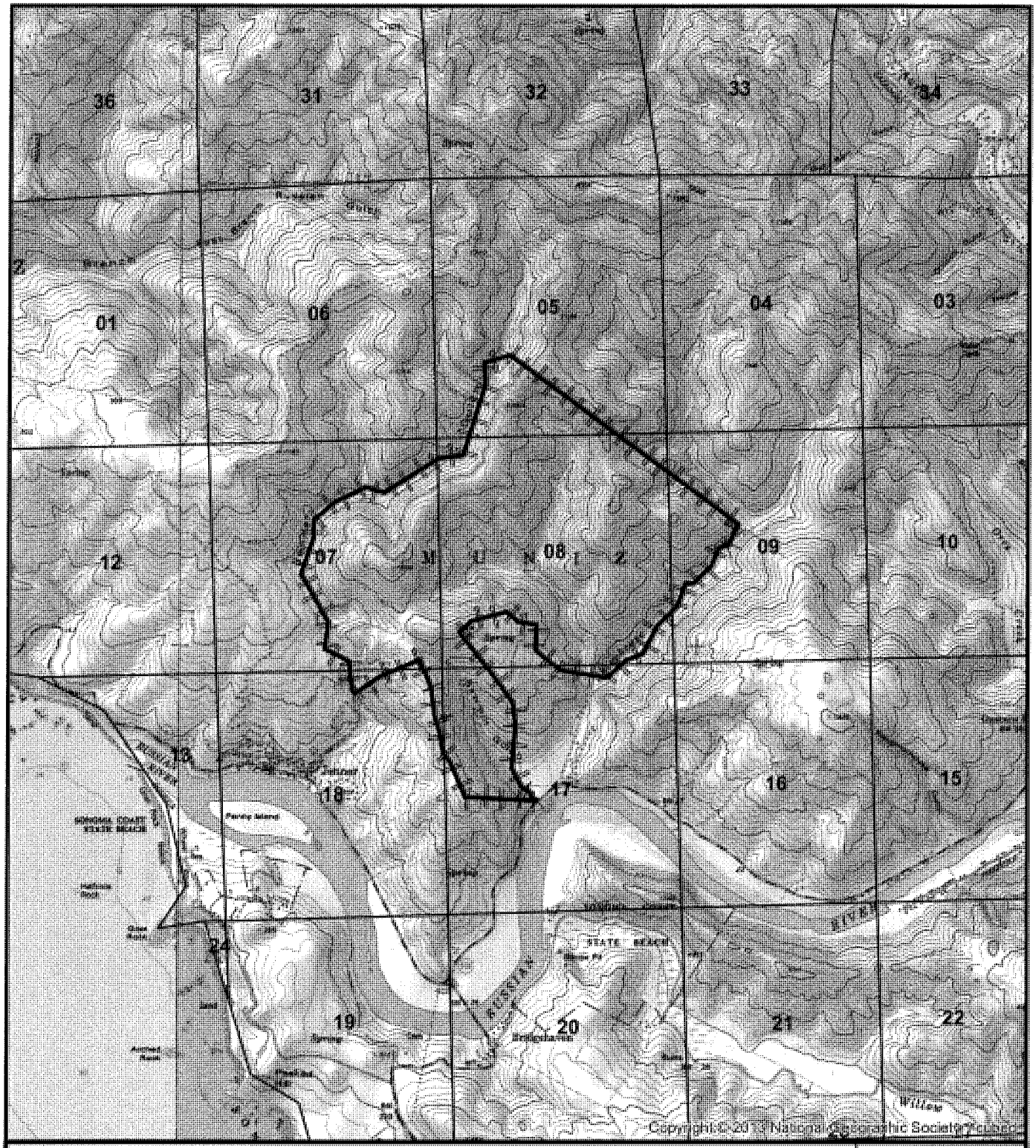
Sincerely,

Harlan Tranmer

Harlan Tranmer, RPF #2850
1221 Gravenstein Hwy South
Sebastopol, CA 95472
(707) 566-7510
htranmer@eResourceSolutions.com

Attachment: **NTMP Boundary Map**



General Location Map
Berry's Knotfarm NTMP

Portion of Muniz Rancho
Portions of Projected Sections 5,7,8,9,17,18
T7N, R 11W
MDB&M
Duncans Mills, CA Quadrangle

Environmental Resource Solutions, Inc.

List of Neighbors Within 1000 feet Downstream of Berry's Knotfarm NTMP Boundary

Name	Address	City	State	ZIP
Mark Mann Trust 099-090-017	8450 Starr Rd	Windsor	California	95492
Robert & Mary Mann Trust 099-090-012	29876 King Ridge Rd	Cazadero	California	95421
State Of California 099-090-004 and 099-070-011	650 Howe Ave	Sacramento	California	95825
Elwood & Gloria Keller Trust 097-150-004 and 099-090-005 and 099-090-009	745 Nebraska Drive	Santa Rosa	California	95405
Ernest Ricioli 097-150-003 and 097-150-005	2200 Laughlin Rd	Windsor	California	95492
William Guido Ricioli Trust 097-150-005 and 097-020-001	2201 Laughlin Rd	Windsor	California	95493
Sonoma Co Ag Preservation & Open Space District 099-030-034 and 099-030-32 and 099-020-015 and 097-010-007	39611 Oak Glen Rd #12	Yucaipa	California	92399
Hamid & Nellie Emami 099-100-016	1859 Fern Hollow Drive	Diamond Bar	California	91765
County of Sonoma 099-100-038	2555 Mendocino Ave	Santa Rosa	California	95403
Scott Smith Trust 099-100-044 and 099-100-074 and 099-100-078 and 099-100-077 and 099-100-005 and 099-100-083 and 099-100-082 and 099-100-062 and 099-100-070 099-100-58, 099-100-59	10 Hop Ranch Court	Santa Rosa	California	95403
Marilyn Puget 099-100-032 and 099-100-031 and 099-100-030	2140 Woodlake Drive	Ukiah	California	95482
Dennis & Sharon Wieland 099-100-092 and 099-100-093 and 099-100-015	2014 24th Street	Sacramento	California	95818
Alfred & Beatrice Helisten 099-100-041	568 Lakemead way	Emerald Hills	California	94062
Rocerick Whitney 099-100-043 and 099-100-42	10 North Street	Willits	California	95490

Oliver Lowe & Deborah Sciales 099-100-048 and 099-100-080	**125 Larkspur Street #201**	**San Rafael**	**California**	**94901**
Tea Sik Lee 099-100-025 and 099-100-50	**2652 Lake Ridge Shrs E**	**Reno**	**Nevada**	**89519**
Barbara Whitney 099-100-042	**700 E Gobbi Street #87**	**Ukiah**	**California**	**95482**
Matthew & Genevieve Antaky 099-100-063 and 099-100-064	**PO Box 5**	**Jenner**	**California**	**95450**
Richard & Sheila Rendall 099-100-087	**PO Box 1517**	**Terrebonne**	**Oregon**	**97760**
Wayne & Ann Royston 099-100-088	**1815 11th Street NE**	**Buffalo**	**Minnesota**	**55313**
Franklin Trailer Sales Inc 099-100-081 and 099-100-040	**2801 Ashbourne Drive**	**Sacramento**	**California**	**95821**
Joann McEachin & Wilhelm Steinfels 099-100-084	**1512 Sierra Drive**	**Petaluma**	**California**	**94954**
Kathleen Breeden 099-100-061	**6577 Bennett Valley Road**	**Santa Rosa**	**California**	**95404**
John & Carrie Kozubal 099-100-079 and 099-100-091 and 099-100-055	**PO Box 183**	**Jenner**	**California**	**95450**
Bonnie Jean Petit 099-100-052 and 099-100-021	**PO Box 793**	**North Plains**	**Oregon**	**97133**
Jewel Butler 099-100-075	**PO Box 249**	**Gasquet**	**California**	**95543**
James Carroll 099-100-068	**8994 San Antonio Ave**	**South Gate**	**California**	**90280**
HA Reynolds 099-100-022	**PO Box 12**	**Willits**	**California**	**95490**

Harlan Tranmer

From: Sharon Wieland Ph.D. <wielandconsulting@gmail.com>
Sent: Thursday, June 27, 2024 1:29 PM
To: Harlan Tranmer
Subject: Request for Information on Surface Domestic Water Supplies

Dear Harlan Tranmer:
In response to your June 25, 2024 request for information on surface domestic water supplies re: APN 099-090-013, 015, and 008 I am providing the following information:

- My husband and I own these properties and several more properties downstream from the property of Bruce Berry and along Jenner Gulch.
- Our surface water supply sources come primarily from Jenner Creek (Jenner Gulch).
- The organization responsible for recording water usage from the system that is meter based is SO CO P.I. CSA 41 Jenner, 2300 County Center Drive #A220, Santa Rosa, CA 95403.

Please let me know if you need any further information.
Sincerely,

Sharon Wieland
wielandconsulting@gmail.com
Telephone: 916-606-8235

6/27/2024

Domestic Water Response

Joann McEachin called. Absentee landowner in Jenner. She received our request for information. She said they granted an easement to the County for installation of a waterline but she does not know where it is or if it was ever installed. She was generally concerned but when I explained the project to her, the concerns seemed to be alleviated.

Harlan Tranmer RPF #2850

Russian River Utility

Website accessed 6/27/2024 at:

https://www.rruwater.com/countyWater.shtml#:~:text=The%20water%20supply%20consists%20of%20surface%20water%20pumped%20from%20Jenner,multimedia%20gravity%20filter%20treatment%20plant.

Jenner Water System
This system serves 123 customers. The water supply consists of surface water pumped from Jenner Creek. This raw water is treated in a multimedia gravity filter treatment plant. This plant is monitored by a remote telemetry system which transmits turbidity, disinfectant residual, and tank level to the RRU office in Forestville. Treated and disinfected water is stored in a 100,000-gallon tank. Russian River Utility monitors and controls this system with a remote radio telemetry system.

Jenner Water System (CSA # 41, Zone 34)

Department of Transportation & Public Works, County of Sonoma | August, 2015

Michael Keller
8645 Alden Lane
Windsor, CA. 95492
Tel# 707-484-5019
e-mail:jmichaelkel@comcast.net

Environmental Resource Solutions, Inc.
1221 Gravenstein Highway South
Sebastopol, CA

Subject: Berry's Knotfarm NTMP

As per your request, the Keller family has the right to use and divert water from Sheephouse Creek for domestic water purposes.

Water is used under	Pre-1914 Claim
Year diversion commenced	1945

The Ricioli family also has a similar right to water use from Sheephouse Creek for their permanently occupied rental house /property located to the north east of and adjoining our property.

Thank you,

Mike Keller

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

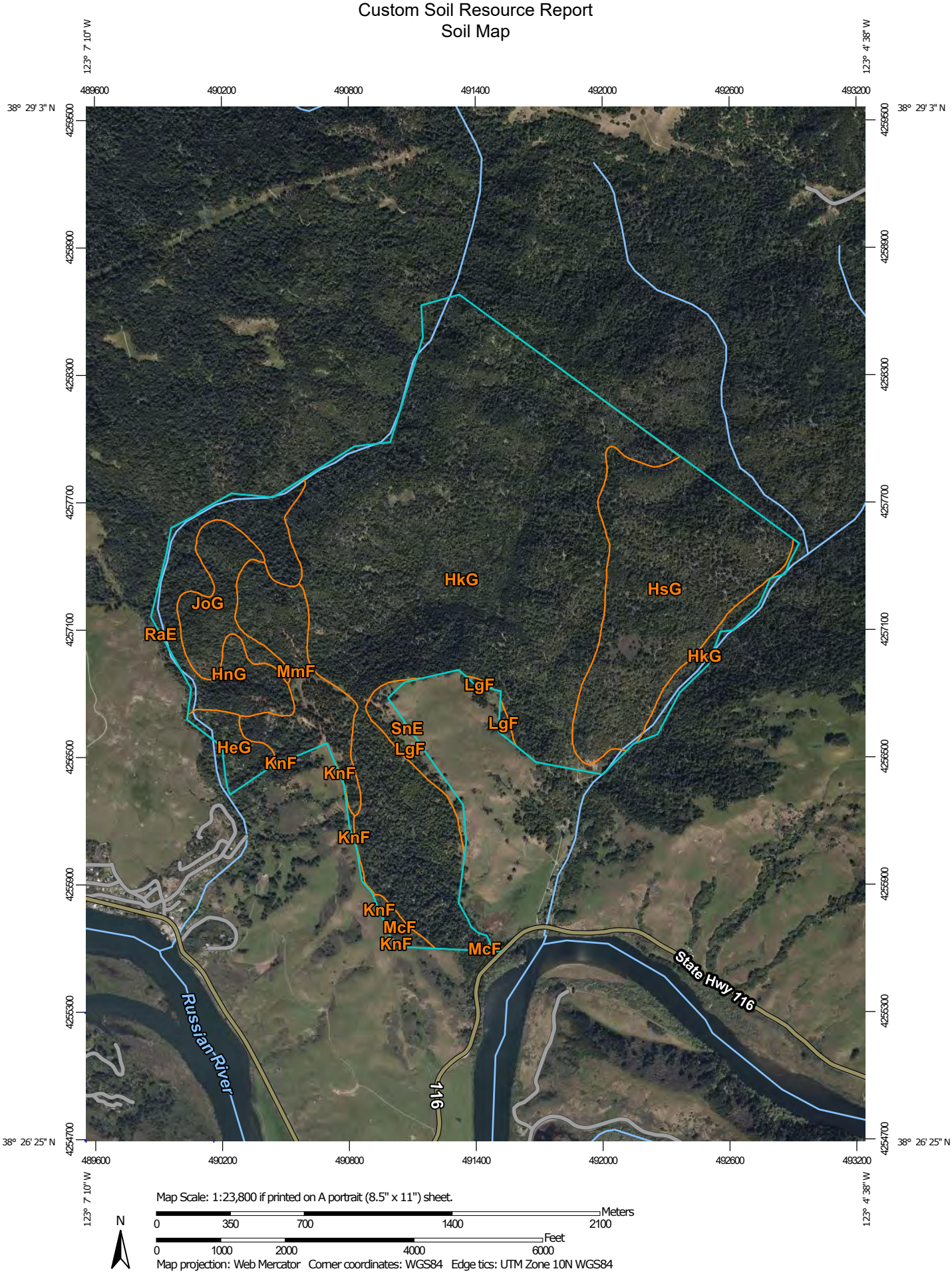
A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Sonoma County, California

Berry's Knotfarm

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


123° 7' 10" W
123° 4' 38" W
489600
490200
490800
491400
492000
492600
493200
38° 29' 3" N
38° 26' 25" N
4259500
4258900
4258300
4257700
4257100
4256500
4255900
4255300
4254700
HkG
HsG
JoG
RaE
HnG
MmF
LgF
SnE
HeG
KnF
McF
Russian River
State Hwy 116
116
Map Scale: 1:23,800 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0
350
700
1400
2100
Feet
0
1000
2000
4000
6000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sonoma County, California
Survey Area Data: Version 17, Sep 11, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HeG	Hely silt loam, 50 to 75 percent slopes	17.9	1.6%
HkG	Hugo very gravelly loam, 50 to 75 percent slopes	666.5	60.7%
HnG	Hugo-Josephine complex, 50 to 75 percent slopes	78.8	7.2%
HsG	Hugo-Hely complex, 50 to 75 percent slopes	195.2	17.8%
JoG	Josephine loam,50 to 75 percent slopes	42.8	3.9%
KnF	Kneeland loam, 30 to 50 percent slopes	1.7	0.2%
LgF	Laughlin loam, 30 to 50 percent slopes	19.1	1.7%
McF	Maymen gravelly sandy loam, 30 to 50 percent slopes	6.7	0.6%
MmF	Mendocino sandy clay loam, 30 to 50 percent slopes	69.4	6.3%
RaE	Raynor clay, 15 to 30 percent slopes	0.0	0.0%
SnE	Steinbeck loam, 15 to 30 percent slopes	0.2	0.0%
Totals for Area of Interest		**1,098.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called

noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can

be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Sonoma County, California

HeG—Hely silt loam, 50 to 75 percent slopes

Map Unit Setting

National map unit symbol: hfdz
Elevation: 800 to 2,000 feet
Mean annual precipitation: 40 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 240 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Hely and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hely

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 29 inches: silt loam
H3 - 29 to 59 inches: weathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F004BK103CA - Upper slopes and higher elevation mountains
Hydric soil rating: No

Minor Components

Hugo

Percent of map unit: 5 percent
Hydric soil rating: No

Josephine
Percent of map unit: 5 percent
Hydric soil rating: No

Laughlin
Percent of map unit: 5 percent
Hydric soil rating: No

HkG—Hugo very gravelly loam, 50 to 75 percent slopes

Map Unit Setting
National map unit symbol: hff4
Elevation: 800 to 3,000 feet
Mean annual precipitation: 60 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition
Hugo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hugo

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from sedimentary rock

Typical profile
H1 - 0 to 8 inches: very gravelly loam
H2 - 8 to 31 inches: gravelly sandy clay loam
H3 - 31 to 48 inches: gravelly clay loam
H4 - 48 to 59 inches: weathered bedrock

Properties and qualities
Slope: 50 to 75 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F004BK102CA - Fog-influenced, low elevation mountain slopes
Hydric soil rating: No

Minor Components

Josephine

Percent of map unit: 4 percent
Hydric soil rating: No

Laughlin

Percent of map unit: 4 percent
Hydric soil rating: No

Maymen

Percent of map unit: 4 percent
Hydric soil rating: No

Atwell

Percent of map unit: 3 percent
Hydric soil rating: No

HnG—Hugo-Josephine complex, 50 to 75 percent slopes

Map Unit Setting

National map unit symbol: hffc
Elevation: 800 to 5,000 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 55 to 57 degrees F
Frost-free period: 125 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Hugo and similar soils: 50 percent
Josephine and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hugo

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 8 inches: very gravelly loam
H2 - 8 to 31 inches: gravelly sandy clay loam
H3 - 31 to 48 inches: gravelly clay loam
H4 - 48 to 59 inches: weathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F004BK102CA - Fog-influenced, low elevation mountain slopes
Hydric soil rating: No

Description of Josephine

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 13 inches: loam
H2 - 13 to 25 inches: clay loam
H3 - 25 to 36 inches: fine sandy loam
H4 - 36 to 59 inches: weathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F004BK103CA - Upper slopes and higher elevation mountains

Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Hydric soil rating: No

HsG—Hugo-Hely complex, 50 to 75 percent slopes

Map Unit Setting

National map unit symbol: hffj
Elevation: 800 to 3,000 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 55 to 57 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Hugo and similar soils: 50 percent
Hely and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hugo

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 8 inches: very gravelly loam
H2 - 8 to 25 inches: gravelly sandy clay loam
H3 - 25 to 30 inches: gravelly clay loam
H4 - 30 to 59 inches: weathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F004BK102CA - Fog-influenced, low elevation mountain slopes
Hydric soil rating: No

Description of Hely

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 29 inches: silt loam
H3 - 29 to 59 inches: weathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F004BK103CA - Upper slopes and higher elevation mountains
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Hydric soil rating: No

JoG—Josephine loam,50 to 75 percent slopes

Map Unit Setting

National map unit symbol: hffw
Elevation: 1,200 to 5,000 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 125 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Josephine and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Josephine

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 13 inches: gravelly loam
H2 - 13 to 25 inches: gravelly clay loam
H3 - 25 to 36 inches: gravelly fine sandy loam
H4 - 36 to 59 inches: weathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F004BK103CA - Upper slopes and higher elevation mountains
Hydric soil rating: No

Minor Components

Laughlin
Percent of map unit: 4 percent
Hydric soil rating: No

Boomer
Percent of map unit: 4 percent
Hydric soil rating: No

Hugo
Percent of map unit: 4 percent
Hydric soil rating: No

Mendocino
Percent of map unit: 3 percent
Hydric soil rating: No

KnF—Kneeland loam, 30 to 50 percent slopes

Map Unit Setting
National map unit symbol: hfg8
Elevation: 3,000 feet
Mean annual precipitation: 40 inches
Mean annual air temperature: 54 degrees F
Frost-free period: 280 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition
Kneeland and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kneeland

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile
H1 - 0 to 13 inches: loam
H2 - 13 to 35 inches: clay loam
H3 - 35 to 45 inches: unweathered bedrock

Properties and qualities
Slope: 30 to 50 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R004BY062CA - Coastal Terrace Uplands
Hydric soil rating: No

Minor Components

Los osos

Percent of map unit: 5 percent
Hydric soil rating: No

Steinbeck

Percent of map unit: 5 percent
Hydric soil rating: No

Kinman

Percent of map unit: 5 percent
Hydric soil rating: No

LgF—Laughlin loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfgm
Elevation: 800 to 3,500 feet
Mean annual precipitation: 35 to 70 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 240 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Laughlin and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laughlin

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile
H1 - 0 to 4 inches: loam
H2 - 4 to 22 inches: sandy clay loam
H3 - 22 to 32 inches: unweathered bedrock

Properties and qualities
Slope: 30 to 50 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R004BY065CA - SHALLOW LOAMY UPLANDS
Hydric soil rating: No

Minor Components

Maymen
Percent of map unit: 5 percent
Hydric soil rating: No

Hugo
Percent of map unit: 5 percent
Hydric soil rating: No

Suther
Percent of map unit: 5 percent
Hydric soil rating: No

McF—Maymen gravelly sandy loam, 30 to 50 percent slopes

Map Unit Setting
National map unit symbol: hfh6
Elevation: 400 to 4,250 feet
Mean annual precipitation: 22 to 70 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 130 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition

Maymen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Maymen

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 12 inches: gravelly sandy loam
H2 - 12 to 18 inches: gravelly loam
H3 - 18 to 28 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R015XD131CA - VERY SHALLOW
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

Henneke

Percent of map unit: 2 percent
Hydric soil rating: No

Los gatos

Percent of map unit: 1 percent
Hydric soil rating: No

Hugo

Percent of map unit: 1 percent
Hydric soil rating: No

Huse

Percent of map unit: 1 percent
Hydric soil rating: No

MmF—Mendocino sandy clay loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfh9
Elevation: 1,500 feet
Mean annual precipitation: 40 to 65 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 285 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition

Mendocino and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mendocino

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 18 inches: sandy clay loam
H2 - 18 to 40 inches: sandy clay
H3 - 40 to 59 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C

Ecological site: F004BK102CA - Fog-influenced, low elevation mountain slopes
Hydric soil rating: No

Minor Components

Empire
Percent of map unit: 5 percent
Hydric soil rating: No

Goldridge
Percent of map unit: 5 percent
Hydric soil rating: No

Hugo
Percent of map unit: 5 percent
Hydric soil rating: No

RaE—Raynor clay, 15 to 30 percent slopes

Map Unit Setting
National map unit symbol: hfhz
Elevation: 200 to 1,200 feet
Mean annual precipitation: 22 to 35 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 260 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition
Raynor and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Raynor

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from igneous rock

Typical profile
H1 - 0 to 17 inches: clay
H2 - 17 to 35 inches: clay
H3 - 35 to 45 inches: very cobbly clay
H4 - 45 to 60 inches: fragmental material

Properties and qualities
Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 47 inches to strongly contrasting textural stratification
Drainage class: Well drained

Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R014XC009CA - CLAYEY HILLS
Hydric soil rating: No

Minor Components

Goulding
Percent of map unit: 5 percent
Hydric soil rating: No

Diablo
Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop
Percent of map unit: 5 percent
Hydric soil rating: No

SnE—Steinbeck loam, 15 to 30 percent slopes

Map Unit Setting
National map unit symbol: hfjy
Elevation: 1,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 250 to 270 days
Farmland classification: Not prime farmland

Map Unit Composition
Steinbeck and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Steinbeck

Setting
Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 16 inches: fine sandy loam
H3 - 16 to 35 inches: sandy clay loam
H4 - 35 to 59 inches: weathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R015XD126CA - LOAMY UPLAND
Hydric soil rating: No

Minor Components

Los osos

Percent of map unit: 5 percent
Hydric soil rating: No

Cotati

Percent of map unit: 5 percent
Hydric soil rating: No

Goldridge

Percent of map unit: 5 percent
Hydric soil rating: No

ESTIMATED SURFACE SOIL EROSION HAZARD
RM-87 (4/84)

STATE OF CALIFORNIA
BOARD OF FORESTRY

Soil: HeG Hely silt loam, 50-75% slopes

I . SOIL FACTORS	**A= Slopes <30, B= 30-60, C=60+%**			FACTOR RATING BY AREA		
A. SOIL TEXTURE	FINE	MEDIUM	COURSE	A	B	C
1. DETACHABILITY	Low	Moderate	High			
RATING	1-9	10-18	19-30	**14**	**14**	
2. PERMABILITY	Slow	Moderate	Rapid			
RATING	5-4	3-2	1	**3**	**3**	

B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK

	Shallow	Moderate	Deep			
	1"-19"	20"-39"	40"-60" +			
Rating	15-9	8-4	3-1	**6**	**6**	

C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2 MM IN SIZE INCLUDING ROCKS OR STONES

	Low	Moderate	High				FACTOR RATING BY AREA		
	(-) 10-39%	40-70%	71-100%						
Rating	10-6	5-3	2-1	**10**	**10**		A	B	C
						SUBTOTAL	**33**	**33**	

II. SLOPE FACTOR

Slope	5-15%	16-30%	31-40%	41-50%	51-70%	71-80% (+)			
Rating	1-3	4-6	7-10	11-15	16-25	26-35	**11**	**25**	

III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE

	Low		Moderate		High				
	0-40%		41-80%		81-100%				
Rating	15-8		7-4		3-1		**3**	**3**	

IV. TWO-YEAR, ONE-HOUR RAINFALL INTENSITY (Hundredths Inch)

	Low	Moderate	High	Extreme				
	(-) 30-39	40-59	60-69	70-80 (+)				
Rating	1-3	4-7	8-11	12-15		**12**	**12**	

TOTAL SUM OF FACTORS ------>	**59**	**73**	

EROSION HAZARD RATING

<50	50-65	66-75	>75			
Low (L)	Moderate (M)	High (H)	Extreme (E)			
THE DETERMINATION IS -------->				**M**	**H**	

7540-130-0435

ESTIMATED SURFACE SOIL EROSION HAZARD
RM-87 (4/84)

STATE OF CALIFORNIA
BOARD OF FORESTRY

Soil: **HkG** **Hugo very gravelly loam, 50-75% slopes**

I . SOIL FACTORS A = 50%, B = 60%, C = 70%				FACTOR RATING BY AREA		
A. SOIL TEXTURE	FINE	MEDIUM	COURSE	A	B	C
1. DETACHABILITY	Low	Moderate	High			
RATING	1-9	10-18	19-30	**17**	**17**	**17**
2. PERMABILITY	Slow	Moderate	Rapid			
RATING	5-4	3-2	1	**3**	**3**	**3**

B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK

	Shallow	Moderate	Deep			
	1"-19"	20"-39"	40"-60" +			
Rating	15-9	8-4	3-1	**3**	**3**	**3**

C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2 MM IN SIZE INCLUDING ROCKS OR STONES

	Low	Moderate	High				FACTOR RATING BY AREA		
	(-) 10-39%	40-70%	71-100%						
Rating	10-6	5-3	2-1	**3**	**3**	**3**	A	B	C
						SUBTOTAL	**26**	**26**	**26**

II. SLOPE FACTOR

Slope	5-15%	16-30%	31-40%	41-50%	51-70%	71-80% (+)			
Rating	1-3	4-6	7-10	11-15	16-25	26-35	**5**	**24**	**32**

III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE

	Low		Moderate		High				
	0-40%		41-80%		81-100%				
Rating	15-8		7-4		3-1		**3**	**3**	**3**

IV. TWO-YEAR, ONE-HOUR RAINFALL INTENSITY (Hundredths Inch)

	Low	Moderate	High	Extreme				
	(-) 30-39	40-59	60-69	70-80 (+)				
Rating	1-3	4-7	8-11	12-15		**12**	**12**	**12**
				TOTAL SUM OF FACTORS ------>		**46**	**65**	**73**

EROSION HAZARD RATING

<50	50-65	66-75	>75			
Low (L)	Moderate (M)	High (H)	Extreme (E)			
			THE DETERMINATION IS -------->	**L**	**M**	**H**

7540-130-0435

ESTIMATED SURFACE SOIL EROSION HAZARD
RM-87 (4/84)

STATE OF CALIFORNIA
BOARD OF FORESTRY

Soil: **HnG** **Hugo-Josephine complex, 50-75% slopes**

I . SOIL FACTORS N = 50%, O = 60%, P = 70%				FACTOR RATING BY AREA		
A. SOIL TEXTURE	FINE	MEDIUM	COURSE	N	O	P
1. DETACHABILITY	Low	Moderate	High			
RATING	1-9	10-18	19-30	**17**	**17**	
2. PERMABILITY	Slow	Moderate	Rapid			
RATING	5-4	3-2	1	**3**	**3**	

B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK

	Shallow	Moderate	Deep			
	1"-19"	20"-39"	40"-60" +			
Rating	15-9	8-4	3-1	**2**	**2**	

C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2 MM IN SIZE INCLUDING ROCKS OR STONES

	Low	Moderate	High				FACTOR RATING BY AREA		
	(-) 10-39%	40-70%	71-100%						
Rating	10-6	5-3	2-1	**5**	**5**		N	O	P
						SUBTOTAL	**27**	**27**	

II. SLOPE FACTOR

Slope	5-15%	16-30%	31-40%	41-50%	51-70%	71-80% (+)			
Rating	1-3	4-6	7-10	11-15	16-25	26-35	**4**	**20**	

III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE

	Low		Moderate		High				
	0-40%		41-80%		81-100%				
Rating	15-8		7-4		3-1		**3**	**3**	

IV. TWO-YEAR, ONE-HOUR RAINFALL INTENSITY (Hundredths Inch)

	Low	Moderate	High	Extreme				
	(-) 30-39	40-59	60-69	70-80 (+)				
Rating	1-3	4-7	8-11	12-15		**12**	**12**	
				TOTAL SUM OF FACTORS ------>		**46**	**62**	

EROSION HAZARD RATING

<50	50-65	66-75	>75			
Low (L)	Moderate (M)	High (H)	Extreme (E)			
		THE DETERMINATION IS -------->		**L**	**M**	

7540-130-0435

ESTIMATED SURFACE SOIL EROSION HAZARD
RM-87 (4/84)

STATE OF CALIFORNIA
BOARD OF FORESTRY

Soil: **HsG** **Hugo-Hely complex, 50-75% slopes**

I . SOIL FACTORS Q = 50%, R = 60%, S = 70%				FACTOR RATING BY AREA		
A. SOIL TEXTURE	FINE	MEDIUM	COURSE	Q	R	S
1. DETACHABILITY	Low	Moderate	High			
RATING	1-9	10-18	19-30	**16**	**16**	
2. PERMABILITY	Slow	Moderate	Rapid			
RATING	5-4	3-2	1	**3**	**3**	

B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK

	Shallow	Moderate	Deep			
	1"-19"	20"-39"	40"-60" +			
Rating	15-9	8-4	3-1	**5**	**5**	

C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2 MM IN SIZE INCLUDING ROCKS OR STONES

	Low	Moderate	High				FACTOR RATING BY AREA		
	(-) 10-39%	40-70%	71-100%						
Rating	10-6	5-3	2-1	**4**	**4**		Q	R	S
						SUBTOTAL	**28**	**28**	

II. SLOPE FACTOR

Slope	5-15%	16-30%	31-40%	41-50%	51-70%	71-80% (+)			
Rating	1-3	4-6	7-10	11-15	16-25	26-35	**15**	**30**	

III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE

	Low		Moderate		High				
	0-40%		41-80%		81-100%				
Rating	15-8		7-4		3-1		**3**	**3**	

IV. TWO-YEAR, ONE-HOUR RAINFALL INTENSITY (Hundredths Inch)

	Low	Moderate	High	Extreme				
	(-) 30-39	40-59	60-69	70-80 (+)				
Rating	1-3	4-7	8-11	12-15		**12**	**12**	
				TOTAL SUM OF FACTORS ------>		**58**	**73**	

EROSION HAZARD RATING

<50	50-65	66-75	>75			
Low (L)	Moderate (M)	High (H)	Extreme (E)			
		THE DETERMINATION IS -------->		**M**	**H**	

7540-130-0435

ESTIMATED SURFACE SOIL EROSION HAZARD
RM-87 (4/84)

STATE OF CALIFORNIA
BOARD OF FORESTRY

Soil: JoG **Josephine loam, 50-75% slopes**

I . SOIL FACTORS E = 50%, F = 60%, G = 70%				FACTOR RATING BY AREA		
A. SOIL TEXTURE	FINE	MEDIUM	COURSE	A	B	C
1. DETACHABILITY	Low	Moderate	High			
RATING	1-9	10-18	19-30	**17**		
2. PERMABILITY	Slow	Moderate	Rapid			
RATING	5-4	3-2	1	**3**		

B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK

	Shallow	Moderate	Deep			
	1"-19"	20"-39"	40"-60" +			
Rating	15-9	8-4	3-1	**4**		

C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2 MM IN SIZE INCLUDING ROCKS OR STONES

	Low	Moderate	High				FACTOR RATING BY AREA		
	(-) 10-39%	40-70%	71-100%						
Rating	10-6	5-3	2-1	**7**			A	B	C
						SUBTOTAL	**31**		

II. SLOPE FACTOR

Slope	5-15%	16-30%	31-40%	41-50%	51-70%	71-80% (+)			
Rating	1-3	4-6	7-10	11-15	16-25	26-35	**13**		

III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE

	Low		Moderate		High				
	0-40%		41-80%		81-100%				
Rating	15-8		7-4		3-1		**3**		

IV. TWO-YEAR, ONE-HOUR RAINFALL INTENSITY (Hundredths Inch)

	Low	Moderate	High	Extreme				
	(-) 30-39	40-59	60-69	70-80 (+)				
Rating	1-3	4-7	8-11	12-15		**12**		
				TOTAL SUM OF FACTORS ------>		**59**		

EROSION HAZARD RATING

<50	50-65	66-75	>75			
Low (L)	Moderate (M)	High (H)	Extreme (E)			
		THE DETERMINATION IS -------->		**M**		

7540-130-0435

ESTIMATED SURFACE SOIL EROSION HAZARD
RM-87 (4/84)

STATE OF CALIFORNIA
BOARD OF FORESTRY

Soil: **LgF** **Laughlin loam, 30-50% slopes**

I . SOIL FACTORS A = 30%, B = 40%, C = 50%				FACTOR RATING BY AREA		
A. SOIL TEXTURE	FINE	MEDIUM	COURSE	A	B	C
1. DETACHABILITY	Low	Moderate	High			
RATING	1-9	10-18	19-30	**17**		
2. PERMABILITY	Slow	Moderate	Rapid			
RATING	5-4	3-2	1	**3**		

B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK

	Shallow	Moderate	Deep			
	1"-19"	20"-39"	40"-60" +			
Rating	15-9	8-4	3-1	**7**		

C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2 MM IN SIZE INCLUDING ROCKS OR STONES

	Low	Moderate	High				FACTOR RATING BY AREA		
	(-) 10-39%	40-70%	71-100%						
Rating	10-6	5-3	2-1	**7**			A	B	C
						SUBTOTAL	**34**		

II. SLOPE FACTOR

Slope	5-15%	16-30%	31-40%	41-50%	51-70%	71-80% (+)			
Rating	1-3	4-6	7-10	11-15	16-25	26-35	**8**		

III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE

	Low		Moderate		High				
	0-40%		41-80%		81-100%				
Rating	15-8		7-4		3-1		**3**		

IV. TWO-YEAR, ONE-HOUR RAINFALL INTENSITY (Hundredths Inch)

	Low	Moderate	High	Extreme				
	(-) 30-39	40-59	60-69	70-80 (+)				
Rating	1-3	4-7	8-11	12-15		**12**		
				TOTAL SUM OF FACTORS ------>		**57**		

EROSION HAZARD RATING

<50	50-65	66-75	>75			
Low (L)	Moderate (M)	High (H)	Extreme (E)			
		THE DETERMINATION IS -------->		**M**		

7540-130-0435

ESTIMATED SURFACE SOIL EROSION HAZARD
RM-87 (4/84)

STATE OF CALIFORNIA
BOARD OF FORESTRY

Soil: **McF** **Maymen gravelly sandy loam, 30-50% slopes**

I . SOIL FACTORS T = 30%, U = 50%, V = 70%				FACTOR RATING BY AREA		
A. SOIL TEXTURE	FINE	MEDIUM	COURSE	T	U	V
1. DETACHABILITY	Low	Moderate	High			
RATING	1-9	10-18	19-30	**23**	**23**	
2. PERMABILITY	Slow	Moderate	Rapid			
RATING	5-4	3-2	1	**3**	**3**	

B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK

	Shallow	Moderate	Deep			
	1"-19"	20"-39"	40"-60" +			
Rating	15-9	8-4	3-1	**9**	**9**	

C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2 MM IN SIZE INCLUDING ROCKS OR STONES

	Low	Moderate	High				FACTOR RATING BY AREA		
	(-) 10-39%	40-70%	71-100%						
Rating	10-6	5-3	2-1	**2**	**2**		T	U	V
						SUBTOTAL	**37**	**37**	

II. SLOPE FACTOR

Slope	5-15%	16-30%	31-40%	41-50%	51-70%	71-80% (+)			
Rating	1-3	4-6	7-10	11-15	16-25	26-35	**10**	**20**	

III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE

	Low		Moderate		High				
	0-40%		41-80%		81-100%				
Rating	15-8		7-4		3-1		**3**	**3**	

IV. TWO-YEAR, ONE-HOUR RAINFALL INTENSITY (Hundredths Inch)

	Low	Moderate	High	Extreme				
	(-) 30-39	40-59	60-69	70-80 (+)				
Rating	1-3	4-7	8-11	12-15		**12**	**12**	
				TOTAL SUM OF FACTORS ------>		**62**	**72**	

EROSION HAZARD RATING

<50	50-65	66-75	>75			
Low (L)	Moderate (M)	High (H)	Extreme (E)			
			THE DETERMINATION IS -------->	**M**	**H**	

7540-130-0435

ESTIMATED SURFACE SOIL EROSION HAZARD
RM-87 (4/84)

STATE OF CALIFORNIA
BOARD OF FORESTRY

Soil: MmF Mendocino sandy clay loam, 30-50% slopes

I . SOIL FACTORS	**A= Slopes <30, B= 30-60, C=60+%**			FACTOR RATING BY AREA		
A. SOIL TEXTURE	FINE	MEDIUM	COURSE	A	B	C
1. DETACHABILITY	Low	Moderate	High			
RATING	1-9	10-18	19-30	**16**	**16**	
2. PERMABILITY	Slow	Moderate	Rapid			
RATING	5-4	3-2	1	**3**	**3**	

B. DEPTH TO RESTRICTIVE LAYER OR BEDROCK

	Shallow	Moderate	Deep			
	1"-19"	20"-39"	40"-60" +			
Rating	15-9	8-4	3-1	**2**	**2**	

C. PERCENT SURFACE COARSE FRAGMENTS GREATER THAN 2 MM IN SIZE INCLUDING ROCKS OR STONES

	Low	Moderate	High				FACTOR RATING BY AREA		
	(-) 10-39%	40-70%	71-100%						
Rating	10-6	5-3	2-1	**10**	**10**		A	B	C
						SUBTOTAL	**31**	**31**	

II. SLOPE FACTOR

Slope	5-15%	16-30%	31-40%	41-50%	51-70%	71-80% (+)			
Rating	1-3	4-6	7-10	11-15	16-25	26-35	**3**	**13**	

III. PROTECTIVE VEGETATIVE COVER REMAINING AFTER DISTURBANCE

	Low		Moderate		High				
	0-40%		41-80%		81-100%				
Rating	15-8		7-4		3-1		**3**	**3**	

IV. TWO-YEAR, ONE-HOUR RAINFALL INTENSITY (Hundredths Inch)

	Low	Moderate	High	Extreme				
	(-) 30-39	40-59	60-69	70-80 (+)				
Rating	1-3	4-7	8-11	12-15		**12**	**12**	
				TOTAL SUM OF FACTORS ------>		**49**	**59**	

EROSION HAZARD RATING

<50	50-65	66-75	>75			
Low (L)	Moderate (M)	High (H)	Extreme (E)			
			THE DETERMINATION IS -------->	**L**	**M**	

7540-130-0435

CALIFORNIA
NATIVE PLANT SOCIETY

CNPS Rare Plant Inventory

Search Results

102 matches found. Click on scientific name for details

Search Criteria: 9-Quad include [3812258:3812352:3812351:3812341:3812238:3812331:3812342:3812248]

▲ SCIENTIFIC NAME	COMMON NAME	FED LIST	STATE LIST	CA RARE PLANT RANK
Abronia umbellata var. *breviflora*	pink sand-verbena	None	None	1B.1
Agrostis blasdalei	Blasdale's bent grass	None	None	1B.2
Allium peninsulare var. *franciscanum*	Franciscan onion	None	None	1B.2
Alopecurus aequalis var. *sonomensis*	Sonoma alopecurus	FE	None	1B.1
Amorpha californica var. *napensis*	Napa false indigo	None	None	1B.2
Amsinckia lunaris	bent-flowered fiddleneck	None	None	1B.2
Arabis blepharophylla	coast rockcress	None	None	4.3
Arctostaphylos bakeri ssp. *bakeri*	Baker's manzanita	None	CR	1B.1
Arctostaphylos bakeri ssp. *sublaevis*	Cedars manzanita	None	CR	1B.2
Arctostaphylos hispidula	Howell's manzanita	None	None	4.2
Arctostaphylos stanfordiana ssp. *decumbens*	Rincon Ridge manzanita	None	None	1B.1
Asclepias solanoana	serpentine milkweed	None	None	4.2
Calamagrostis crassiglumis	Thurber's reed grass	None	None	2B.1
Calamagrostis ophitidis	serpentine reed grass	None	None	4.3
Calochortus raichei	Cedars fairy-lantern	None	None	1B.2
Calochortus uniflorus	pink star-tulip	None	None	4.2
Calystegia collina ssp. *oxyphylla*	Mt. Saint Helena morning-glory	None	None	4.2
Calystegia purpurata ssp. *saxicola*	coastal bluff morning-glory	None	None	1B.2
Carex comosa	bristly sedge	None	None	2B.1
Carex saliniformis	deceiving sedge	None	None	1B.2
Castilleja ambigua var. *ambigua*	johnny-nip	None	None	4.2
Castilleja latifolia	Monterey Coast paintbrush	None	None	4.3
Ceanothus confusus	Rincon Ridge ceanothus	None	None	1B.1
Ceanothus foliosus var. *vineatus*	Vine Hill ceanothus	None	None	1B.1
Ceanothus gloriosus var. *exaltatus*	glory brush	None	None	4.3
Ceanothus gloriosus var. *gloriosus*	Point Reyes ceanothus	None	None	4.3
Ceanothus purpureus	holly-leaved ceanothus	None	None	1B.2
Chlorogalum pomeridianum var. *minus*	dwarf soaproot	None	None	1B.2
Chloropyron maritimum ssp. *palustre*	Point Reyes salty bird's-beak	None	None	1B.2

▲ SCIENTIFIC NAME	COMMON NAME	FED LIST	STATE LIST	CA RARE PLANT RANK
Chorizanthe cuspidata var. *cuspidata*	San Francisco Bay spineflower	None	None	1B.2
Chorizanthe cuspidata var. *villosa*	woolly-headed spineflower	None	None	1B.2
Chorizanthe valida	Sonoma spineflower	FE	CE	1B.1
Cirsium andrewsii	Franciscan thistle	None	None	1B.2
Collomia diversifolia	serpentine collomia	None	None	4.3
Cordylanthus tenuis ssp. *brunneus*	serpentine bird's-beak	None	None	4.3
Cordylanthus tenuis ssp. *capillaris*	Pennell's bird's-beak	FE	CR	1B.2
Cuscuta pacifica var. *papillata*	Mendocino dodder	None	None	1B.2
Cypripedium californicum	California lady's-slipper	None	None	4.2
Cypripedium montanum	mountain lady's-slipper	None	None	4.2
Delphinium bakeri	Baker's larkspur	FE	CE	1B.1
Delphinium luteum	golden larkspur	FE	CR	1B.1
Dirca occidentalis	western leatherwood	None	None	1B.2
Eastwoodiella californica	swamp harebell	None	None	1B.2
Eleocharis parvula	small spikerush	None	None	4.3
Elymus californicus	California bottle-brush grass	None	None	4.3
Erigeron biolettii	streamside daisy	None	None	3
Erigeron greenei	Greene's narrow-leaved daisy	None	None	1B.2
Erigeron serpentinus	serpentine daisy	None	None	1B.3
Eriogonum cedrorum	Cedars buckwheat	None	None	1B.3
Eriogonum ternatum	ternate buckwheat	None	None	4.3
Erysimum concinnum	bluff wallflower	None	None	1B.2
Erysimum franciscanum	San Francisco wallflower	None	None	4.2
Erythranthe nudata	bare monkeyflower	None	None	4.3
Fissidens pauperculus	minute pocket moss	None	None	1B.2
Fritillaria liliacea	fragrant fritillary	None	None	1B.2
Gilia capitata ssp. *chamissonis*	blue coast gilia	None	None	1B.1
Gilia capitata ssp. *pacifica*	Pacific gilia	None	None	1B.2
Gilia capitata ssp. *tomentosa*	woolly-headed gilia	None	None	1B.1
Gilia millefoliata	dark-eyed gilia	None	None	1B.2
Hemizonia congesta ssp. *congesta*	congested-headed hayfield tarplant	None	None	1B.2
Hesperevax sparsiflora var. *brevifolia*	short-leaved evax	None	None	1B.2
Horkelia marinensis	Point Reyes horkelia	None	None	1B.2
Horkelia tenuiloba	thin-lobed horkelia	None	None	1B.2
Hosackia gracilis	harlequin lotus	None	None	4.2
Iris longipetala	coast iris	None	None	4.2
Kopsiopsis hookeri	small groundcone	None	None	2B.3
Lasthenia californica ssp. *bakeri*	Baker's goldfields	None	None	1B.2

▲ SCIENTIFIC NAME	COMMON NAME	FED LIST	STATE LIST	CA RARE PLANT RANK
Lasthenia californica ssp. macrantha	perennial goldfields	None	None	1B.2
Lasthenia conjugens	Contra Costa goldfields	FE	None	1B.1
Lathyrus palustris	marsh pea	None	None	2B.2
Leptosiphon aureus	bristly leptosiphon	None	None	4.2
Leptosiphon grandiflorus	large-flowered leptosiphon	None	None	4.2
Leptosiphon jepsonii	Jepson's leptosiphon	None	None	1B.2
Leptosiphon rosaceus	rose leptosiphon	None	None	1B.1
Lessingia arachnoidea	Crystal Springs lessingia	None	None	1B.2
Lessingia hololeuca	woolly-headed lessingia	None	None	3
Limnanthes vinculans	Sebastopol meadowfoam	FE	CE	1B.1
Lupinus tidestromii	Tidestrom's lupine	FE	CE	1B.1
Microseris paludosa	marsh microseris	None	None	1B.2
Monardella viridis	green monardella	None	None	4.3
Piperia candida	white-flowered rein orchid	None	None	1B.2
Piperia leptopetala	narrow-petaled rein orchid	None	None	4.3
Pleuropogon hooverianus	North Coast semaphore grass	None	CT	1B.1
Polemonium carneum	Oregon polemonium	None	None	2B.2
Polygonum marinense	Marin knotweed	None	None	3.1
Ramalina thrausta	angel's hair lichen	None	None	2B.1
Ranunculus lobbii	Lobb's aquatic buttercup	None	None	4.2
Sidalcea calycosa ssp. rhizomata	Point Reyes checkerbloom	None	None	1B.2
Sidalcea malviflora ssp. purpurea	purple-stemmed checkerbloom	None	None	1B.2
Silene scouleri ssp. scouleri	Scouler's catchfly	None	None	2B.2
Streptanthus barbiger	bearded jewelflower	None	None	4.2
Streptanthus glandulosus ssp. hoffmanii	Hoffman's bristly jewelflower	None	None	1B.3
Streptanthus morrisonii ssp. hirtiflorus	Dorr's Cabin jewelflower	None	None	1B.2
Streptanthus morrisonii ssp. morrisonii	Morrison's jewelflower	None	None	1B.2
Thamnolia vermicularis	whiteworm lichen	None	None	2B.1
Trichostema ovatum	San Joaquin bluecurls	None	None	4.2
Trifolium amoenum	two-fork clover	FE	None	1B.1
Trifolium buckwestiorum	Santa Cruz clover	None	None	1B.1
Trifolium hydrophilum	saline clover	None	None	1B.2
Triphysaria floribunda	San Francisco owl's-clover	None	None	1B.2
Triquetrella californica	coastal triquetrella	None	None	1B.2
Usnea longissima	Methuselah's beard lichen	None	None	4.2

Showing 1 to 102 of 102 entries

Suggested Citation:

California Native Plant Society, Rare Plant Program. 2024. Rare Plant Inventory (online edition, v9.5). Website https://

www.rareplants.cnps.org [accessed 28 March 2024].

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

Query Summary:
Quad IS (Duncans Mills (3812341) OR Valley Ford (3812238) OR Bodega Head (3812331) OR Camp Meeker (3812248) OR Arched Rock (3812342) OR Guerneville (3812258) OR Cazadero (3812351) OR Fort Ross (3812352))
AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)
AND Federal Listing Status IS (Endangered OR Threatened) OR State Listing Status IS (Endangered OR Threatened OR Rare OR Candidate Endangered OR Candidate Threatened)

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CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	960	2	None	Threatened	G1G2	S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	2226	3	None	Candidate Endangered	G4	S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Bombus occidentalis	western bumble bee	Insects	IIHYM24252	306	6	None	Candidate Endangered	G3	S1	null	IUCN_VU-Vulnerable, USFS_S-Sensitive	null
Charadrius nivosus nivosus	western snowy plover	Birds	ABNNB03031	140	2	Threatened	None	G3T3	S3	null	CDFW_SSC-Species of Special Concern	Great Basin standing waters, Sand shore, Wetland
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Birds	ABNRB02022	165	1	Threatened	Endangered	G5T2T3	S1	null	BLM_S-Sensitive, USFS_S-Sensitive	Riparian forest
Eucyclogobius newberryi	tidewater goby	Fish	AFCQN04010	127	4	Endangered	None	G3	S3	null	AFS_EN-Endangered, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	Aquatic, Klamath/North coast flowing waters, Sacramento/San Joaquin flowing waters, South coast flowing waters
Oncorhynchus kisutch pop. 4	coho salmon - central California coast ESU	Fish	AFCHA02034	23	13	Endangered	Endangered	G5T2Q	S2	null	AFS_EN-Endangered	Aquatic
Oncorhynchus mykiss irideus pop. 49	steelhead - northern California DPS winter-run	Fish	AFCHA0213Q	96	3	Threatened	None	G5T3Q	S3	null	AFS_TH-Threatened, CDFW_SSC-Species of Special Concern	Aquatic, Estuary, Klamath/North coast flowing waters

Oncorhynchus mykiss irideus pop. 8	steelhead - central California coast DPS	Fish	AFCHA0209G	55	7	Threatened	None	G5T3Q	S3	null	AFS_TH-Threatened, CDFW_SSC-Species of Special Concern	Aquatic, Sacramento/San Joaquin flowing waters
Rana draytonii	California red-legged frog	Amphibians	AAABH01022	1797	27	Threatened	None	G2G3	S2S3	null	CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable	Aquatic, Artificial flowing waters, Artificial standing waters, Freshwater marsh, Marsh & swamp, Riparian forest, Riparian scrub, Riparian woodland, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Riparia riparia	bank swallow	Birds	ABPAU08010	299	1	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern	Riparian scrub, Riparian woodland
Speyeria zerene myrtleae	Myrtle's silverspot butterfly	Insects	IILEPJ608C	17	10	Endangered	None	G5T1	S1	null	null	Coastal dunes
Spirinchus thaleichthys pop. 2	longfin smelt - San Francisco Bay-Delta DPS	Fish	AFCHB03040	35	2	Endangered	Threatened	G5TNRQ	S1	null	IUCN_LC-Least Concern	Aquatic, Estuary, Marine bay, Sacramento/San Joaquin flowing waters
Syncaris pacifica	California freshwater shrimp	Crustaceans	ICMAL27010	20	8	Endangered	Endangered	G2	S2	null	IUCN_EN-Endangered	Aquatic, Sacramento/San Joaquin flowing waters
Thaleichthys pacificus	eulachon	Fish	AFCHB04010	10	1	Threatened	None	G4	S1	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Aquatic, Klamath/North coast flowing waters

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

Query Summary:
Quad IS (Duncans Mills (3812341) OR Valley Ford (3812238) OR Bodega Head (3812331) OR Camp Meeker (3812248) OR Arched Rock (3812342) OR Guerneville (3812258) OR Cazadero (3812351) OR Fort Ross (3812352))
AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)
AND Other Status CONTAINS (CDF_S-Sensitive OR CDFW_FP-Fully Protected OR CDFW_SSC-Species of Special Concern OR CDFW_WL-Watch List OR MMC_SSC-Species of Special Concern)

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CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Actinemys marmorata	northwestern pond turtle	Reptiles	ARAAD02031	1160	27	Proposed Threatened	None	G2	SNR	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive	null
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	960	2	None	Threatened	G1G2	S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Antrozous pallidus	pallid bat	Mammals	AMACC10010	425	3	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive	Chaparral, Coastal scrub, Desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Riparian woodland, Sonoran desert scrub, Upper montane coniferous forest, Valley & foothill grassland
Arborimus pomo	Sonoma tree vole	Mammals	AMAFF23030	222	16	None	None	G3	S3	null	CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	North coast coniferous forest, Oldgrowth, Redwood
Ardea alba	great egret	Birds	ABNGA04040	43	1	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Ardea herodias	great blue heron	Birds	ABNGA04010	156	1	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	2226	3	None	Candidate Endangered	G4	S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern,	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland

											USFWS_BCC-Birds of Conservation Concern	
Cerorhinca monocerata	rhinoceros auklet	Birds	ABNNN11010	10	1	None	None	G5	S3	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	null
Charadrius nivosus nivosus	western snowy plover	Birds	ABNNB03031	140	2	Threatened	None	G3T3	S3	null	CDFW_SSC-Species of Special Concern	Great Basin standing waters, Sand shore, Wetland
Corynorhinus townsendii	Townsend's big-eared bat	Mammals	AMACC08010	635	6	None	None	G4	S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive	Broadleaved upland forest, Chaparral, Chenopod scrub, Great Basin grassland, Great Basin scrub, Joshua tree woodland, Lower montane coniferous forest, Meadow & seep, Mojavean desert scrub, Riparian forest, Riparian woodland, Sonoran desert scrub, Sonoran thorn woodland, Upper montane coniferous forest, Valley & foothill grassland
Cypseloides niger	black swift	Birds	ABNUA01010	46	1	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFWS_BCC-Birds of Conservation Concern	null
Dicamptodon ensatus	California giant salamander	Amphibians	AAAAH01020	254	38	None	None	G2G3	S2S3	null	CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	Aquatic, Meadow & seep, North coast coniferous forest, Riparian forest
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	190	1	None	None	G5	S3S4	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_LC-Least Concern	Cismontane woodland, Marsh & swamp, Riparian woodland, Valley & foothill grassland, Wetland
Eucyclogobius newberryi	tidewater goby	Fish	AFCQN04010	127	4	Endangered	None	G3	S3	null	AFS_EN-Endangered, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	Aquatic, Klamath/North coast flowing waters, Sacramento/San Joaquin flowing waters, South coast flowing waters
Eumetopias jubatus	Steller sea lion	Mammals	AMAJC03010	38	1	Delisted	None	G3	S2	null	IUCN_NT-Near Threatened, MMC_SSC-Species of Special Concern	Marine intertidal & splash zone communities, Protected deepwater coastal communities, Rock shore
Fratercula cirrhata	tufted puffin	Birds	ABNNN12010	17	1	None	None	G5	S1S2	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Protected deepwater coastal communities
Hesperoleucus parvipinnis	Gualala roach	Fish	AFCJB19025	4	1	None	None	G3	S3	null	CDFW_SSC-Species of Special Concern	Aquatic, Klamath/North coast flowing waters

Hysterocarpus traskii pomo	Russian River tule perch	Fish	AFCQK02011	4	2	None	None	G5T4	S4	null	AFS_VU-Vulnerable, CDFW_SSC-Species of Special Concern	Aquatic, Klamath/North coast flowing waters
Lasiurus frantzii	western red bat	Mammals	AMACC05080	128	1	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Cismontane woodland, Lower montane coniferous forest, Riparian forest, Riparian woodland
Nannopterum auritum	double-crested cormorant	Birds	ABNFD01020	39	1	None	None	G5	S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Riparian forest, Riparian scrub, Riparian woodland
Oncorhynchus mykiss irideus pop. 49	steelhead - northern California DPS winter-run	Fish	AFCHA0213Q	96	3	Threatened	None	G5T3Q	S3	null	AFS_TH-Threatened, CDFW_SSC-Species of Special Concern	Aquatic, Estuary, Klamath/North coast flowing waters
Oncorhynchus mykiss irideus pop. 8	steelhead - central California coast DPS	Fish	AFCHA0209G	55	7	Threatened	None	G5T3Q	S3	null	AFS_TH-Threatened, CDFW_SSC-Species of Special Concern	Aquatic, Sacramento/San Joaquin flowing waters
Pandion haliaetus	osprey	Birds	ABNKC01010	504	4	None	None	G5	S4	null	CDF_S-Sensitive, CDFW_WL-Watch List, IUCN_LC-Least Concern	Riparian forest
Rana boylii pop. 1	foothill yellow-legged frog - north coast DPS	Amphibians	AAABH01051	1610	44	None	None	G3T4	S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Aquatic, Klamath/North coast flowing waters, Riparian forest, Riparian scrub, Riparian woodland
Rana draytonii	California red-legged frog	Amphibians	AAABH01022	1797	27	Threatened	None	G2G3	S2S3	null	CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable	Aquatic, Artificial flowing waters, Artificial standing waters, Freshwater marsh, Marsh & swamp, Riparian forest, Riparian scrub, Riparian woodland, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Taricha rivularis	red-bellied newt	Amphibians	AAAAF02020	136	16	None	None	G2	S2	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Broadleaved upland forest, North coast coniferous forest, Redwood, Riparian forest, Riparian woodland
Taxidea taxus	American badger	Mammals	AMAJF04010	648	8	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Alkali marsh, Alkali playa, Alpine, Alpine dwarf scrub, Bog & fen, Brackish marsh, Broadleaved upland forest, Chaparral, Chenopod scrub, Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub, Desert dunes, Desert wash, Freshwater marsh, Great Basin grassland, Great Basin scrub, Interior dunes, Ione formation, Joshua tree woodland, Limestone, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Mojavean desert scrub, Montane dwarf scrub, North coast coniferous forest, Oldgrowth, Pavement plain, Redwood, Riparian forest, Riparian scrub, Riparian woodland, Salt marsh, Sonoran desert scrub, Sonoran thorn woodland, Ultramafic, Upper montane coniferous forest, Upper Sonoran scrub, Valley & foothill

												grassland
Thaleichthys pacificus	eulachon	Fish	AFCHB04010	10	1	Threatened	None	G4	S1	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Aquatic, Klamath/North coast flowing waters

CALIFORNIA WILDLIFE HABITAT RELATIONSHIPS SYSTEM

supported by the

CALIFORNIA INTERAGENCY WILDLIFE TASK GROUP

and maintained by the

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Database Version: 10.1.29

SPECIES SUMMARY REPORT:

FE = Federal Endangered
FT = Federal Threatened
CE = California Endangered
CT = California Threatened
CF = California Fully Protected
CP = California Protected
SC = California Species of Special Concern
PE = Federally-Proposed Endangered
PT = Federally-Proposed Threatened
FC = Federal Candidate
BL = BLM Sensitive
FS = USFS Sensitive
CD = CDF Sensitive
HA = Harvest

Note: Any given status code for a species may apply to the full species or to only one or more subspecies or distinct population segments.

Total Number of Species: 103

ID	Species Name	Status	Native/Introduced
M160	AMERICAN BADGER (Taxidea taxus)	SC, HA	NATIVE
B042	AMERICAN WHITE PELICAN (Pelecanus erythrorhynchos)	SC	NATIVE
B581	ASHY STORM-PETREL (Oceanodroma homochroa)	SC, BL	NATIVE
B113	BALD EAGLE (Haliaeetus leucocephalus)	CE, CF, BL, FS, CD	NATIVE
B102	BARROW'S GOLDENEYE (Bucephala islandica)	SC, HA	NATIVE
B497	BELL'S SPARROW (Artemisiospiza belli)	FT, SC	NATIVE
B368	BEWICK'S WREN (Thryomanes bewickii)	SC	NATIVE
B143	BLACK RAIL (Laterallus jamaicensis)	CT, CF, BL	NATIVE
B584	BLACK STORM-PETREL (Oceanodroma melania)	SC	NATIVE
M051	BLACK-TAILED JACKRABBIT (Lepus californicus)	SC, HA	NATIVE
B074	BRANT (Branta bernicla)	SC, HA	NATIVE
M018	BROAD-FOOTED MOLE (Scapanus latimanus)	SC	NATIVE
M045	BRUSH RABBIT (Sylvilagus bachmani)	FE, CE, HA	NATIVE
B269	BURROWING OWL (Athene cunicularia)	SC, BL	NATIVE
A004	CALIFORNIA GIANT SALAMANDER (Dicamptodon ensatus)	SC	NATIVE
M105	CALIFORNIA KANGAROO RAT (Dipodomys californicus)	SC	NATIVE
R059	CALIFORNIA MOUNTAIN KINGSNAKE (Lampropeltis zonata)	BL, FS	NATIVE
B140	CALIFORNIA QUAIL (Callipepla californica)	SC, HA	NATIVE
A071	CALIFORNIA RED-LEGGED FROG (Rana draytonii)	FT, SC	NATIVE
M170	CALIFORNIA SEA-LION (Zalophus californianus)	CP	NATIVE
A001	CALIFORNIA TIGER SALAMANDER (Ambystoma californiense)	CT	NATIVE
A001b	CALIFORNIA TIGER SALAMANDER (SON DPS) (Ambystoma californiense pop. 2)	FE, CT	NATIVE
B484	CALIFORNIA TOWHEE (Pipilo crissalis)	FT, CE	NATIVE
M134	CALIFORNIA VOLE (Microtus californicus)	FE, CE, SC, BL	NATIVE
B244	CASSIN'S AUKLET (Ptychoramphus aleuticus)	SC	NATIVE
B144	CLAPPER RAIL (Rallus longirostris)	FE, CE, CT, CF	NATIVE
A012	COMMON ENSATINA (Ensatina eschscholtzii)	FS, HA	NATIVE
R061	COMMON GARTERSNAKE (Thamnophis sirtalis)	FE, CE, CF, SC, HA	NATIVE
B003	COMMON LOON (Gavia immer)	SC	NATIVE
M145	COMMON PORCUPINE (Erethizon dorsatum)	SC	NATIVE
R023	COMMON SAGEBRUSH LIZARD (Sceloporus graciosus)	BL, HA	NATIVE
B461	COMMON YELLOWTHROAT (Geothlypis trichas)	SC	NATIVE
M117	DEER MOUSE (Peromyscus maniculatus)	SC	NATIVE
M127	DUSKY-FOOTED WOODRAT (Neotoma fuscipes)	FE, SC	NATIVE
M155	FISHER (Pekania pennanti)	CT, SC, FC, BL, FS	NATIVE
A043	FOOTHILL YELLOW-LEGGED FROG (Rana boylii)	SC, BL, FS	NATIVE
B579	FORK-TAILED STORM-PETREL (Oceanodroma furcata)	SC, BL	NATIVE
M026	FRINGED MYOTIS (Myotis thysanodes)	SC, BL, FS	NATIVE
B126	GOLDEN EAGLE (Aquila chrysaetos)	CF, BL, CD	NATIVE
B501	GRASSHOPPER SPARROW (Ammodramus savannarum)	SC	NATIVE
B051	GREAT BLUE HERON (Ardea herodias)	CD	NATIVE
B052	GREAT EGRET (Ardea alba)	CD	NATIVE
B070	GREATER WHITE-FRONTED GOOSE (Anser albifrons)	SC, HA	NATIVE
M168	GUADALUPE FUR-SEAL (Arctocephalus townsendi)	FT, CT, CF, CP	NATIVE
M171	HARBOR SEAL (Phoca vitulina)	CP	NATIVE

ID	Species	Status	Native/Introduced
B096	HARLEQUIN DUCK (Histrionicus histrionicus)	SC, HA	NATIVE
B417	HUTTON'S VIREO (Vireo huttoni)	SC	NATIVE
B410	LOGGERHEAD SHRIKE (Lanius ludovicianus)	FE, SC	NATIVE
M025	LONG-EARED MYOTIS (Myotis evotis)	SC, BL	NATIVE
B272	LONG-EARED OWL (Asio otus)	SC	NATIVE
M027	LONG-LEGGED MYOTIS (Myotis volans)	SC	NATIVE
M157	LONG-TAILED WEASEL (Mustela frenata)	SC, HA	NATIVE
B240	MARBLED MURRELET (Brachyramphus marmoratus)	FT, CE, CD	NATIVE
B372	MARSH WREN (Cistothorus palustris)	SC	NATIVE
M165	MOUNTAIN LION (Puma concolor)	SC	NATIVE
B159	MOUNTAIN PLOVER (Charadrius montanus)	SC, BL	NATIVE
M169	NORTHERN (STELLER) SEA-LION (Eumetopias jubatus)	CP, SC	NATIVE
M173	NORTHERN ELEPHANT SEAL (Mirounga angustirostris)	CF, CP	NATIVE
M167	NORTHERN FUR-SEAL (Callorhinus ursinus)	CP	NATIVE
B117	NORTHERN GOSHAWK (Accipiter gentilis)	SC, BL, FS, CD	NATIVE
B114	NORTHERN HARRIER (Circus cyaneus)	SC	NATIVE
M163	NORTHERN RIVER OTTER (Lontra canadensis)	SC	NATIVE
R046	NORTHERN RUBBER BOA (Charina bottae)	CT	NATIVE
B309	OLIVE-SIDED FLYCATCHER (Contopus cooperi)	SC	NATIVE
M006	ORNATE SHREW (Sorex ornatus)	FE, SC	NATIVE
B110	OSPREY (Pandion haliaetus)	CD	NATIVE
M144	PACIFIC JUMPING MOUSE (Zapus trinotatus)	SC	NATIVE
M038	PALLID BAT (Antrozous pallidus)	SC, BL, FS	NATIVE
B129	PEREGRINE FALCON (Falco peregrinus)	CF, CD	NATIVE
B338	PURPLE MARTIN (Progne subis)	SC	NATIVE
A008	RED-BELLIED NEWT (Taricha rivularis)	SC	NATIVE
B519	RED-WINGED BLACKBIRD (Agelaius phoeniceus)	SC	NATIVE
B090	REDHEAD (Aythya americana)	SC, HA	NATIVE
R048	RING-NECKED SNAKE (Diadophis punctatus)	SC, FS, HA	NATIVE
M152	RINGTAIL (Bassariscus astutus)	CF, SC	NATIVE
B487	RUFOUS-CROWNED SPARROW (Aimophila ruficeps)	SC	NATIVE
M114	SALT-MARSH HARVEST MOUSE (Reithrodontomys raviventris)	FE, CE, CF	NATIVE
B499	SAVANNAH SPARROW (Passerculus sandwichensis)	CE, SC	NATIVE
B273	SHORT-EARED OWL (Asio flammeus)	SC	NATIVE
B154	SNOWY PLOVER (Charadrius nivosus)	FT, SC	NATIVE
B505	SONG SPARROW (Melospiza melodia)	SC	NATIVE
M132	SONOMA RED TREE VOLE (Arborimus pomo)	SC	NATIVE
B134	SOOTY GROUSE (Dendragapus fuliginosus)	SC, HA	NATIVE
B270	SPOTTED OWL (Strix occidentalis)	FT, CT, SC, BL, FS, CD	NATIVE
B483	SPOTTED TOWHEE (Pipilo maculatus)	SC	NATIVE
R053	STRIPED RACER (Coluber lateralis)	FT, CT, HA	NATIVE
B121	SWAINSON'S HAWK (Buteo swainsoni)	CT, BL	NATIVE
R039	TIGER WHIPTAIL (Aspidoscelis tigris)	SC	NATIVE
M037	TOWNSEND'S BIG-EARED BAT (Corynorhinus townsendii)	SC, BL, FS	NATIVE
B520	TRICOLORED BLACKBIRD (Agelaius tricolor)	SC, BL	NATIVE
B248	TUFTED PUFFIN (Fratercula cirrhata)	SC	NATIVE
M003	VAGRANT SHREW (Sorex vagrans)	SC	NATIVE
B281	VAUX'S SWIFT (Chaetura vauxi)	SC	NATIVE
M113	WESTERN HARVEST MOUSE (Reithrodontomys megalotis)	SC	NATIVE
R004	WESTERN POND TURTLE (Actinemys marmorata)	SC, BL, FS	NATIVE
M033	WESTERN RED BAT (Lasiurus blossevillii)	SC	NATIVE
R036	WESTERN SKINK (Plestiodon skiltonianus)	BL, HA	NATIVE
M161	WESTERN SPOTTED SKUNK (Spilogale gracilis)	SC, HA	NATIVE
B111	WHITE-TAILED KITE (Elanus leucurus)	CF, BL	NATIVE
B430	YELLOW WARBLER (Setophaga petechia)	SC	NATIVE
B467	YELLOW-BREASTED CHAT (Icteria virens)	SC	NATIVE
B522	YELLOW-HEADED BLACKBIRD (Xanthocephalus xanthocephalus)	SC	NATIVE
M023	YUMA MYOTIS (Myotis yumanensis)	BL	NATIVE

Total Number of Species: 103

Query Parameters

Included Locations:

SONOMA

Included Location Seasons:

all
Y
W
S
M

Included Habitat and Stage:

Closed-cone Pine-cypress
Douglas-fir
Eastside Pine
Jeffrey Pine
Juniper
Klamath Mixed Conifer
Lodgepole Pine
Montane Hardwood-conifer
Pinyon-juniper
Ponderosa Pine
Red Fir
Redwood
Sierran Mixed Conifer
Subalpine Conifer
White Fir
Aspen
Blue Oak Woodland
Blue Oak-foothill Pine
Coastal Oak Woodland
Eucalyptus
Montane Hardwood
Valley Oak Woodland
Desert Riparian
Montane Riparian
Riverine
Valley Foothill Riparian
Estuarine
Marine
Saline Emergent Wetland
Fresh Emergent Wetland
Lacustrine
Wet Meadow
Joshua Tree
Palm Oasis
Desert Scrub
Desert Succulent Shrub
Desert Wash
Chamise-redshank Chaparral
Mixed Chaparral
Montane Chaparral
Alkali Desert Scrub
Alpine Dwarf-shrub
Bitterbrush
Coastal Scrub
Low Sage
Sagebrush
Annual Grassland
Perennial Grassland
Deciduous Orchard
Dryland Grain Crops
Evergreen Orchard
Irrigated Grain Crops
Irrigated Hayfield
Irrigated Row And Field Crops
Pasture
Rice
Vineyard
Barren
Urban

Habitat Suitability Threshold:

Reproduction - L Cover - L Feeding - L

Included Habitat Seasons:

Y
W
S

IPaC **U.S. Fish & Wildlife Service**

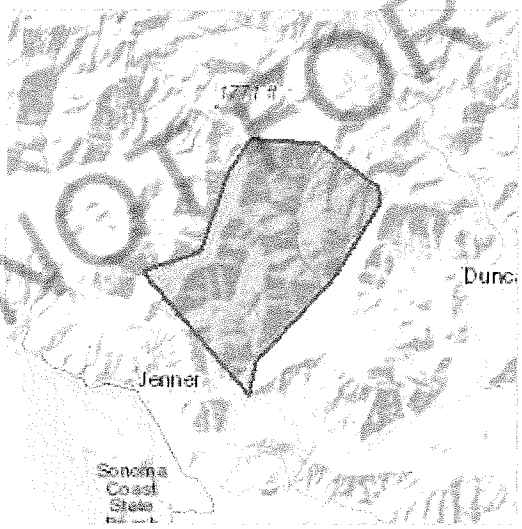
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Sonoma County, California



Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS
Marbled Murrelet Brachyramphus marmoratus There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/4467	Threatened
Northern Spotted Owl Strix occidentalis caurina Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/1123	Threatened
Western Snowy Plover Charadrius nivosus nivosus There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8035	Threatened

Reptiles

NAME	STATUS
Green Sea Turtle Chelonia mydas No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6199	Threatened
Northwestern Pond Turtle Actinemys marmorata Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1111	Proposed Threatened

Amphibians

NAME	STATUS

California Red-legged Frog Rana draytonii — Threatened
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/2891

Fishes

NAME	STATUS
Tidewater Goby Eucyclogobius newberryi	Endangered

Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/57

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus	Proposed Threatened

Wherever found
There is **proposed** critical habitat for this species.
https://ecos.fws.gov/ecp/species/9743

Myrtle's Silverspot Butterfly Speyeria zerene myrtleae	Endangered

Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6929

Flowering Plants

NAME	STATUS
Baker's Larkspur Delphinium bakeri	Endangered

Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/5031

Clover (tidestrom"s) Lupine Lupinus tidestromii	Endangered

Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4459

Showy Indian Clover Trifolium amoenum Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6459

Sonoma Alopecurus Alopecurus aequalis var. sonomensis Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/557

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Mar 1 to Aug 31
Golden Eagle Aquila chrysaetos This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Mar 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (▩)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

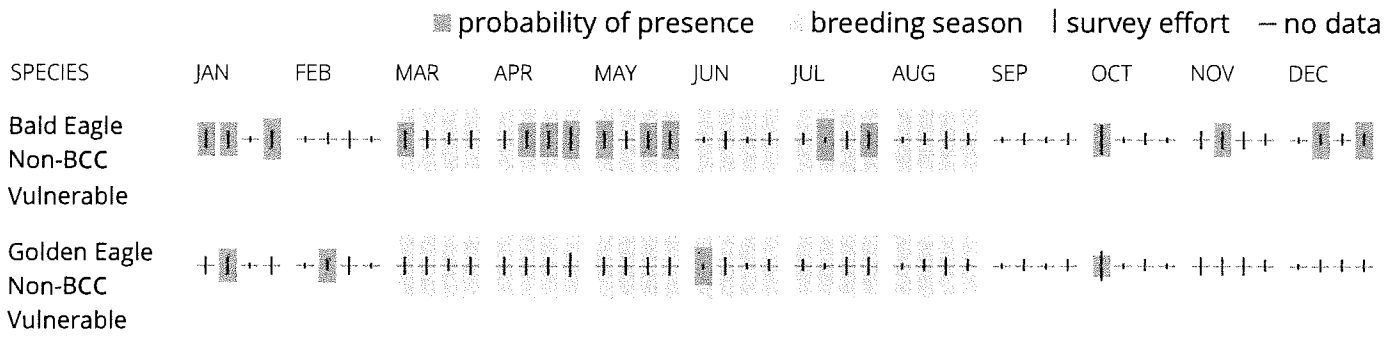
Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Ancient Murrelet Synthliboramphus antiquus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 10 to Sep 10
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Mar 1 to Aug 31

Black Oystercatcher Haematopus bachmani — Breeds Apr 15 to Oct 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9591

Black Turnstone Arenaria melanocephala — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Brandt's Cormorant Urile penicillatus — Breeds Apr 15 to Sep 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

California Gull Larus californicus — Breeds Mar 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Chestnut-backed Chickadee Poecile rufescens rufescens — Breeds Mar 1 to Jul 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Clark's Grebe Aechmophorus clarkii — Breeds Jun 1 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds Mar 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Oak Titmouse Baeolophus inornatus — Breeds Mar 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Rufous Hummingbird Selasphorus rufus — Breeds Apr 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Western Grebe aechmophorus occidentalis — Breeds Jun 1 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/6743

Western Gull Larus occidentalis — Breeds Apr 21 to Aug 25
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Western Screech-owl Megascops kennicottii cardonensis — Breeds Mar 1 to Jun 30
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Willet Tringa semipalmata — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wrentit Chamaea fasciata — Breeds Mar 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read

"Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (▩)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (▩)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

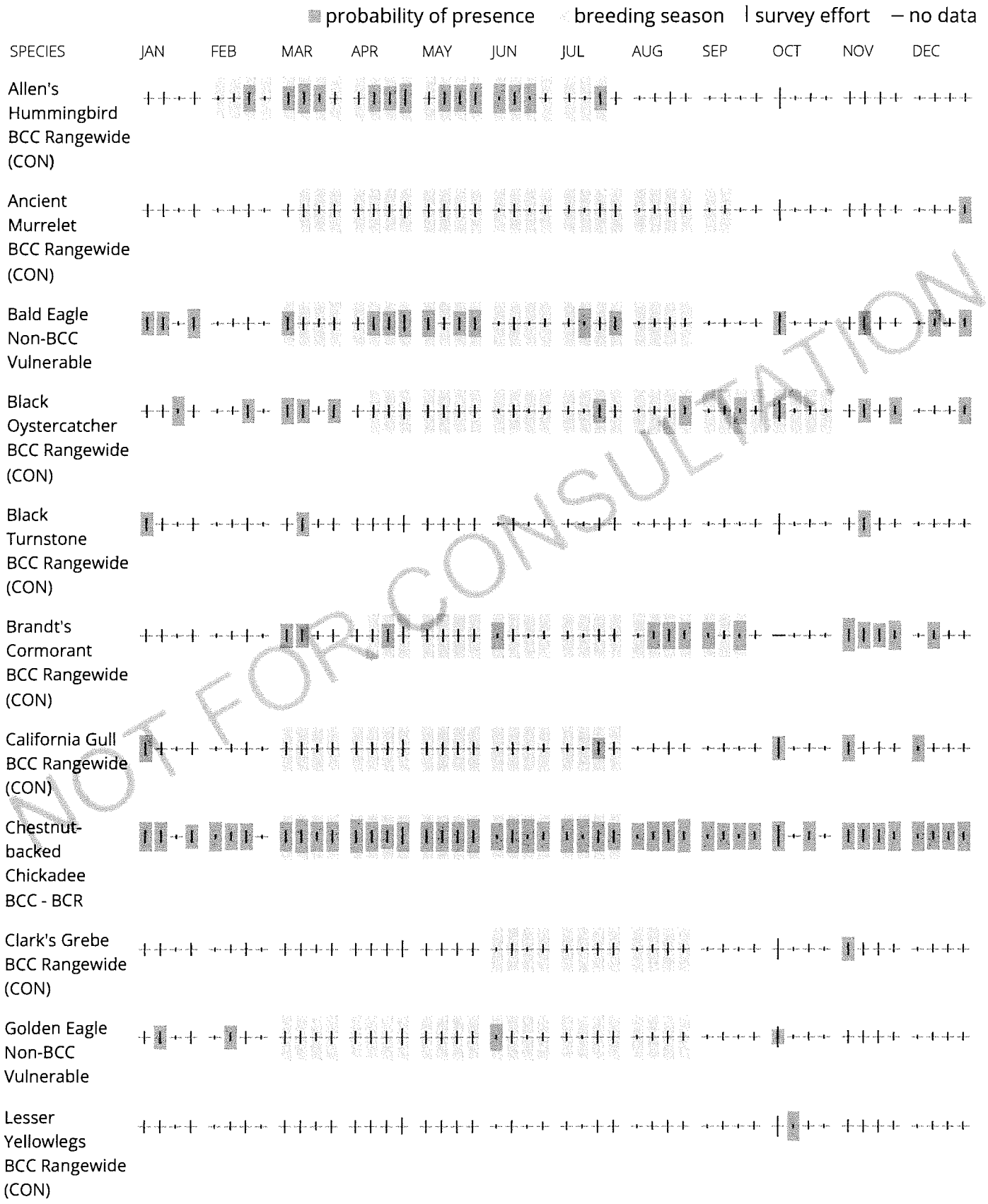
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

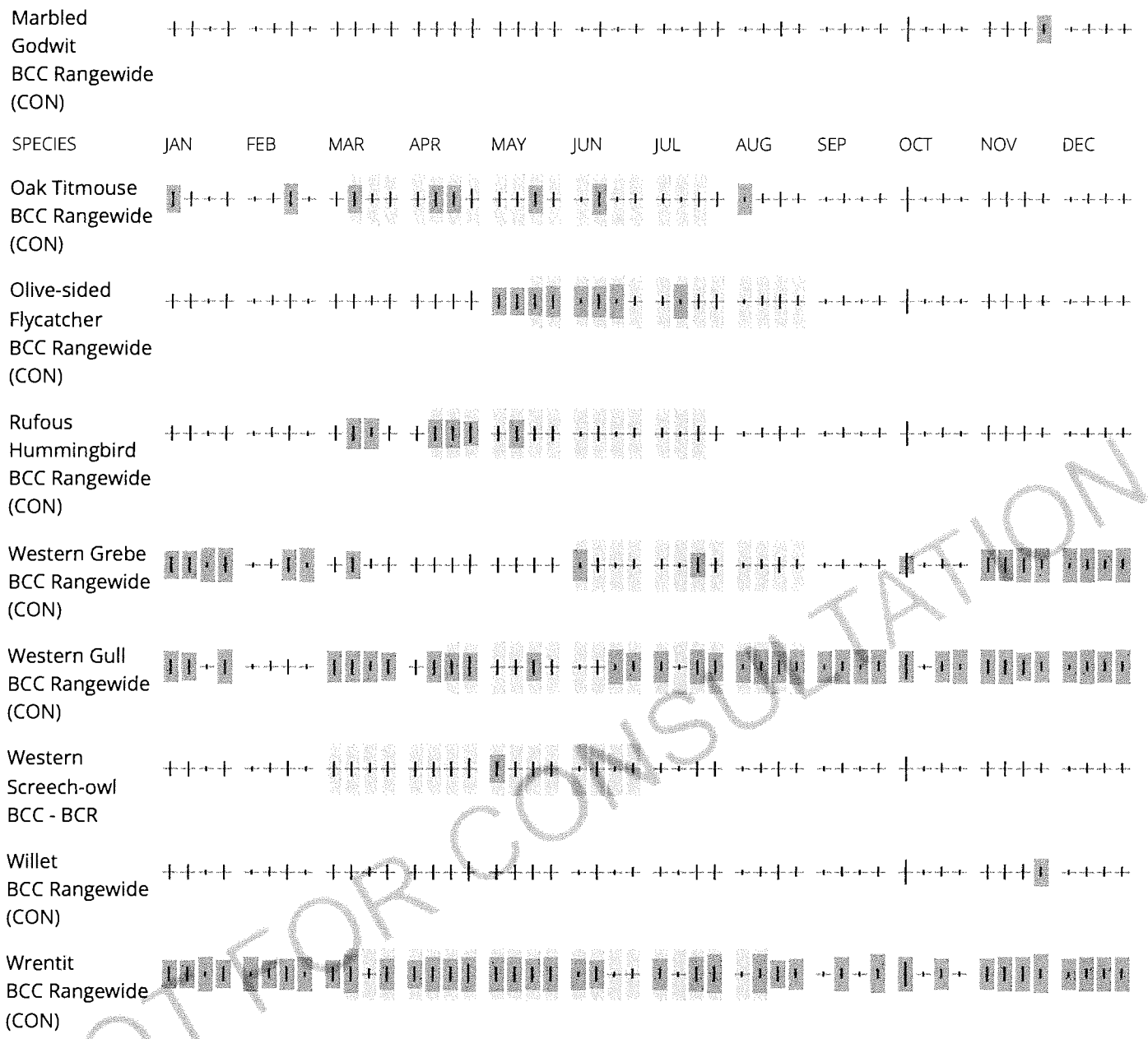
No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

PEM1B

FRESHWATER FORESTED/SHRUB WETLAND

PSS1C

RIVERINE

R2UBH

R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

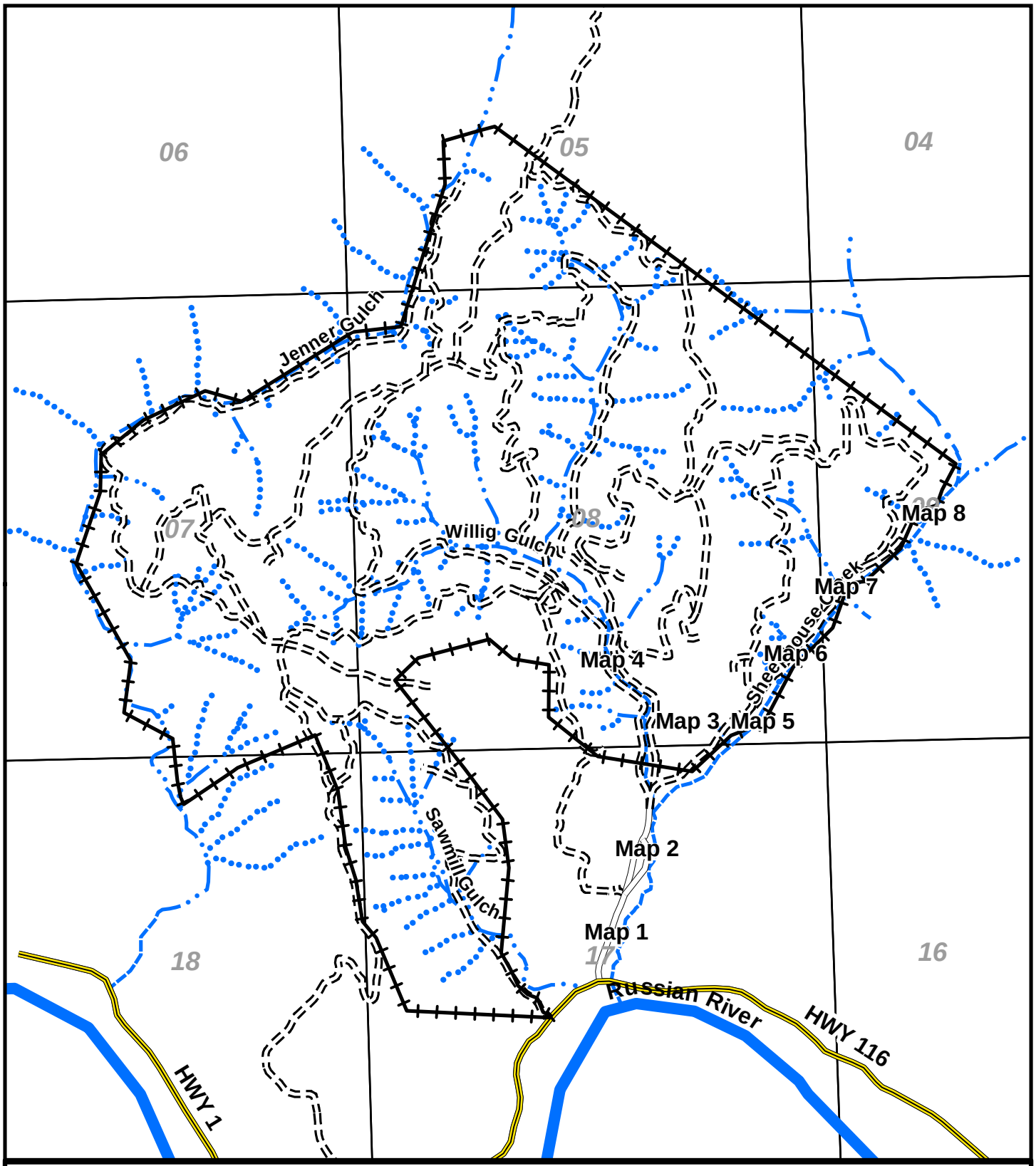
Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.



N
W E
S

1:24,000

Property / NTMP Boundary

0 2,000 Feet

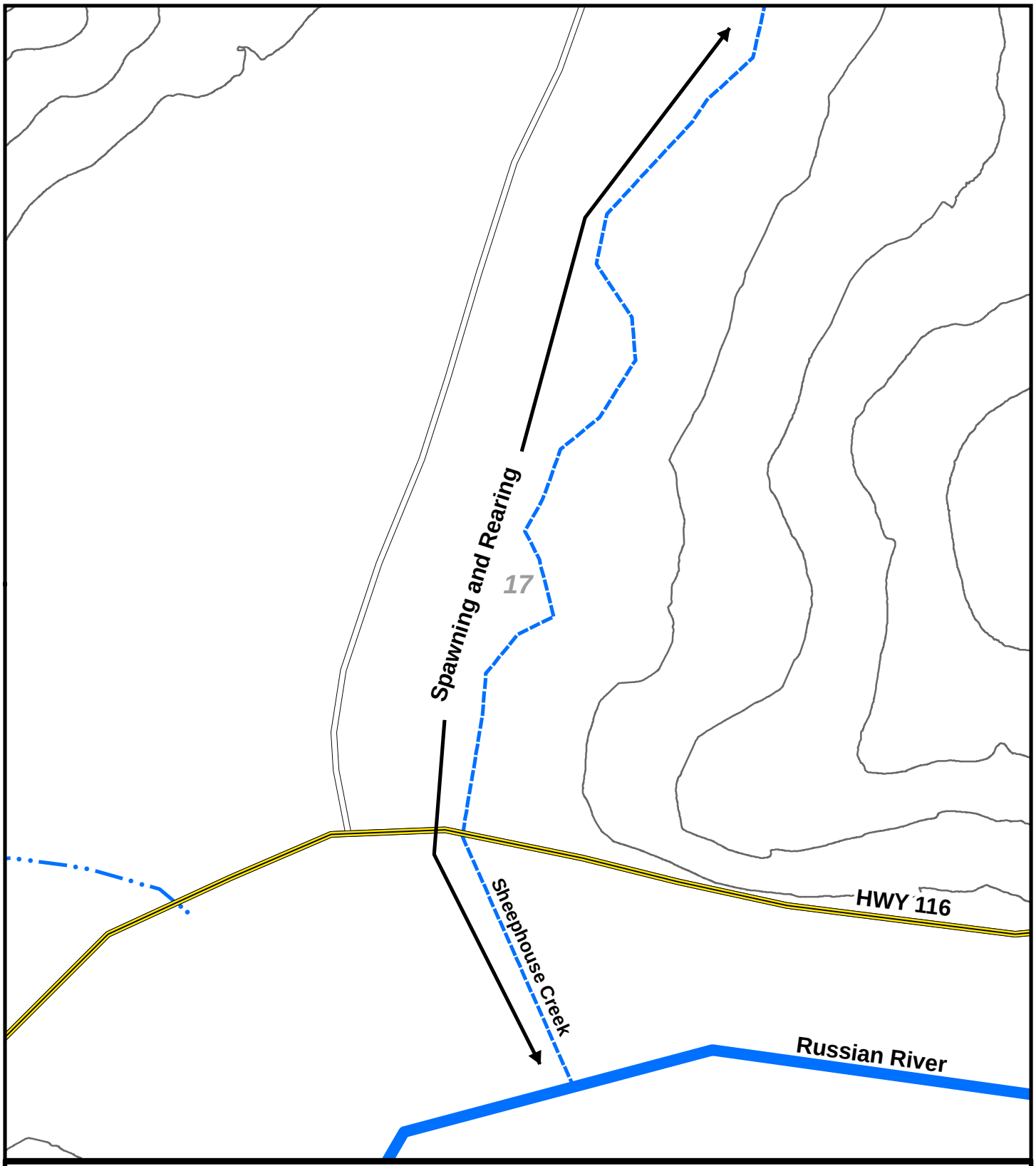
Berry's Knotfarm NTMP
Salmonid Habitat Index Map

P:ortion of Muniz Rancho
Sections 5, 7, 8, 9, 17, 18 MDB&M
Duncans Mills, CA Quadrangle

Permanent Road
Seasonal Road
Highway
Russian River

Watercourse
Class I
Class II Large
Class II Small
Class III

Environmental Resource Solutions, Inc. October 15, 2024



N
W E
S

1:2,400

Property / NTMP Boundary

0 220 Feet

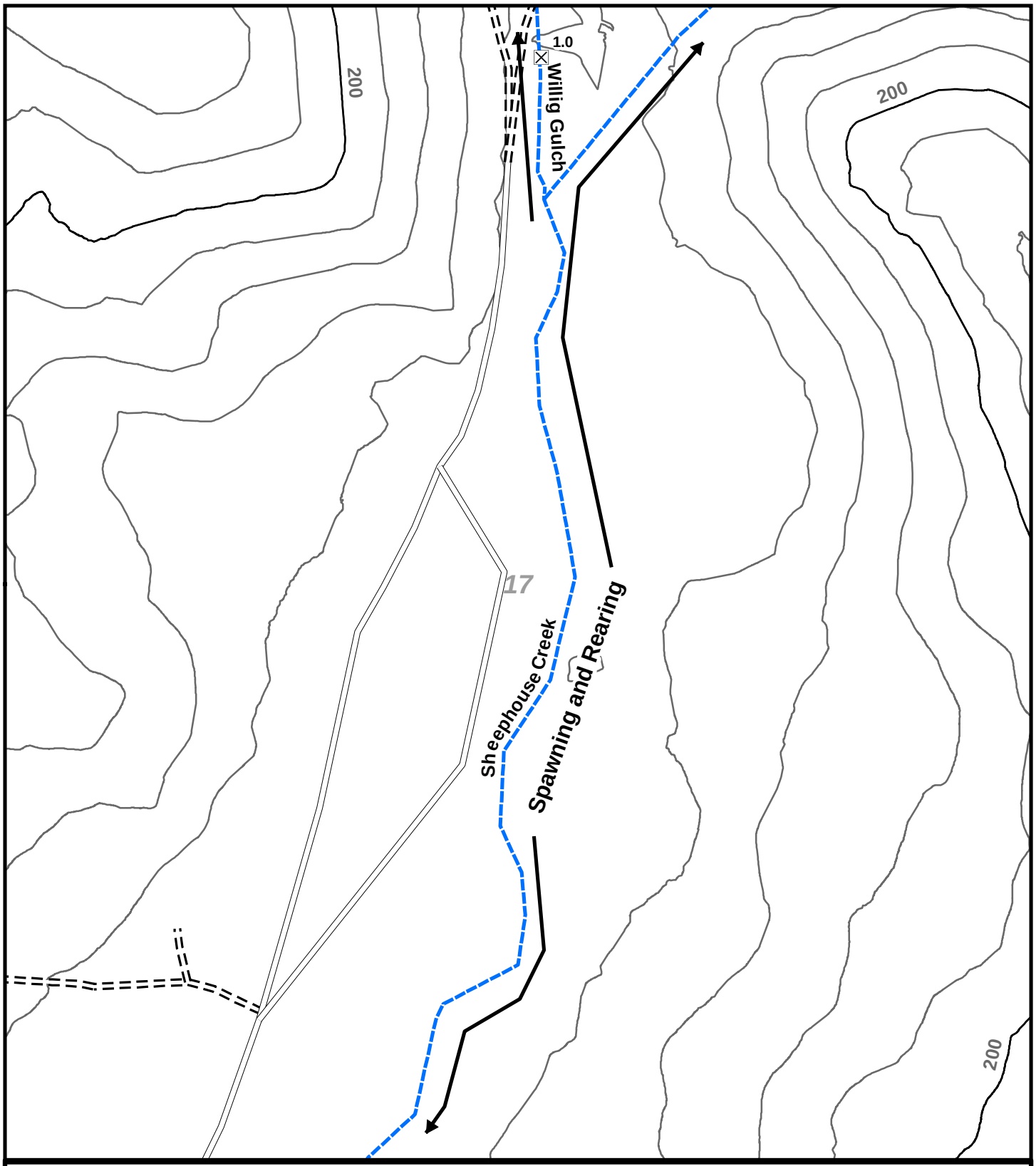
Berry's Knotfarm NTMP
Salmonid Habitat Map 1

P:ortion of Muniz Rancho
Sections 5, 7, 8, 9, 17, 18 MDB&M
Duncans Mills, CA Quadrangle

Permanent Road
Seasonal Road
Highway
Watercourse
Class I
Class II Large
Class II Small
Class III
Russian River
Crossing
Landing

Anadromous Salmonid Habitat

Environmental Resource Solutions, Inc. October 15, 2024



N
W E
S

1:2,400

Property / NTMP Boundary

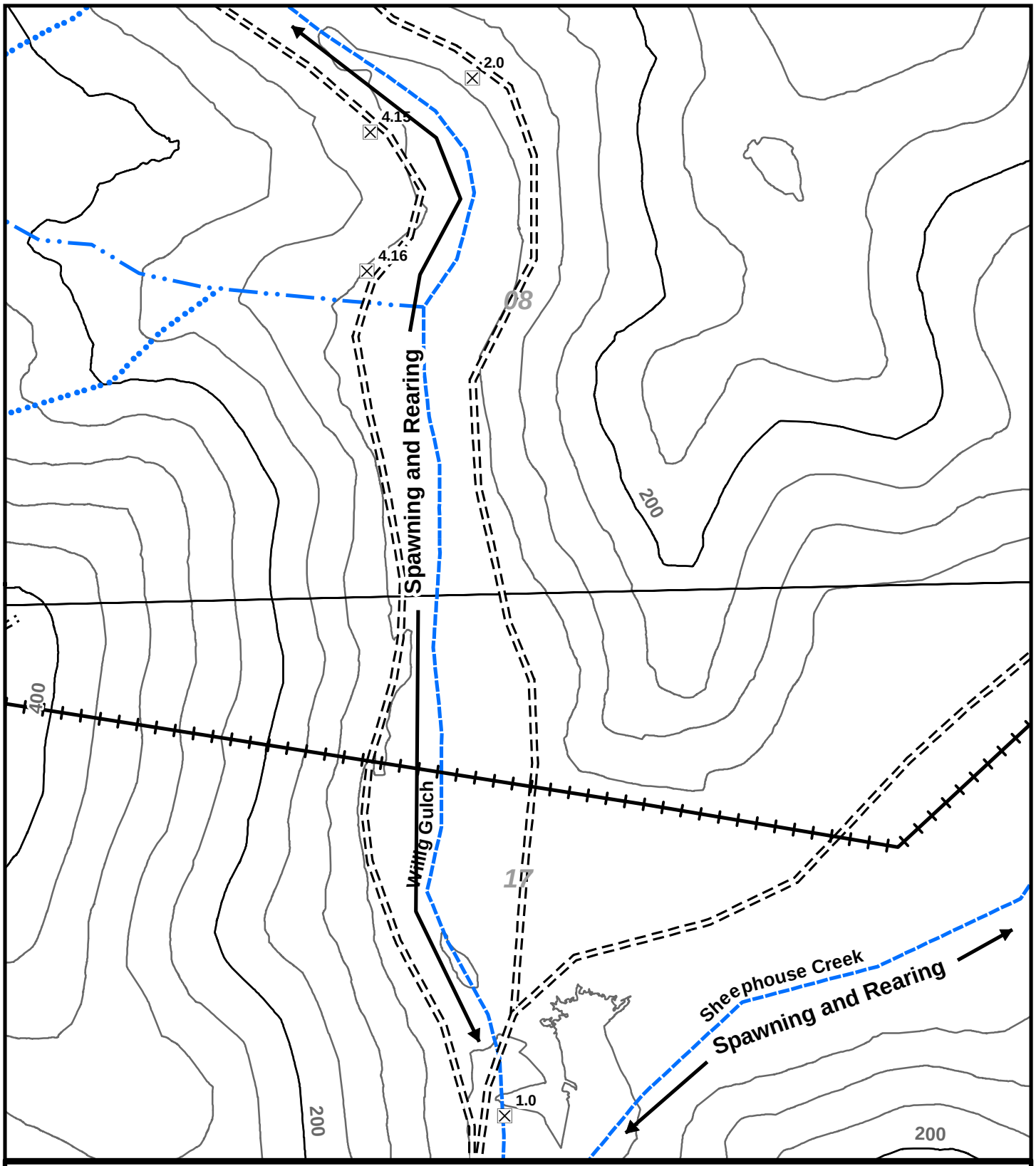
0 220 Feet

Berry's Knotfarm NTMP
Salmonid Habitat Map 2

P:ortion of Muniz Rancho
Sections 5, 7, 8, 9, 17, 18 MDB&M
Duncans Mills, CA Quadrangle

Permanent Road
Seasonal Road
Highway
Watercourse
Class I
Class II Large
Class II Small
Class III
Russian River
Crossing
Landing
Anadromous Salmonid Habitat

Environmental Resource Solutions, Inc. October 15, 2024



N
W E
S

1:2,400

Property / NTMP Boundary

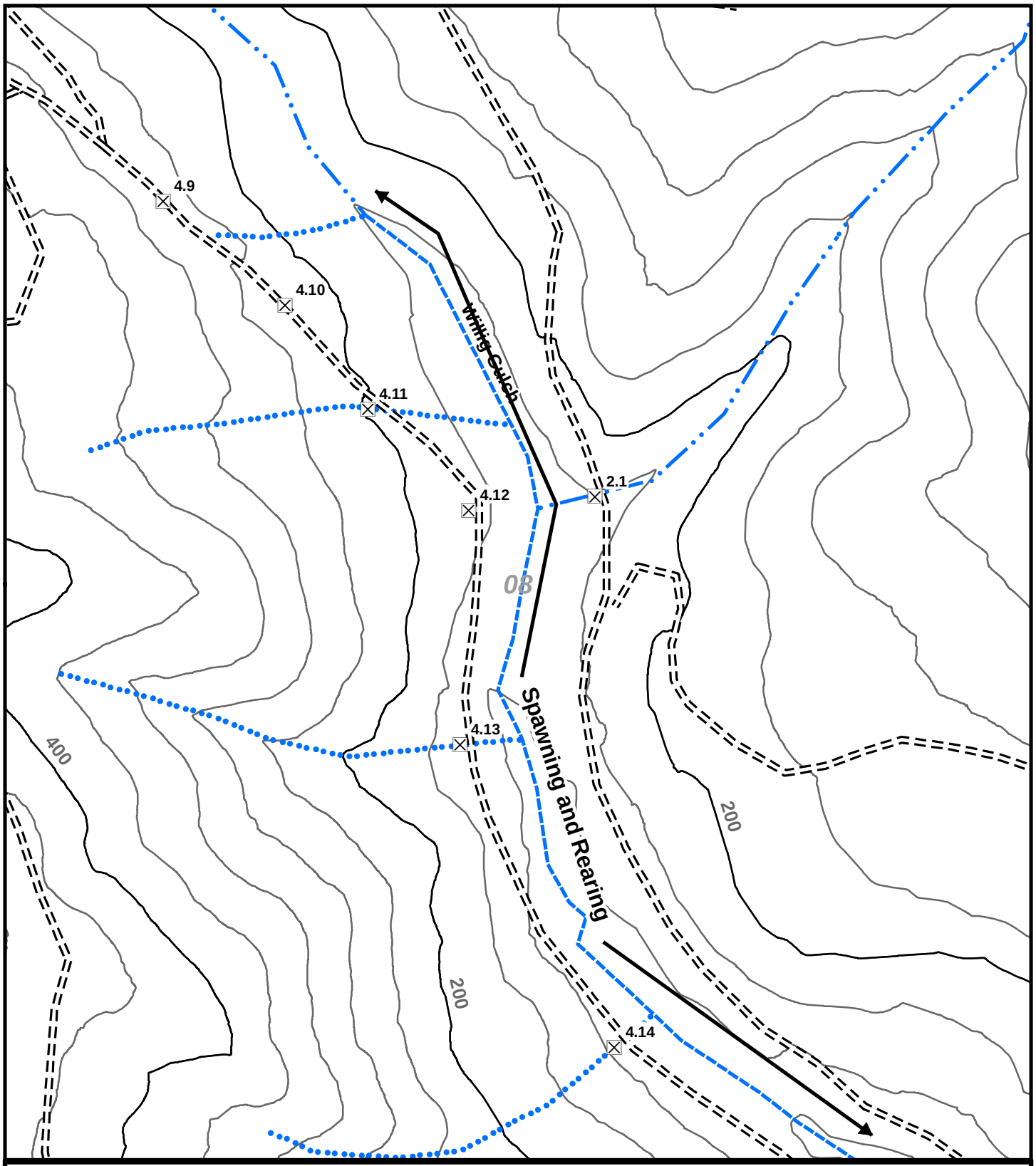
0 220 Feet

Berry's Knotfarm NTMP
Salmonid Habitat Map 3

P:ortion of Muniz Rancho
Sections 5, 7, 8, 9, 17, 18 MDB&M
Duncans Mills, CA Quadrangle

Permanent Road
Seasonal Road
Highway
Watercourse
Class I
Class II Large
Class II Small
Class III
Russian River
Crossing
Landing
Anadromous Salmonid Habitat

Environmental Resource Solutions, Inc. October 15, 2024



N
W E
S

1:2,400

Property / NTMP Boundary

0 220 Feet

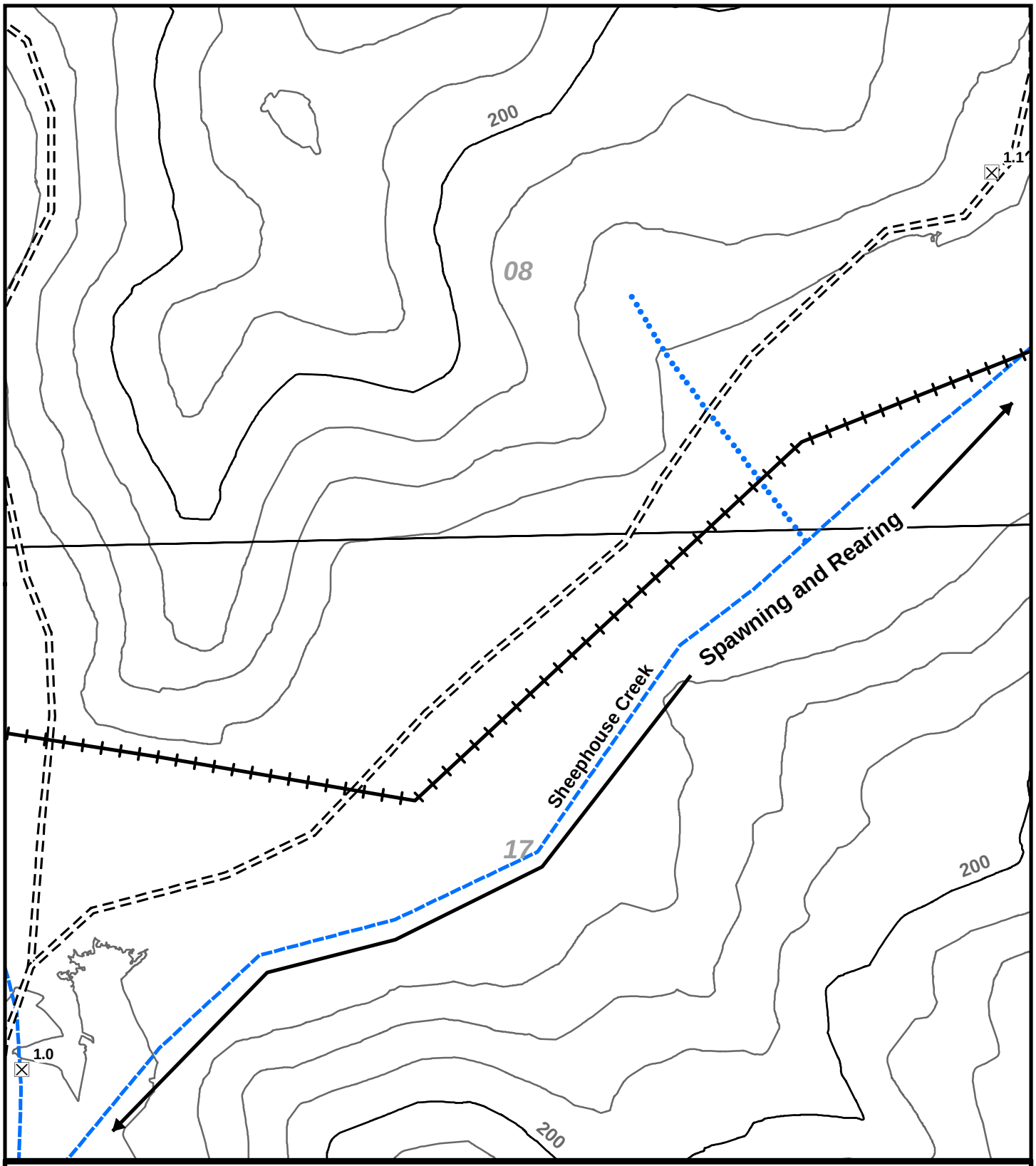
Berry's Knotfarm NTMP
Salmonid Habitat Map 4

P:ortion of Muniz Rancho
Sections 5, 7, 8, 9, 17, 18 MDB&M
Duncans Mills, CA Quadrangle

Permanent Road
Seasonal Road
Highway
Watercourse
Class I
Class II Large
Class II Small
Class III
Russian River
Crossing
Landing

Anadromous Salmonid Habitat

Environmental Resource Solutions, Inc. October 15, 2024



N
W E
S

1:2,400

Property / NTMP Boundary

0 220 Feet

Berry's Knotfarm NTMP
Salmonid Habitat Map 5

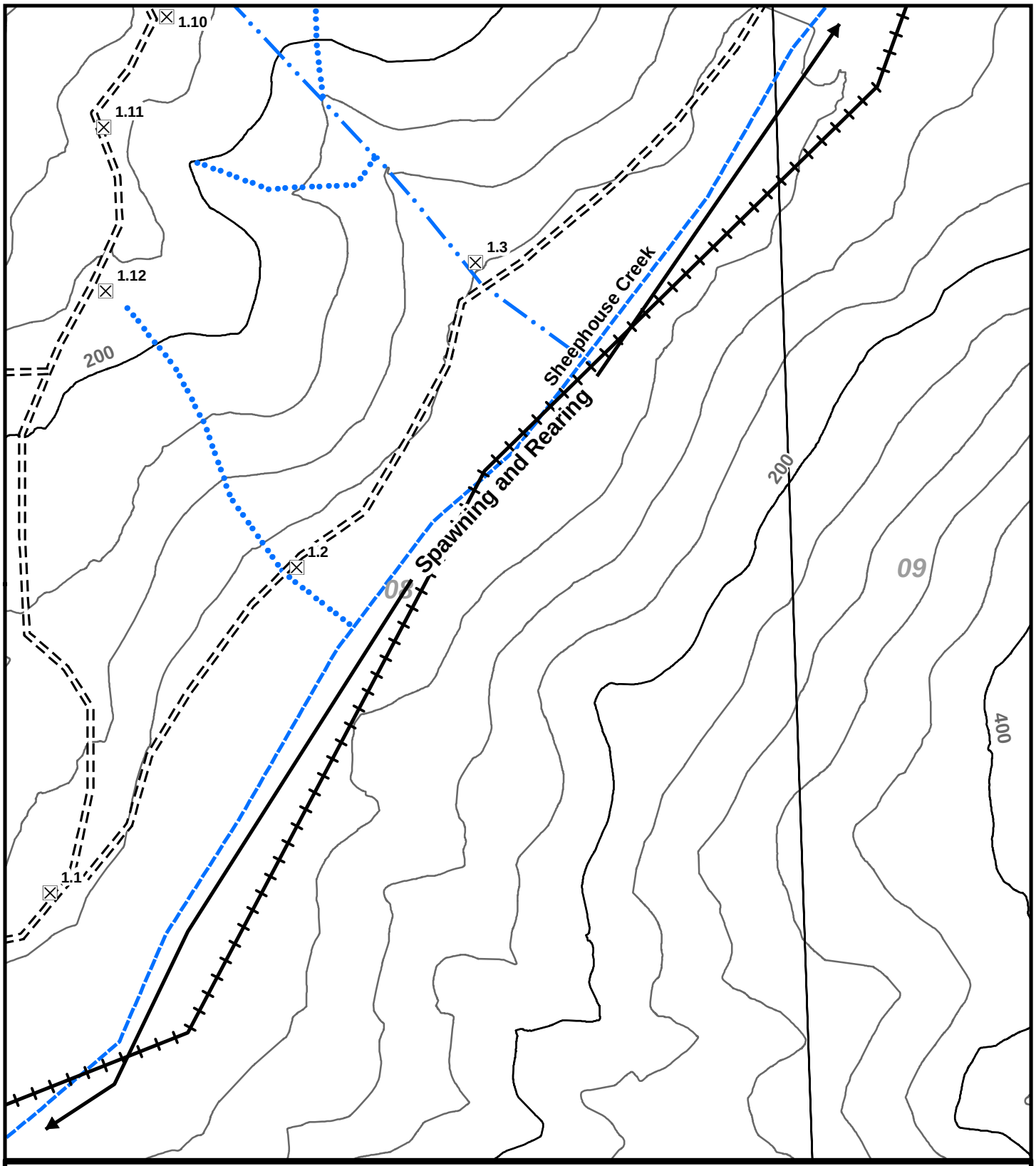
P:ortion of Muniz Rancho
Sections 5, 7, 8, 9, 17, 18 MDB&M
Duncans Mills, CA Quadrangle

Permanent Road
Seasonal Road
Highway
Russian River
Crossing
Landing

Watercourse
Class I
Class II Large
Class II Small
Class III

Anadromous Salmonid Habitat

Environmental Resource Solutions, Inc. October 15, 2024



N
W E
S

1:2,400

Property / NTMP Boundary

0 220 Feet

Berry's Knotfarm NTMP
Salmonid Habitat Map 6

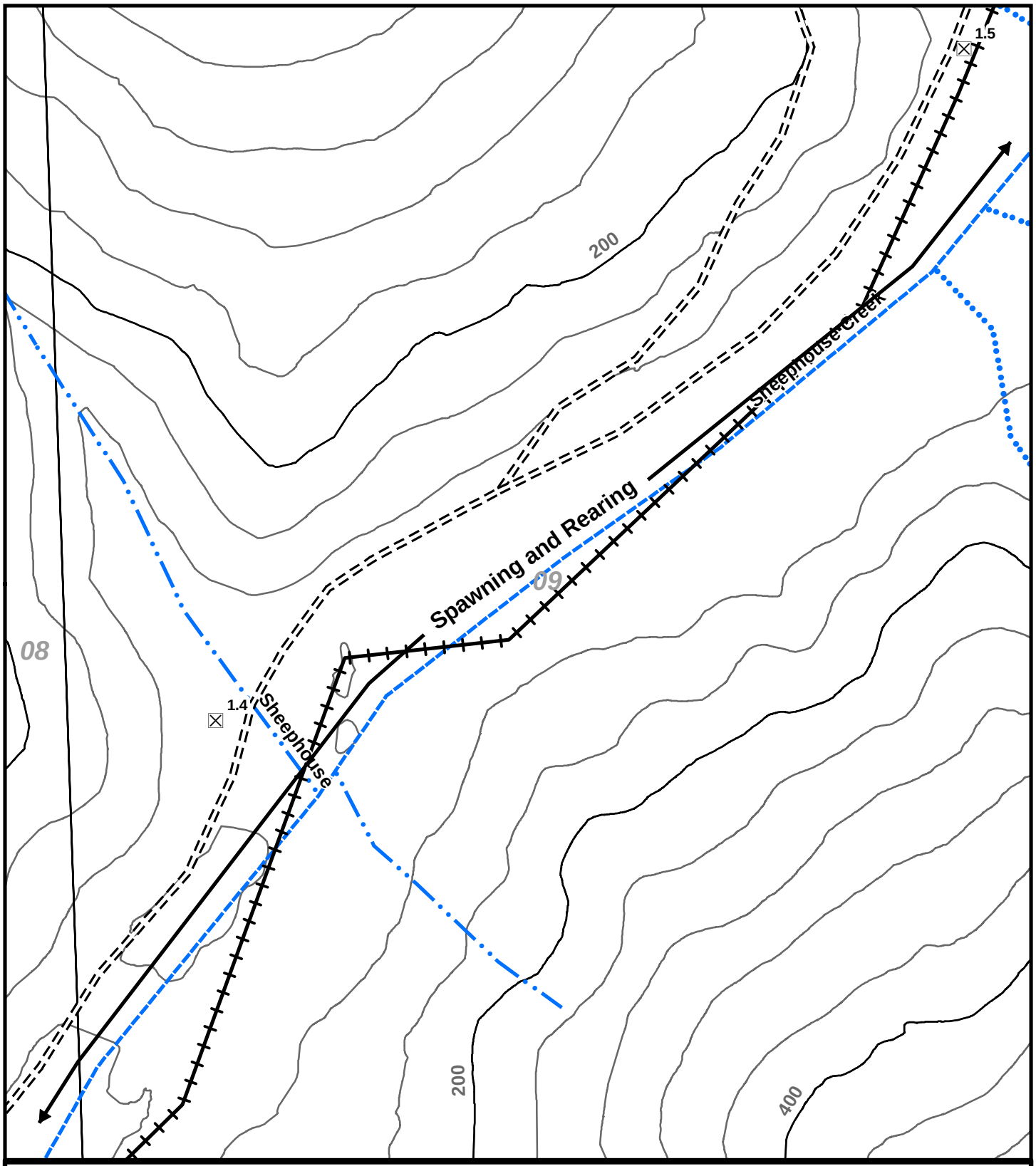
P:ortion of Muniz Rancho
Sections 5, 7, 8, 9, 17, 18 MDB&M
Duncans Mills, CA Quadrangle

Permanent Road
Seasonal Road
Highway
Russian River
Crossing
Landing

Watercourse
Class I
Class II Large
Class II Small
Class III

Anadromous Salmonid Habitat

Environmental Resource Solutions, Inc. October 15, 2024



N
W E
S

1:2,400

Property / NTMP Boundary

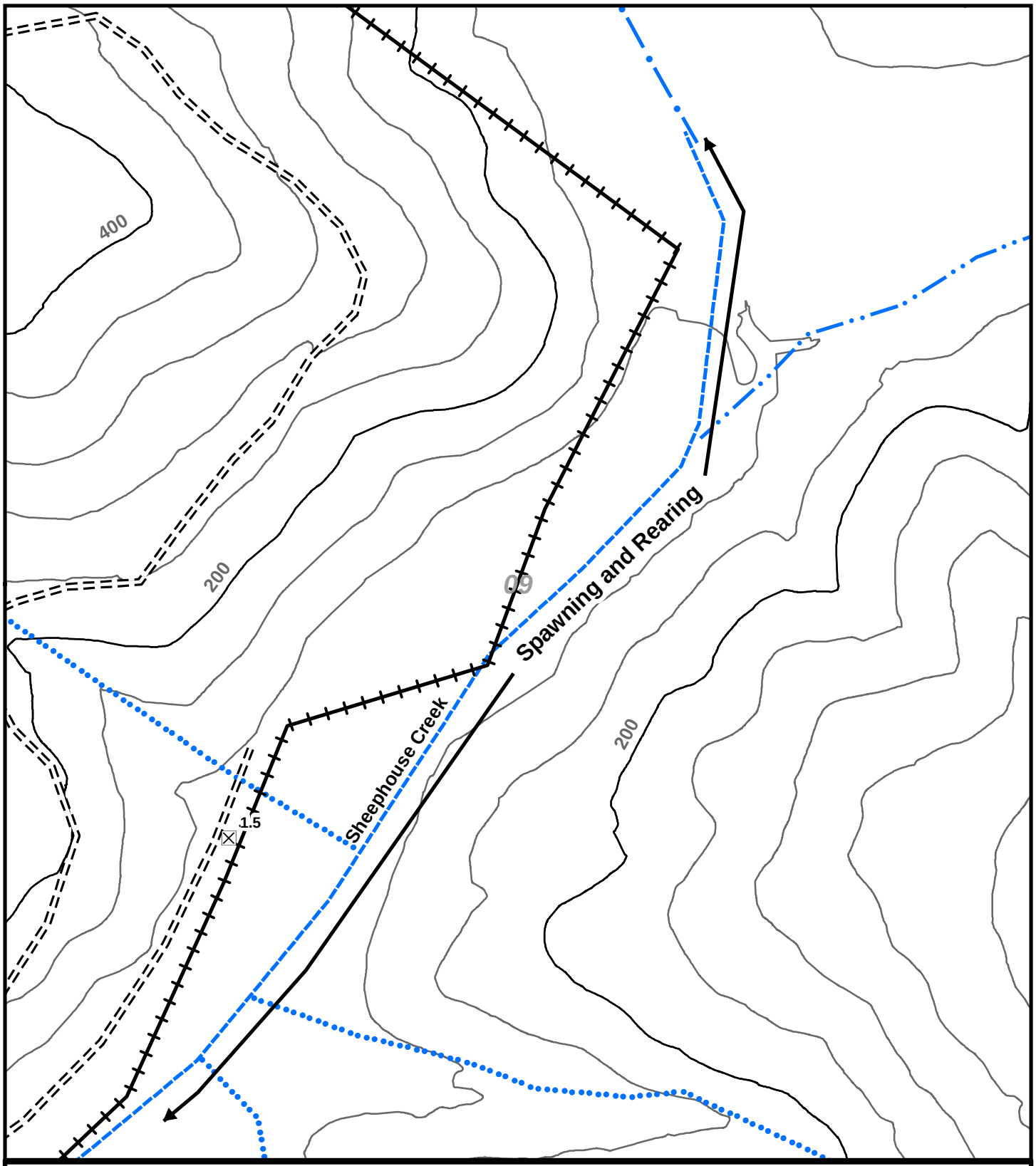
0 220 Feet

Berry's Knotfarm NTMP
Salmonid Habitat Map 7

P:ortion of Muniz Rancho
Sections 5, 7, 8, 9, 17, 18 MDB&M
Duncans Mills, CA Quadrangle

Permanent Road
Seasonal Road
Highway
Watercourse
Class I
Class II Large
Class II Small
Class III
Russian River
Crossing
Landing
Anadromous Salmonid Habitat

Environmental Resource Solutions, Inc. October 15, 2024



N
W E
S

1:2,400

Property / NTMP Boundary

0 220 Feet

Berry's Knotfarm NTMP
Salmonid Habitat Map 8

P:ortion of Muniz Rancho
Sections 5, 7, 8, 9, 17, 18 MDB&M
Duncans Mills, CA Quadrangle

Permanent Road
Seasonal Road
Highway
Watercourse
Class I
Class II Large
Class II Small
Class III
Russian River
Crossing
Landing
Anadromous Salmonid Habitat

Environmental Resource Solutions, Inc. October 15, 2024

CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT
Sheephouse Creek
Report Revised April 14, 2006
Report Completed 2000
Assessment Completed 1996

INTRODUCTION

A stream inventory was conducted during the summer of 1996 on Sheephouse Creek. The inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the amount and condition of available habitat to fish, and other aquatic species with an emphasis on anadromous salmonids in Sheephouse Creek. The objective of the biological inventory was to document the salmonid and other aquatic species present and their distribution.

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

WATERSHED OVERVIEW

Sheephouse Creek is a tributary to the Russian River, located in Sonoma County, California (see Sheephouse Creek map, page 2). The legal description at the confluence with the Russian River is T7N, R11W. Its location is 38°26'58" N. latitude and 123°5'22" W. longitude. Seasonal vehicle access exists from a private road via HWY 116 near Jenner.

Sheephouse Creek and its tributaries drain a basin of approximately 3.4 square miles. The East Fork of Sheephouse Creek and 2 minor unnamed tributaries were also inventoried and the results are included in this report. Sheephouse Creek is a second order stream and has approximately 6.3 miles of blue line stream, according to the USGS Duncans Mills 7.5 minute quadrangles. Elevations range from about 40 feet at the mouth of the creek to 640 feet in the headwaters. Coniferous forest dominates the watershed, but there are zones of grassland and oak-woodland in the upper watershed. The watershed is entirely privately owned, and primarily managed for timber production.

METHODS

The habitat inventory conducted in Sheephouse Creek follows the

methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi and Reynolds, 1994). The AmeriCorps Volunteers that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). This inventory was conducted by a two person team and was supervised by Bob Coey, Russian River Basin Planner (DFG).

HABITAT INVENTORY COMPONENTS

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

1. Flow:

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

2. Channel Type:

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

3. Temperatures:

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

4. Habitat Type:

Habitat typing uses the 24 habitat classification types defined by McCain and others (1988). Habitat units are numbered sequentially

and assigned a type identification number selected from a standard list of 24 habitat types. Dewatered units are labeled "DRY". Sheephouse Creek habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All unit lengths were measured, additionally, the first occurrence of each unit type and a randomly selected 10% subset of all units were completely sampled (length, mean width, mean depth, maximum depth and pool tail crest depth). All measurements were in feet to the nearest tenth.

5. Embeddedness:

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

6. Shelter Rating:

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

7. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. In all fully measured habitat units, dominant and sub-dominant substrate elements were visually estimated using a list of seven size classes.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the California Salmonid Stream Habitat Restoration Manual, 1994. Canopy density relates to the amount of stream shaded from the sun. In Sheephouse Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated visually into percentages of evergreen or deciduous trees.

9. Bank Composition:

Bank composition elements range from bedrock to bare soil. However, the stream banks are usually covered with grass, brush, or trees. These factors influence the ability of stream banks to withstand winter flows. In Sheephouse Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully measured unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation was estimated and recorded.

BIOLOGICAL INVENTORY

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

DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat, a dBASE IV data entry program developed by Tim Curtis, Inland Fisheries Division, California Department of Fish and Game. This program processes and summarizes the data, and produces the following tables and appendices:

- Riffle, flatwater, and pool habitat types
- Habitat types and measured parameters
- Pool types
- Maximum pool depths by habitat types
- Shelter by habitat types
- Dominant substrates by habitat types
- Vegetative cover and dominant bank composition
- Fish habitat elements by stream reach

Graphics are produced from the tables using Lotus 1,2,3. Graphics

developed for Sheephouse Creek include:

- Level II Habitat Types by % Occurrence and % Total Length
- Level IV Habitat Types by % Occurrence
- Pool Habitat Types by % Occurrence
- Maximum Depth in Pools
- Pool Shelter Types by % Area
- Substrate Composition in Low Gradient Riffles
- Percent Cobble Embeddedness by Reach
- Mean Percent Canopy
- Mean Percent Canopy by Reach
- Percent Bank Composition and Bank Vegetation

HABITAT INVENTORY RESULTS FOR SHEEPHOUSE CREEK

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

The habitat inventory of July 1-18, 1996 was conducted by Elaine Hards (Intern), John Fort (DFG), Eddie Sanchez, and Sarah Nossaman (Americorps). The data was analyzed by Ken Bunzel (DFG). The survey began at the confluence with the Russian River and extended up Sheephouse Creek to a point 2,397 feet past the confluence of the Northeast tributary. The survey ended because flows dwindled and habitat typing became difficult because of slash covering the creek. The total length of the stream surveyed was 15,851 feet (3 miles), with an additional 221 feet of side channel. A flow of .166 cfs was measured with a Marsh-McBirney Model 2000 flowmeter on July 23, 1996 underneath the, Hwy 116 overpass at the confluence with the Russian River.

This section of Sheephouse Creek has three channel types: from the mouth to 2,000 feet an E4, the middle 11,473 feet an F4 and the upper 2,379 feet a B3. E4 channels are low gradient (<2%), meandering riffle/pool gravel channels with low width/depth ratio, very efficient and stable with a high meander width ratio.

F4 channel types are entrenched meandering riffle/pool channels on low gradients with a high width/depth ratio and a predominantly gravel substrate.

B3 channel types are moderately entrenched, moderate gradient (2-4%), riffle dominated channels, with infrequently spaced pools, a very stable plan and profile, stable banks and have a predominantly cobble substrate.

Water temperatures ranged from 55-58°F and air temperatures ranged from 57-73°F. Summer temperatures were also measured by Jim Berry

(landowner) using a remote temperature recorder placed in a pool near the mouth (see Temperature Summary graphs at end of report). The recorder logged temperatures every 2 hours from July 9 - August 8 and again from August 14 - November 15, 1996. The highest temperature recorded was 58°F in July and the lowest was 44°F in November.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 39% pool units, 35% flatwater units, 23% riffle units, and 2% dry streambed units. Based on total **length** there were 51% flatwater units, 23% pool units, 22% riffle units, and 4% dry streambed units (Graph 1).

Three hundred, twenty-four habitat units were measured and 15% were completely sampled. Seventeen Level IV habitat types were identified. The data is summarized in Table 2. The most frequent habitat types by percent **occurrence** were runs at 24%, low gradient riffles 23%, root wad scour pools 19% and glides 10% (Graph 2). By percent total **length**, runs made up 42%, low gradient riffles 22%, root wad scour pools 11%, and glides 8%.

One hundred, twenty-seven pools were identified (Table 3). Scour pools were most often encountered at 81%, and comprised 78% of the total length of pools (Graph 3).

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Seventy of the 127 pools (55%) had a depth of two feet or greater (Graph 4). These deeper pools comprised 14% of the total length of stream habitat.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Pool types had the highest shelter rating at 65. Riffle had the lowest rating with 7 and flatwater rated 9 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 67, main channel pools rated 59, and backwater pools rated 39 (Table 3).

Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were root masses at 37%, large woody debris 26%, undercut banks 19%, and small woody debris 14%. Graph 5 describes the pool shelter in Sheephouse Creek.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in 9 of the 10 low gradient riffles measured. (Graph 6).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 122 pool tail-outs measured, 18 had a value of 1 (15%); 81 had a value of 2 (66%); 21 had a value of 3 (17%); and 2 had a value of 4 (2%). On this scale, a value of one is best for fisheries.

The mean percent canopy density for the stream reach surveyed was 94%. The mean percentages of deciduous and evergreen trees were 43% and 57%, respectively. Graph 8 describes the canopy for the entire survey.

For the entire stream reach surveyed, the mean percent right bank vegetated was 76% and the mean percent left bank vegetated was 73%. For the habitat units measured, the dominant vegetation types for the stream banks were: 55% evergreen trees, 29% deciduous trees, 8% brush, 7% grass and 1% bare soil. The dominant substrate for the stream banks were: 88% silt/clay/sand, 9% cobble/gravel, 2% boulder and 1% bedrock (Graph 10).

HABITAT INVENTORY RESULTS FOR SOUTHWEST TRIBUTARY

The habitat inventory of July 26 - August 6, 1996 was conducted by Sarah Nossaman and Eddie Sanchez (AmeriCorps). The survey began at the confluence with Sheephouse Creek and extended up the tributary until flows dwindled and the stream became unsuitable for salmonids at 7088 feet. This section of the Southwest Tributary has an F4 channel type.

Water temperatures were 55°F and air temperatures ranged from 56-66°F.

Based on frequency of ***occurrence*** *there were 36% pool units, 28% flatwater units, 26% riffle units, and 10% dry streambed units. Based on total* ***length*** *there were 79% dry streambed units, 8% riffle units, 8% flatwater units, and 5% pool units.*

The most frequent habitat types by percent ***occurrence*** *were low gradient riffles at 26%, runs 21%, and log scour pools 10%. By percent total* ***length****, dry streambed made up 79%, low gradient riffles 8%, runs 6%, and root wad scour pools 2%.*

Scour pools were most often encountered at 96%, and comprised 92% of the total length of pools. Thirty five percent had a depth of two feet or greater, and comprised 2% of the total length. Pools in general had a mean shelter rating of 49. Dominant pool shelter

types were root masses at 34%, boulders 28%, and large woody debris 25%.

Gravel was the dominant substrate observed. Of the 24 pool tail-outs measured, three had a value of 1 (13%); ten had a value of 2 (42%); five had a value of 3 (21%); and six had a value of 4 (25%).

The mean percent canopy density for the stream reach surveyed was 93%. The mean percentages of deciduous and evergreen trees were 46% and 54%, respectively. The dominant substrate for the stream banks were: 79% silt/clay/sand and 21% boulder.

HABITAT INVENTORY RESULTS FOR EAST FORK SHEEPHOUSE CREEK

The habitat inventory of July 24 - August 13, 1996 was conducted by Sarah Nossaman and Eddie Sanchez (AmeriCorps). The survey began at the confluence with Sheephouse Creek and extended up the East Fork until habitat typing was no longer possible because of slash completely covering the creek, at 3,391 feet.

This section of the East Fork has an F4 channel type. Water temperatures ranged from 55-58°F. Air temperatures ranged from 58-75°F. Based on frequency of ***occurrence*** *there were 35% flatwater units, 25% riffle units, 22% pool units, and 18% dry streambed units. Based on total* ***length*** *there were 36% flatwater units, 28% dry streambed units, 28% riffle units, and 9% pool units.*

The most frequent habitat types by percent ***occurrence*** *were runs at 31%, low gradient riffles 25%, dry streambed 18% and log scour pools 10%. By percent total* ***length****, runs made up 32%, dry streambed 28%, low gradient riffles 28%, and log scour pools 4%.*

Scour pools were most often encountered at 95%, and comprised 91% of the total length of pools. 10% had a depth of two feet or greater, and comprised 1% of the total length of stream habitat. Pool types in general had a shelter rating of 55. Dominant pool shelter types were large woody debris at 51%, root masses 22%, and undercut banks 12%.

Gravel was the dominant substrate observed. Of the 18 pool tail-outs measured, three had a value of 1 (17%); eight had a value of 2 (44%); seven had a value of 3 (39%); and none had a value of 4.

The mean percent canopy density for the stream reach surveyed was 92%. The mean percentages of deciduous and evergreen trees were 18% and 82%, respectively. The dominant substrates for the stream banks were silt, clay and sand.

HABITAT INVENTORY RESULTS FOR NORTHEAST TRIBUTARY

The habitat inventory of August 9, 1996 was conducted by Sarah Nossaman and Eddie Sanchez (AmeriCorps). The survey began at the confluence with Sheephouse Creek and extended up the tributary until flows dwindled and habitat typing became difficult because of slash covering the creek.

This section of the Northeast tributary has an F3 channel type. Water temperatures ranged from 57-58°F and air temperatures ranged from 70-77°F.

*Based on frequency of **occurrence** there were 56% flatwater units, 28% pool units, 11% riffle units, and 6% dry streambed units. Based on total **length** there were 83% flatwater units, 8% riffle units, 5% pool units, and 3% dry streambed units.*

*The most frequent habitat types by percent **occurrence** were runs at 44%, log scour pools 17%, low gradient riffles 11% and glides 11%. By percent total **length**, runs made up 78%, low gradient riffles 8%, glides 6%, and log scour pools 3%.*

None of the pools had a depth of two feet or greater. Pools in general had a mean shelter rating of 100, with dominant shelter types being large woody debris at 43%, small woody debris 26%, root masses 20%, and undercut banks 6%.

Large cobble and gravel was the dominant substrate observed 80% of the tail-outs rated either 1 or 2.

The mean percent canopy density for the stream reach surveyed was 85%. The mean percentages of deciduous and evergreen trees were 1% and 99%, respectively. The dominant substrate for the stream banks were silt, clay, and sand.

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

On August 7, 1996 a biological inventory was conducted in two sites of Sheephouse Creek to document fish species composition and distribution. Each site was single pass electrofished using one Smith Root Model 12 electrofisher. Fish from each site were counted by species, and returned to the stream. The air temperature ranged from 57-62°F and the water temperature ranged

from 55-56°F. The observers were Sanchez (AmeriCorps), Nossaman (AmeriCorps), and Coey.

The inventory of Reach 1 started at the mouth and ended at the first house approximately 635 feet upstream in habitat units 1-16. In riffle and pool habitat types 39 0+, sixteen 1+, and one 2+ steelhead were observed (9/100') along with 126 sculpin (Cottus Sp.), 2 three-spined stickleback, 2 coho, and one dead Russian River Tule Perch.

The Reach 1 inventory was continued starting 800 feet upstream from the barn and extending for approximately 560 feet in habitat units 97-111. In pool, riffle, and run habitat types twenty two 0+ and three 1+ steelhead were observed (5/100') along with 52 sculpin, 1 Red-legged Frog, and 1 Tree Frog.

The inventory of Reach 1 was continued starting 100 yards downstream from the East Fork of Sheephouse and ending approximately 1500 feet upstream in habitat units 196-226. In pool, riffle, and run habitat types, 63 0+, 16 1+, five 2+ steelhead, and one Resident Rainbow Trout were observed (6/100') along with 12 sculpin, 9 crayfish, and 9 Pacific Giant Salamanders. A large sculpin was observed, approximately 6" in length.

The inventory of the East Fork of Sheephouse Creek started in habitat unit 1 and ended approximately 300 feet upstream in habitat unit 15. In pool and run habitat types above the log jam (units 8-15) no steelhead were seen, however, 8 Pacific Giant Salamanders were observed along with 1 Red-legged Frog. In pool, run, and riffle habitat types below the log jam two 0+, two 1+, and one 2+ steelhead were observed (2/100') along with 1 sculpin, 2 Pacific Giant Salamanders, and one crayfish. Young of the year salmonids were seen earlier in this tributary in areas later the stream was dry.

The inventory of the Southwest tributary started at the beginning of the reach and continued for approximately 700 feet in habitat units 4-30. In riffle and pool habitat types 25 0+, fourteen 1+, and two 2+ steelhead were observed (6/100') along with 2 sculpin and 12 Pacific Giant salamanders. Jim Berry commented that this tributary was dry throughout the drought years (1987-1994).

No salmonids were observed in the northeast tributary where log jams occur near the mouth.

A summary of 1996 data collected appears in the table below.

Summary of Species Observed in 1996 Surveys			
YEARS	**SPECIES**	**SOURCE**	**Native/Introduced**
1996	Steelhead	DFG	N
1996	Coho	DFG	N
1996	Sculpin	DFG	N
1996	Three-spined Stickleback	DFG	N
1996	Russian River Tule Perch	DFG	N
1996	Pacific Giant Salamander	DFG	N
1996	Red-legged Frog	DFG	N
1996	Crayfish	DFG	N

No introduced fish species were found during the surveys and historical records indicate no hatchery stocking, rescues or transfers have occurred in the watershed.

DISCUSSION FOR SHEEPHOUSE CREEK

Sheephouse Creek has three channel types: E4, F4 and B3. The lower 2000 feet is an E4 channel type. E4 channels are low gradient (<2%), meandering riffle/pool gravel channels with low width/depth ratios, usually very efficient and stable, with a high meander width ratio. The channel in Sheephouse Creek is a meadow-like depositional zone influenced by tidewater. Normally E4 channels are very efficient at transporting sediment. However, the backwater effect created by tidewater, causes the excess sediment load generated by upstream landuse practices, to deposit within the channel. Thus, gravel bar formation within the bankful channel has induced lateral bank erosion and increased the rate of flooding. This has been verified by nearby landowners.

According to the DFG Salmonid Stream Habitat Restoration Manual, E4 channels are good for bank-placed boulders, fair for opposing wing-deflectors, and poor for medium-stage weirs, boulder clusters and single wing-deflectors. These type of structures placed within the bankfull channel would decrease channel width, increase sediment transport and reduce flooding to nearby structures.

There are 13,473 feet of F4 channel type in Reach 1. F4 channel types are good for bank-placed boulders and fair for low-stage weirs, single and opposing wing-deflectors, channel constrictors and log cover.

There are 2,379 feet of B3 channel type in Reach 2. These channel types are excellent for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors and log cover. They are also good for medium-stage plunge weirs. Many site specific projects can be designed within these channel types, especially to increase pool frequency, volume and shelter. Any work considered will require careful design, placement, and construction that must include protection for any unstable banks.

The water temperatures recorded on the survey days July 1-23, 1996 ranged from 55-58°F. Air temperatures ranged from 57-73°F. This temperature regime is favorable to salmonids.

Summer temperatures measured using a remote temperature recorder placed in a pool near the mouth ranged from 44-58°F. The Temperature Summary graphs shows that for the entire summer and fall this reach exhibited temperatures favorable to salmonids.

Pools comprised 23% of the total **length** of this survey. In first and second order streams a primary pool is defined to have a maximum depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. In Sheephouse Creek, the pools are relatively shallow with 55% having a maximum depth of at least 2 feet. These pools comprised 14% of the total length of stream habitat. In coastal coho and steelhead streams, it is generally desirable to have primary pools comprise approximately 50% of total habitat length. log structures would increase pool habitat and in locations where their installation will not jeopardize any unstable stream banks, or subject the structures to high stream energy.

The mean shelter rating for pools was 65. However, a pool shelter rating of approximately 80 is desirable. The pool shelter that now exists is being provided primarily by root masses (37%), large woody debris (26%), undercut banks (19%), and small woody debris (14%).

Log and root wad cover structures in the pool and flatwater habitats are needed to improve both summer and winter salmonid habitat. Log cover structures provide rearing fry with protection from predation, rest from water velocity, and also divide territorial units to reduce density related competition.

Nine of the 10 low gradient riffles measured had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids. However, 62% of the pool tail-outs measured had embeddedness ratings of 2. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead. In Sheephouse Creek, the quality of spawning habitat appears to be "fair".

The mean percent canopy for the survey was 94%. This is an excellent percentage of canopy, since 80 percent is generally considered desirable.

Numerous gullies and road related erosion points were noted along the west access road of the creek. The east-side access road was not observed, but it is likely in similar condition. Sedimentation to the creek could be decreased through changes in road maintenance.

During the habitat inventory of Sheephouse Creek, no salmonids were observed upstream of habitat unit 290, 2.6 miles from the mouth, where a log jam appears to impede further passage. Approximately 2000' of suitable habitat exists above this dam. The stream is dry for 20 feet above here and there is another log jam with potential for blocking fish passage about 500 feet upstream.

DISCUSSION FOR SOUTHWEST TRIBUTARY

The Southwest Tributary has an F4 channel type. The temperature regime is favorable to salmonids and canopy is excellent. These channel types are good for bank-placed boulders as well as single and opposing wing-deflectors. They are fair for low-stage weirs, boulder clusters, channel constrictors and log cover.

In the Southwest Tributary, the pools are relatively shallow with only 2% of the total length of stream habitat, being primary pools. The mean shelter rating for pools was 49. However, a pool shelter rating of approximately 80 is desirable. The relatively small amount of pool shelter that now exists is being provided primarily by root masses (34%), boulders (28%), and large woody debris (25%).

The low gradient riffles measured had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids. However, pool embeddedness ratings were high. Only 13% had a rating of 1. In the Southwest Tributary, sediment sources should be mapped and rated according to their potential sediment yields, and control measures taken.

DISCUSSION FOR EAST FORK SHEEPHOUSE CREEK

The East Fork has 3391 feet of F4 channel type. The temperature regime is favorable to salmonids and canopy is excellent.

In the East Fork, the pools are relatively shallow with only 1% of the total length of stream habitat being primary pools. The mean shelter rating for pools was 55, with shelter being provided primarily by large woody debris (51%), root masses (22%), and undercut banks 12%.

All of the low gradient riffles measured had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids. However, 39% of the pool tail-outs measured had embeddedness ratings of either 3 or 4. In the East Fork of Sheephouse Creek, no salmonids were observed upstream of a log jam in habitat unit 8, about 125 feet from the mouth.

DISCUSSION FOR NORTHEAST TRIBUTARY

The Northeast tributary has an F3 channel type.

The mean shelter rating for pools was 100, and is being provided primarily by large woody debris (43%), small woody debris (26%), root masses (20%), and undercut banks (6%). In the Northeast tributary, large cobble is the dominant substrate and the amount of fine sediment in potential spawning appears minimal.

The mean percent canopy for the survey was 85%, which is excellent. No salmonids were observed in the northeast tributary where log jams occur near the mouth.

SUMMARY

In conclusion, biological surveys were conducted to document fish distribution and are not necessarily representative of population information. Steelhead were found throughout Sheephouse Creek, while only 2 juvenile coho were found near the mouth. This is likely because physiological and environmental requirements for coho are more stringent than for steelhead, and coho were likely present but not observed in deeper sheltered pools. The 1996 summer surveys documented fewer 0+ fish than expected, indicating poor spawning conditions in Sheephouse Creek. This is likely linked to the lack of large wood which provides resting cover for adults and young juveniles, and high levels of fine sediment. However, many 1+ fish were observed indicating good rearing conditions in general.

In general, stream shade canopy is very good and water temperatures are suitable for salmonids. There is sufficient gravel, however embeddedness levels are higher than desirable for salmonid spawning. Shelter ratings and the quantity of pool habitat are both low, with the exception of the northeast branch (except here a barrier exists at the mouth). Log debris accumulations in the upper portions of Sheephouse and its tributaries limit salmonid access.

GENERAL RECOMMENDATIONS

Sheephouse Creek and its tributaries should be managed as an anadromous, natural production streams.

Access for migrating salmonids is an ongoing potential problem in the Southwest and Northeast tributaries of Sheephouse Creek, and where log debris from upslope timber harvest operations periodically moves downslope. Log jams should be monitored at these sites, while carefully preserving LWD for shelter on Sheephouse Creek and its tributaries. Many jams were modified in 1998 by the landowner.

Woody debris placed by a landowner, if left undisturbed, will provide fish shelter and rearing habitat. Landowners should be encouraged not to remove woody debris from the stream, except under extreme buildup and only under guidance by a fishery professional.

Future bank erosion problems should be treated with bio-engineering stabilization structures to reduce the amount of fine sediment entering the stream. Rootwad wing deflectors have been placed at many sites and have proven to be very effective.

SPECIFIC FISHERY ENHANCEMENT RECOMMENDATIONS

1) Road related erosion should be identified and corrected. Improved road maintenance strategy should be explored with all landowners. Many low cost/high benefits strategies exist.

2) In Reach 1, bank-placed boulders, opposing wing-deflectors, and vortex weirs placed within the bankfull channel would decrease channel width, increase sediment transport and reduce flooding to nearby structures. Some gravel extraction, in low flow areas, without disturbing point bars may be recommended.

3) Pool enhancement structures placed by a landowner to increase

the number and depth of pools, should be monitored for effectiveness and anchoring should be inspected periodically (see attached). Run and glide habitats could easily be converted to pools with the addition of woody debris, where the banks are stable or in conjunction with stream bank armor to prevent erosion. Large logs would not necessarily need anchoring in this stream.

4) Cross-sections to monitor sediment transport should continue to be monitored by DFG staff.

PROBLEM SITES AND LANDMARKS - SHEEPHOUSE CREEK SURVEY COMMENTS

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

HABITAT UNIT #	STREAM LEN (FT.)	COMMENTS
1.00	68	SMALL COBBLE DAM MAN MADE
2.00	123	SLIGHT BANK EROSION 20 FT LONG X 10 FT HIGH
5.00	257	CORNER BANK ERODING
14.00	544	RT BANK IS LAWN
18.00	711	RD NEXT TO CRK-BANK STABILIZATION (SMALL AMOUNT DONE)
19.00	731	GREEN TREE FROG
24.00	929	DRY TRIB LF BANK, RT BANK ERODIBLE, RIP RAP
26.00	1021	THIS AREA IS HIGHLY ERODIBLE
28.00	1173	LF BANK REACH HAS ACCESS ROAD
29.00	1215	ERODIBLE LEFT BANK
33.00	1357	RIP RAP HIGHLY ERODIBLE BANK, BUNK HOUSE
37.00	1454	SCULPINS, GOOD EF
43.10	1821	INCREDIBLE HABITAT
44.00	1851	WIRE FENCE ALONG BANK
47.00	1995	TELEPHONE POLE
48.00	2057	PVC PIPE 2 IN. W/ STRAINER
49.00	2095	2 IN. WATER DIVERSION PIPE LF BANK W/ SCREEN
57.00	2543	CULVERT RT BANK-SEE FORM
61.00	2649	SPRING RT BANK, TEMP-55
64.00	2718	3 IN. WATER DIVERSION, NO SCREEN
72.00	3042	CONFLUENCE DRY, LARGE METAL BARN RIGHT BANK
117.00	4851	DRY TRIB LF BANK

128.00	5209	LOW STAGE DIAG. WEIR
136.00	5527	POSS TEMPMENTOR PLACEMENT
138.00	5611	2+ SALMONIDS
139.00	5654	CRAYFISH
140.00	5744	BLOWOUT RT BANK-SEE FORM
141.00	5775	CHANNEL DOWNCUTTING
143.00	5899	LOG JAM-SEE FORM
150.00	6211	SCULPIN AND CRAYFISH
159.00	6579	2+ SALMONIDS
164.00	6723	OBSERVING MORE SALMONIDS THAN DOWNSTREAM
171.00	6989	2+ SALMONIDS
178.00	7335	NUMEROUS YOY FISH
192.00	8069	2+ FISH
195.00	8170	3+ SALMONID
207.00	8822	DIRT UP TO THE EDGE OF BANK
211.00	8977	DIRT RD ON RT BANK STOPS (ENDS)
214.00	9124	CONFLUENCE W/ EAST FORK TEMP-56
228.00	9760	POSS. CHANNEL CHANGE
235.00	9916	1+ SHD, RETURNS TO F4 CHANNEL
236.00	10241	1+ SHD
239.00	10394	2- 1+ SHD
243.00	10788	1+ SHD, CRAYFISH
252.00	11615	RED-LEGGED FROG, CRAYFISH,5- 0+ SHD, DRY TRIB RT BANK
253.00	11636	1+ SHD CRAYFISH
255.00	12113	CRAYFISH
256.00	12324	0+ SHD, 1+ SHD
257.00	12343	DRY SIDE CHANNEL RT
258.00	12362	POSS LOG JAM (SEE FORM)
260.00	12420	TIMBER HARVEST LOGS IN CREEK FROM UNITS 259-260.1
261.00	12694	15- 0+ SHD, 1+ SHD
262.00	12707	2 + SHD MAJOR LOG PILE UP ON RT BANK
263.00	12811	SUBSTRATE CHANGING POSS CHANGE TO F2
265.00	12927	LOG JAM- SEE FORM
272.00	13124	BANKS COVERED W/ TIMBER SLASH
273.00	13226	MANY LOGS FALLEN ACROSS INTO CREEK
276.00	13338	1+ SHD
277.00	13467	CONFLUENCE OF UPPER NW + NE FORKS, TEMP-58 AT CONF
278.00	13479	GOING UP WEST FORK SLASH COVERING CREEK.
280.00	13533	0+ SHD
285.00	13707	1+ SHD
290.00	13802	MAJOR LOG JAM-SEE FORM
291.00	14002	NEWTS
293.00	14080	NEWTS, HIGHLY ERODIBLE RT BANK

299.00	14701	DRY TRIB RT, LOG JAM-SEE FORM,
304.00	14800	LANDSLIDE RT BANK-75'H X 100'L X 30'W DEBRIS COVERING CHANNEL
305.00	14842	ENTIRE NORTH SECTION OF CREEK IS COVERED BY REDWOOD SLASH. WHOLE TREES DUE TO EROSION-#296-305=721 FT
307.00	14905	LOG JAM
309.00	14979	ERODED RT BANK, DRY TRIB LF BANK
311.00	15422	DRY TRIB RT BANK, LOG JAM
313.00	15635	OLD METAL WATER PIPE
315.00	15716	MAIN CHANNEL CLOGGED W/ LOGS + DEBRIS
316.00	15726	NEWTS
319.00	15865	DRY ABOVE THIS UNIT, END SURVEY, DRY TRIB RT BANK

PROBLEM SITES AND LANDMARKS - EAST FORK SHEEPHOUSE SURVEY COMMENTS

HABITAT UNIT #	*STREAM LEN (FT.)*	*COMMENTS*
2.00	*39*	*NATURAL LOG WEIR*
8.00	*128*	*LOG JAM-SEE FORM, DRY ABOVE JAM-GRAVEL BUILD UP*
9.00	*186*	*BRIDGE-25'W X 14'L X 2.5'H ABOVE STREAMBED, OLD LOG BRIDGE COVERED W/ VEG.*
33.00	*1143*	*DRY TRIB LF BANK*
42.00	*1412*	*LOG JAM SEE FORM*
48.00	*1624*	*PACIFIC GIANT SALAMANDERS*
57.00	*1904*	*PACIFIC GIANT SALAMANDER*
59.00	*1967*	*LOG JAM 45'L X 18'W X 4'H RETAINING GRAVEL. DOWNCUTTING, 1.5' NOT BARRIER*
63.00	*2042*	*LOG WEIR SEEMS TO BE FISH BARRIER, DOWNCUTTING 4 FT.*
64.00	*2060*	*3 P.G. SALAMANDERS*
67.00	*2185*	*RED-LEGGED FROG ENTERING TIMBER HARVEST AREA*
69.00	*2251*	*DRY TRIB RT BANK*
70.00	*2260*	*LOG JAM 35'L X 25'W X 7'H NOT BARRIER*
83.00	*2755*	*DRY TRIB RT BANK*
84.00	*2817*	*SLASH COVERS CHANNEL, LOGS OVER CRK, APPEAR PUSHED IN BY TRACTOR*
86.00	*2871*	*LOG JAM 10'H X 15'W X 7'L, DOWNCUTTING 3 FT, RETAINING GRAVEL,*

		NOT BARRIER.
95.00	3296	SLASH COMPLETELY COVERING CHANNEL CAN'T SEE CREEK
96.00	3380	WET TRIB LF BANK, 60/60 AT CONFLUENCE, TRIB IS 20 FT RIFFLE AND THEN BECOMES COMPLETELY COVERED, MAKING HAB. TYPING IMPOSSIBLE IN HEADWATERS AREA. LOGGING CURRENTLY OCCURRING UPSTREAM. END OF SURVEY.

PROBLEM SITES AND LANDMARKS - SOUTHWEST TRIB SURVEY COMMENTS

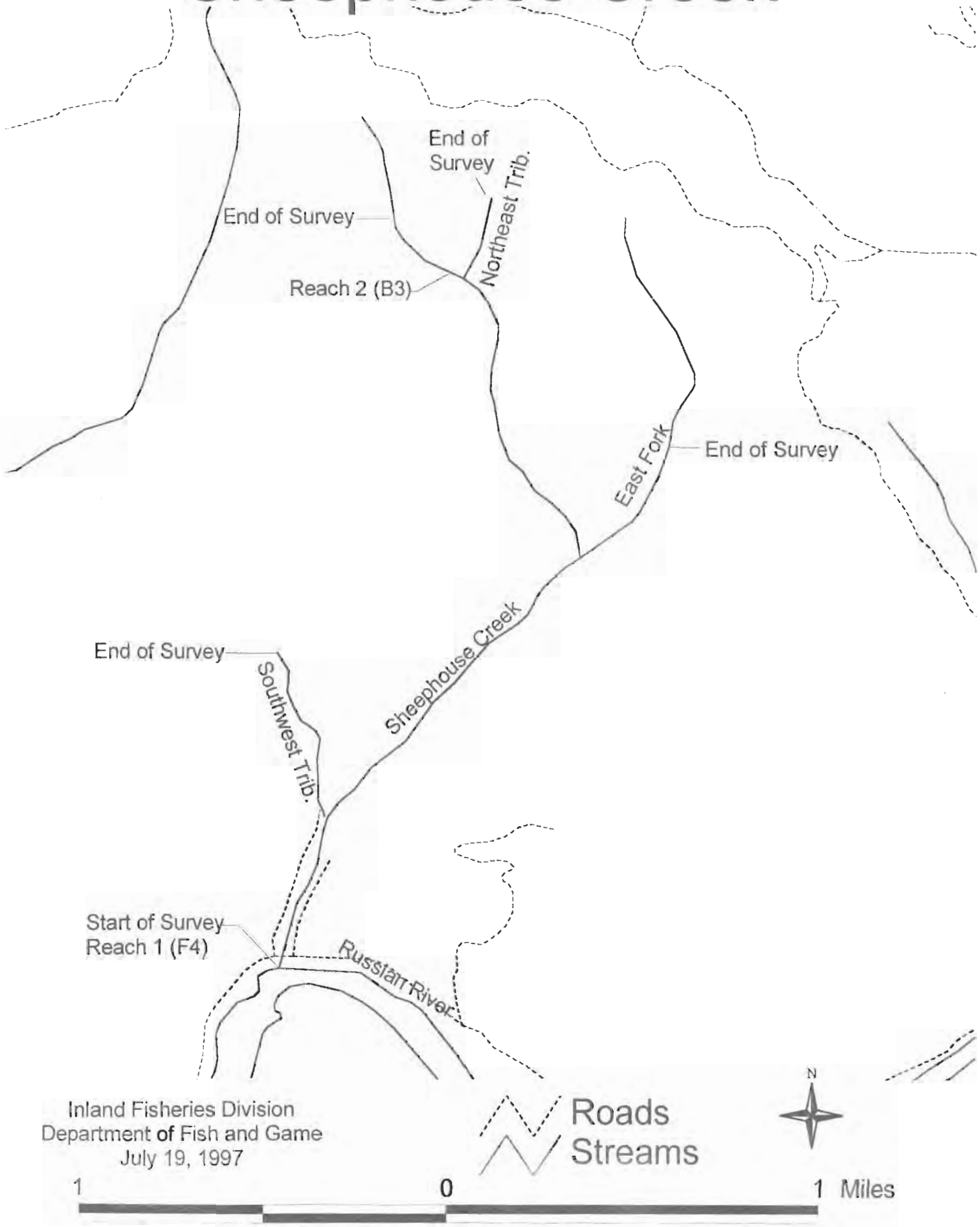
HABITAT UNIT #	STREAM LEN (FT.)	COMMENTS
1.00	1114	2 CULVERTS 2.5 FT DIAMETER UNDER BRIDGE #1, 20'L, DRY TRIB RT BANK AT 1056 FT.
2.00	1129	0+ SHD, POSS. CHANNEL CHANGE
4.00	1196	1+ SHD
6.00	1230	1+ SHD-3
9.00	1283	1+ SHD
10.00	1337	NEWTS
23.00	1643	0+ SHD
26.00	1767	LOG JAM-6'H X 11'W X 14'L. DOWN CUTTING 2 FT, RETAINING GRAVEL. NOT FISH BARRIER
27.00	1848	0 + SHD
30.00	1888	LOG JAM-3'H X 4'L X 12'W, DOWNCUTTING 2.5 FT, RETAINING GRAVEL,POSS. DRY CHANNEL ABOVE JAM.
32.00	1912	SMALL LOG JAM 2.5'L X 17'W, DOWN CUT 2.5 FT, RETAINING GRAVEL
38.00	2029	LOG JAM-4.5'H X 27'W X 6'L, DOWNCUTTING 4.6 FT, RETAINING GRAVEL.
39.00	2048	POSS. CHANNEL CHANGE
42.00	2131	1+ SHD
52.00	2340	LOG JAM- 15'L X 27'W X 5.5'H, NOT RETAINING GRAVEL OR DOWNCUTTING. , CHANNEL TYPED-F4
58.00	2486	1 + SHD
59.00	2522	1+ AND 0+ SHD

60.00	2538	DRY TRIB LT BANK
61.00	6938	LOG JAM (SEE FORM) AT LEAST 4 MORE LOG JAMS IN THIS DRY SECTION
65.00	6977	NEWTS
72.00	7089	EUTROPHICATION OCCURRING ALONG WITH MAJOR IRON DEPOSITS, FILLING THE CHANNEL WITH ORANGE AND GREEN BLOMS AND THICK GROWTHS OF AQUATIC PLANTS FROM THIS UNIT UNTIL THE CHANNEL GOES DRY IN THE HEADWATERS. NO FISH SEEN SINCE UNIT #59 AND NO VIABLE HABITAT OBSERVED ABOVE THIS UNIT. END OF ANADROMY

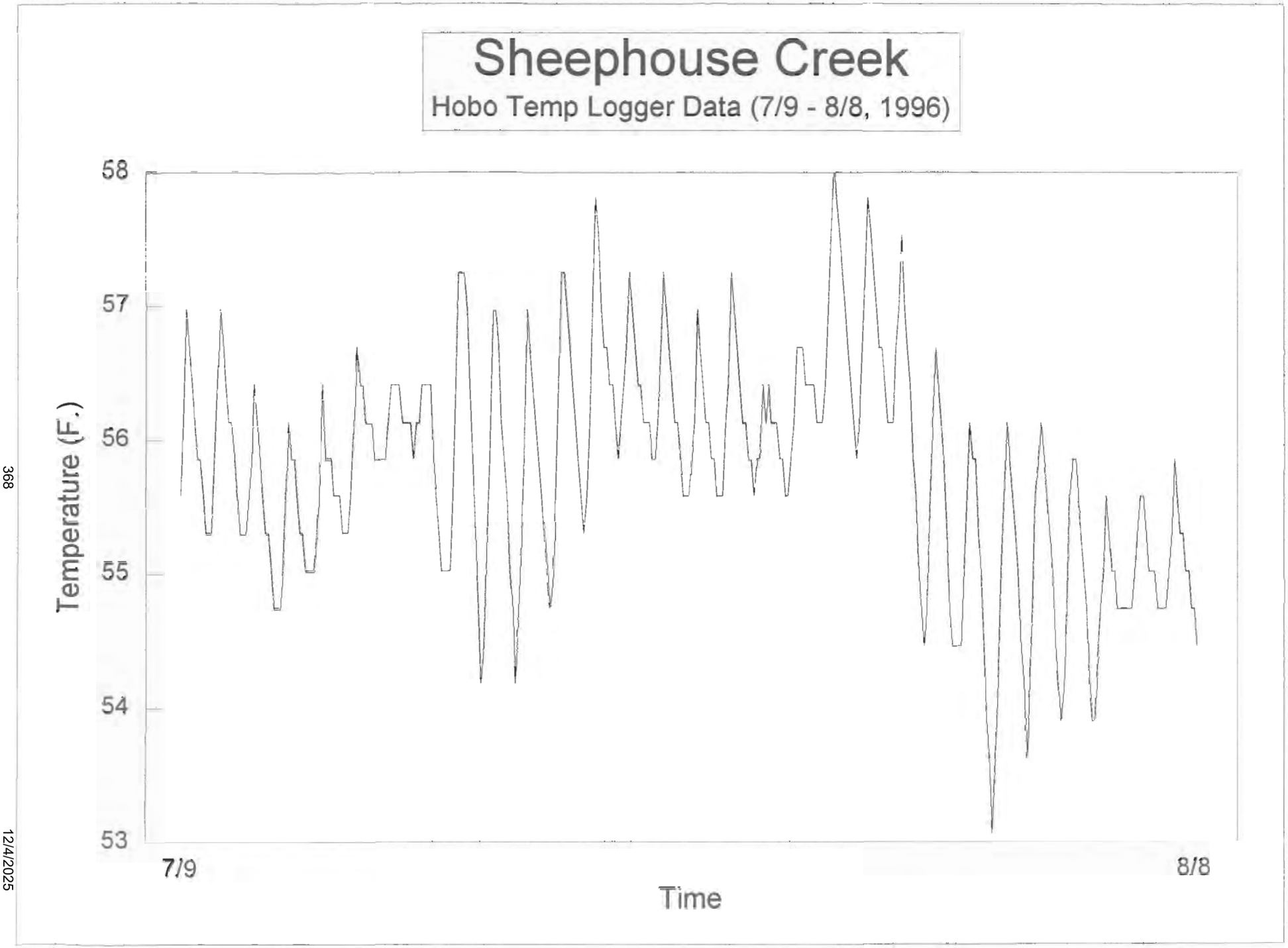
PROBLEM SITES AND LANDMARKS - NORTHEAST TRIB SURVEY COMMENTS

HABITAT UNIT #	STREAM LEN (FT.)	COMMENTS
2.00	74	HIGHLY ERODIBLE LF BANK 40'H X 50'L X 20'W FALLEN TREES IN CK
3.00	143	LOG JAM(SEE FORM)
5.00	260	LOG JAM (SEE FORM)
7.00	280	PACIFIC GIANT SALAMANDER
10.00	373	LOG JAM (SEE FORM) SLASH EVERYWHERE!
14.00	475	SLASH EVERYWHERE! ALMOST IMPOSSIBLE TO WALK CREEK IN THESE UNITS
15.00	497	LOG JAM 22'L X 15'W X 6'H. RETAINING GRAVEL, DRY ABOVE.
18.00	746	NO FISH SEEN TODAY, CREEK COVERED W/ SLASH FOR HUNDREDS OF FT. END OF SURVEY.

Sheephouse Creek

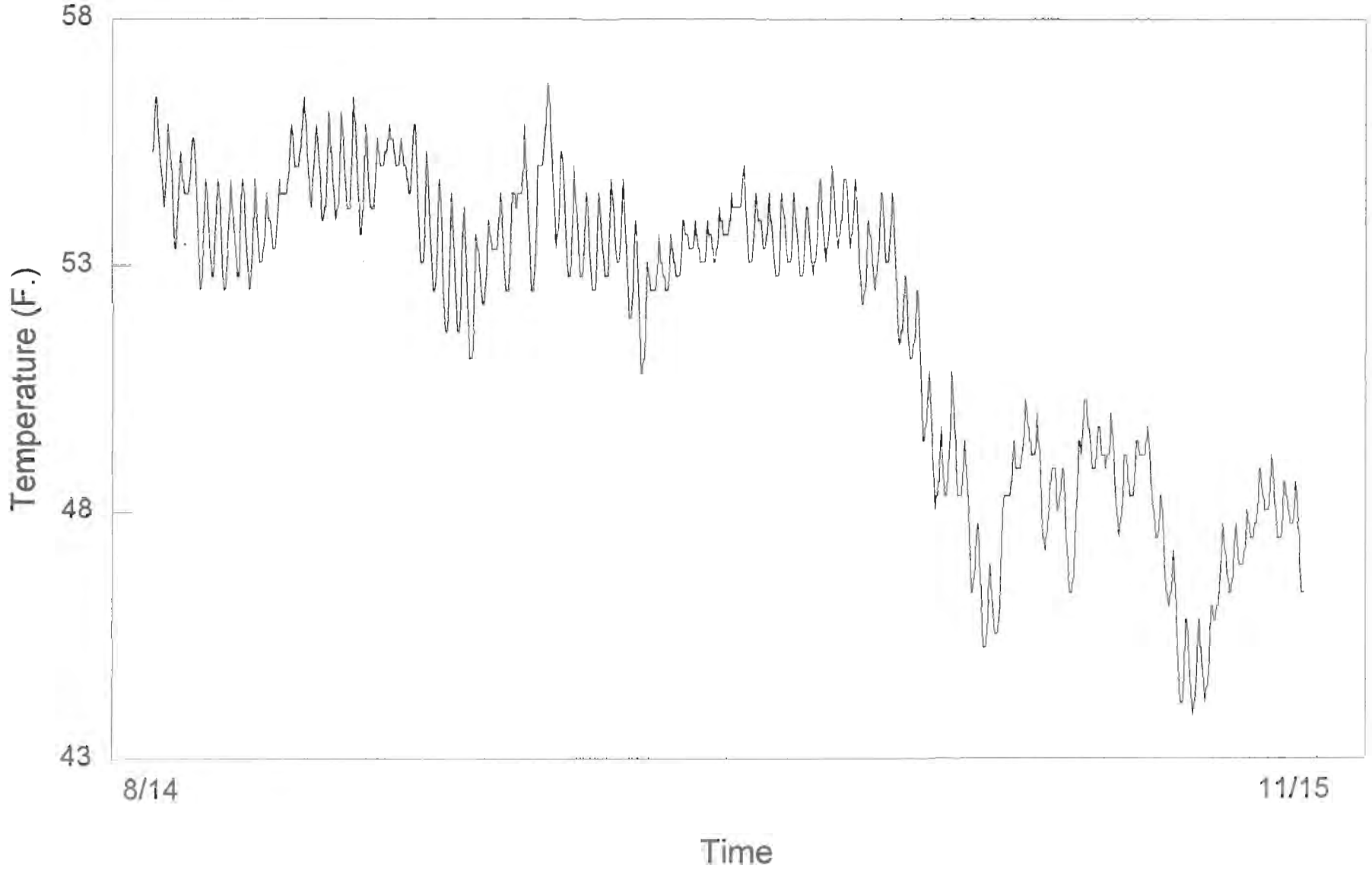


Inland Fisheries Division
Department of Fish and Game
July 19, 1997


Sheephouse Creek
Hobo Temp Logger Data (7/9 - 8/8, 1996)
58
57
56
55
54
53
Temperature (F.)
7/9
8/8
Time

Sheephouse Creek

Hobo Temp Logger Data (8/14 - 11/15, 1996)



Sheephouse Creek — Drainage: Russian River

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES — Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W — LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	ESTIMATED TOTAL AREA (sq.ft.)	MEAN VOLUME (cu.ft.)	ESTIMATED TOTAL VOLUME (cu.ft.)	MEAN RESIDUAL POOL VOL (cu.ft.)	MEAN SHELTER RATING
76	9	RIFFLE	23	47	3548	22	8.6	0.2	261	19845	44	3368	0	7
115	13	FLATWATER	35	72	8244	51	8.9	0.5	329	37809	208	23904	0	9
127	28	POOL	39	29	3689	23	9.6	1.0	281	35646	303	38423	242	65
6	0	DRY	2	99	591	4	0.0	0.0	0	0	0	0	0	0

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq. ft.)	TOTAL VOL. (cu. ft.)
324	50	16072	93300	65696

Sheephouse Creek — Drainage: Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS — Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W — LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

HABITAT UNITS #	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE %	MEAN LENGTH ft.	TOTAL LENGTH ft.	TOTAL LENGTH %	MEAN WIDTH ft.	MEAN DEPTH ft.	MAXIMUM DEPTH ft.	MEAN AREA sq.ft.	TOTAL AREA EST. sq.ft.	MEAN VOLUME cu.ft.	TOTAL VOLUME EST. cu.ft.	MEAN RESIDUAL POOL VOL cu.ft.	MEAN SHELTER RATING	MEAN CANOPY %
76	9	LGR	23	47	3548	22	9	0.2	0.8	261	19845	44	3368	0	7	95
31	4	GLD	10	42	1290	8	9	0.6	1.5	377	11672	224	6954	0	8	93
78	7	RUN	24	86	6727	42	5	0.4	1.7	223	17394	79	6173	0	7	94
6	2	EDW	2	38	226	1	17	1.0	1.7	512	3072	625	3753	0	15	77
15	3	MCP	5	35	521	3	11	1.1	4.7	390	5850	468	7020	388	70	98
2	1	CCP	1	31	63	0	13	0.9	2.5	397	794	329	657	249	20	98
3	3	STP	1	41	122	1	9	1.0	2.6	306	919	361	1082	314	30	95
8	3	CRP	2	39	310	2	8	1.2	3.0	362	2892	428	3426	315	26	81
22	5	LSL	7	26	568	4	10	0.8	3.0	246	5417	218	4806	163	86	98
62	6	LSR	19	30	1830	11	10	1.0	4.5	285	17646	312	19360	252	67	97
2	0	LSBk	1	17	33	0	11	1.2	2.4	170	339	203	407	170	50	0
4	2	LSBo	1	14	57	0	8	1.1	2.6	104	415	121	483	90	51	97
5	2	PLP	2	15	77	0	9	0.8	3.3	155	774	150	751	105	54	88
2	1	SCP	1	30	60	0	8	0.9	2.4	225	450	216	432	167	45	98
1	1	BPR	0	37	37	0	5	0.6	1.7	183	183	110	110	0	30	90
1	1	BPL	0	14	14	0	4	0.6	1.1	56	56	34	34	28	35	95
6	0	DRY	2	99	591	4	0	0.0	0.0	0	0	0	0	0	0	85

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
324	50	16072	87717	58817

Sheephouse Creek

Drainage: Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W

LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA EST. (sq.ft.)	MEAN VOLUME (cu.ft.)	TOTAL VOLUME EST. (cu.ft.)	MEAN RESIDUAL POOL VOL. (cu.ft.)	MEAN SHELTER RATING
20	7	MAIN	16	35	705	19	10.8	1.1	378	7563	438	8759	363	59
103	18	SCOUR	81	28	2874	78	9.6	1.0	266	27348	282	29027	221	67
4	3	BACKWATER	3	28	111	3	6.0	0.8	172	689	144	575	120	39

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
127	28	3689	35600	38361

Sheephouse Creek — Drainage: Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES — Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W — LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

UNITS MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DEPTH	<1 FOOT PERCENT OCCURRENCE	1-<2 FT. MAXIMUM DEPTH	1-<2 FOOT PERCENT OCCURRENCE	2-<3 FT. MAXIMUM DEPTH	2-<3 FOOT PERCENT OCCURRENCE	3-<4 FT. MAXIMUM DEPTH	3-<4 FOOT PERCENT OCCURRENCE	>=4 FEET MAXIMUM DEPTH	>=4 FEET PERCENT OCCURRENCE
15	MCP	12	0	0	7	47	4	27	0	0	4	27
2	CCP	2	0	0	0	0	2	100	0	0	0	0
3	STP	2	0	0	1	33	2	67	0	0	0	0
8	CRP	6	1	13	0	0	6	75	1	13	0	0
22	LSL	17	1	5	12	55	7	32	2	9	0	0
62	LSR	49	1	2	26	42	24	39	10	16	1	2
2	LSBk	2	0	0	0	0	2	100	0	0	0	0
4	LSBo	3	0	0	2	50	2	50	0	0	0	0
5	PLP	4	0	0	3	60	1	20	1	20	0	0
2	SCP	2	0	0	1	50	1	50	0	0	0	0
1	BPR	1	0	0	1	100	0	0	0	0	0	0
1	BPL	1	0	0	1	100	0	0	0	0	0	0

TOTAL UNITS
127

Sheephouse Creek

Drainage: Russian River

Table 5 - Summary of Shelter by Habitat Type

Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W

LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

UNITS MEASURED	UNITS SHELTER MEASURED	HABITAT TYPE	SQ. FT. UNDERCUT BANKS	SQ. FT. SWD	SQ. FT. LWD	SQ. FT. ROOT MASS	SQ. FT. TERR. VEGETATION	SQ. FT. AQUATIC VEGETATION	SQ. FT. WHITE WATER	SQ. FT. BOULDERS	SQ. FT. BEDROCK LEDGES
76	10	LGR	20	37	89	0	0	0	0	3	0
31	5	GLD	57	0	0	25	0	0	0	25	0
78	8	RUN	16	6	0	76	0	0	0	0	0
6	2	EDW	235	5	0	43	0	0	0	0	0
15	15	MCP	439	185	429	713	11	0	9	0	0
2	2	CCP	31	0	0	4	0	0	0	9	0
3	3	STP	6	0	33	71	0	0	0	52	0
8	6	CRP	29	60	16	141	86	0	0	23	0
22	22	LSL	287	468	881	247	31	0	0	18	0
62	62	LSR	891	584	947	2471	96	0	0	12	0
2	2	LSBk	36	10	10	3	0	0	0	6	4
4	4	LSBo	5	12	68	0	0	0	0	69	0
5	5	PLP	46	11	172	0	0	0	0	13	0
2	2	SCP	64	66	0	0	0	0	0	0	0
1	1	SPR	0	23	0	4	0	0	0	0	0
1	1	SPL	10	0	0	10	0	0	0	0	0
6	0	DRY	0	0	0	0	0	0	0	0	0
TOTAL 324	150		2172	1467	2645	3808	224	0	9	230	4
			21%	14%	25%	36%	2%	0%	0%	2%	0%
TOTAL FOR POOLS 127	125		1844	1419	2556	3664	224	0	9	202	4
			19%	14%	26%	37%	2%	0%	0%	2%	0%

Sheephouse Creek

Drainage: Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W

LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

TOTAL HABITAT UNITS	UNITS SUBSTRATE MEASURED	HABITAT TYPE	% TOTAL SILT/CLAY DOMINANT	% TOTAL SAND DOMINANT	% TOTAL GRAVEL DOMINANT	% TOTAL SM COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	% TOTAL BOULDER DOMINANT	% TOTAL BEDROCK DOMINANT
76	10	LGR	0	0	90	0	0	10	0
31	4	GLD	0	25	75	0	0	0	0
78	7	RUN	0	0	100	0	0	0	0
6	2	EDW	0	0	100	0	0	0	0
15	3	MCP	33	67	0	0	0	0	0
2	1	CCP	0	100	0	0	0	0	0
3	3	STP	0	67	33	0	0	0	0
8	3	CRP	0	33	67	0	0	0	0
22	5	LSL	0	80	20	0	0	0	0
62	6	LSR	0	33	67	0	0	0	0
2	0	LSBk	0	0	0	0	0	0	0
4	2	LSBo	0	50	50	0	0	0	0
5	2	PLP	0	100	0	0	0	0	0
2	1	SCP	100	0	0	0	0	0	0
1	1	BPR	0	100	0	0	0	0	0
1	1	BPL	0	0	100	0	0	0	0
6	1	DRY	0	0	100	0	0	0	0

APPENDIX A. Summary of Mean Percent Vegetative Cover for Entire Stream

Mean Percent Canopy	Mean Percent Evergreen	Mean Percent Decidous	Mean Right bank % Cover	Mean Left Bank % Cover
94.29	56.51	42.86	76.27	73.27

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Bedrock	0	1	0.93
Boulder	1	1	1.85
Cobble/Gravel	4	6	9.26
Silt/clay	49	46	87.96

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Grass	7	1	7.41
Brush	5	4	8.33
Deciduous Trees	13	18	28.70
Evergreen Trees	29	30	54.63
No Vegetation	0	1	0.93

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Sheephouse Creek
SAMPLE DATES: 07/01/96 to 07/23/96
STREAM LENGTH: 15851 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: DUNCAN MIL — Latitude: 38°26'58"
Legal Description: T7NR11W — Longitude: 123°5'22"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 01

Channel Type: F4	Canopy Density: 94%
Channel Length: 13473 ft.	Evergreen Component: 50%
Riffle/Flatwater Mean Width: 8 ft.	Deciduous Component: 49%
Total Pool Mean Depth: 1.1 ft.	Pools by Stream Length: 25%
Base Flow: 0.2 cfs	Pools >=3 ft. deep: 17%
Water: 55 - 71 °F Air: 57 - 73 °F	Mean Pool Shelter Rtn: 69
Dom. Bank Veg.: Evergreen Trees	Dom. Shelter: Root masses
Vegetative Cover: 78%	Occurrence of LOD: 40%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 14% 2. 67% 3. 19% 4. 0%

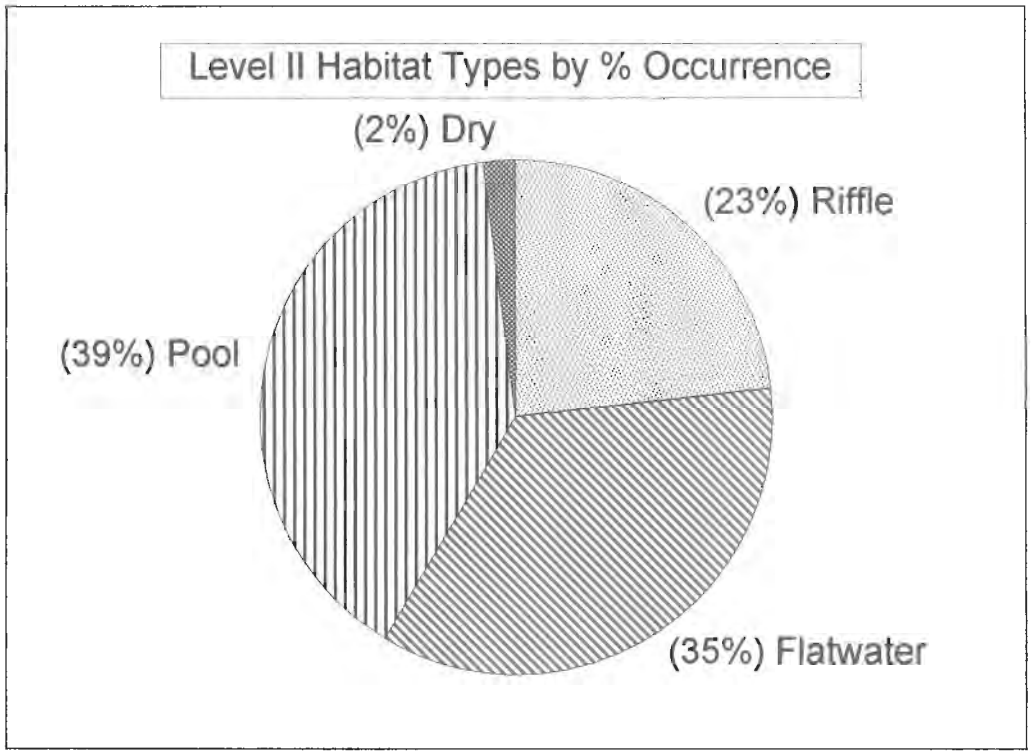
STREAM REACH 02

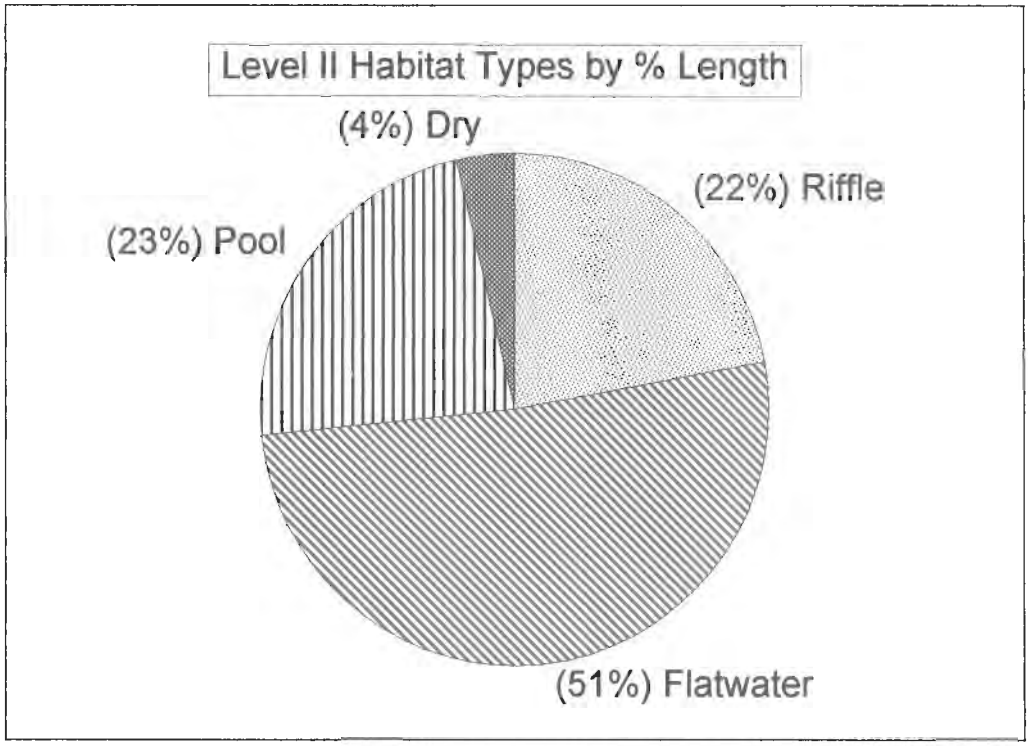
Channel Type: B3	Canopy Density: 94%
Channel Length: 2379 ft.	Evergreen Component: 97%
Riffle/Flatwater Mean Width: 4 ft.	Deciduous Component: 3%
Total Pool Mean Depth: 0.6 ft.	Pools by Stream Length: 7%
Base Flow: 0.2 cfs	Pools >=3 ft. deep: 0%
Water: 56 - 57 °F Air: 65 - 70 °F	Mean Pool Shelter Rtn: 40
Dom. Bank Veg.: Evergreen Trees	Dom. Shelter: Large Woody Debris
Vegetative Cover: 62%	Occurrence of LOD: 62%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 591 ft.

Embeddness Value: 1. 21% 2. 64% 3. 0% 4. 14%

Sheephouse

Level II Habitat Types

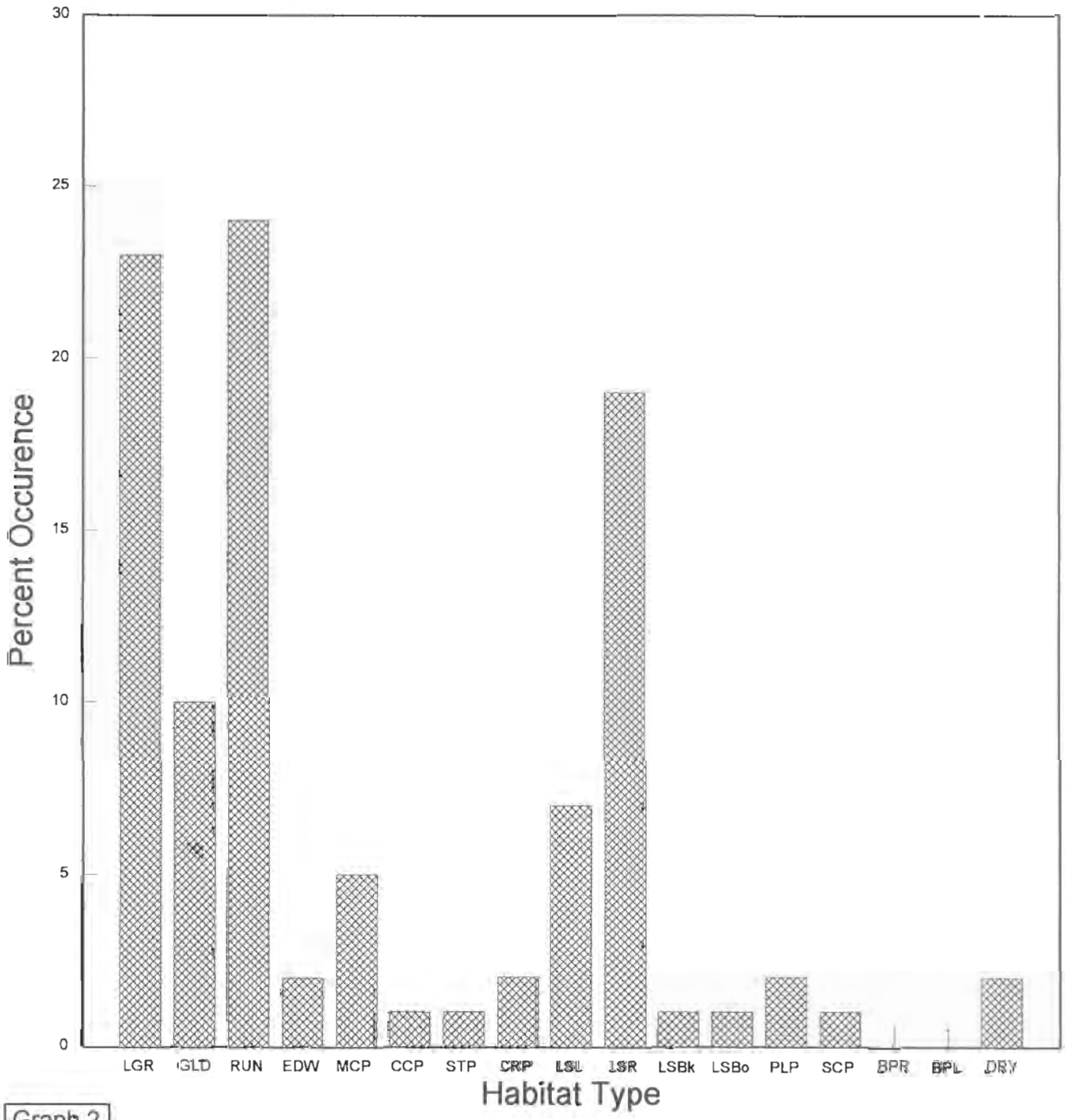




Graph 1

Sheephouse Creek

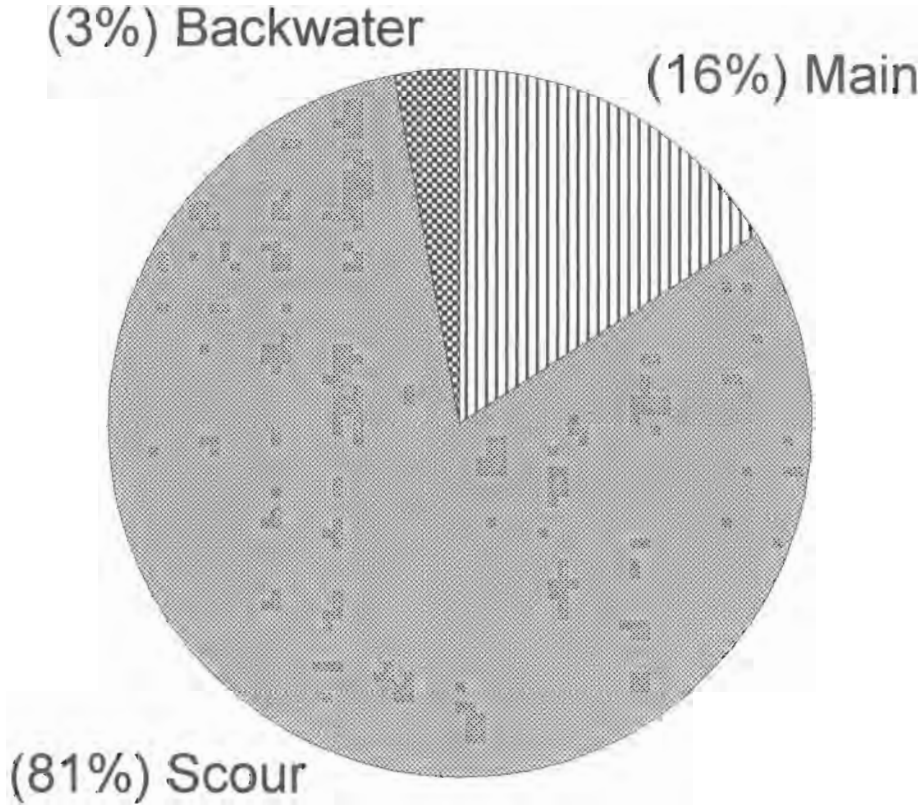
Level IV Habitat Types by % Occurrence



Graph 2

Sheephouse Creek

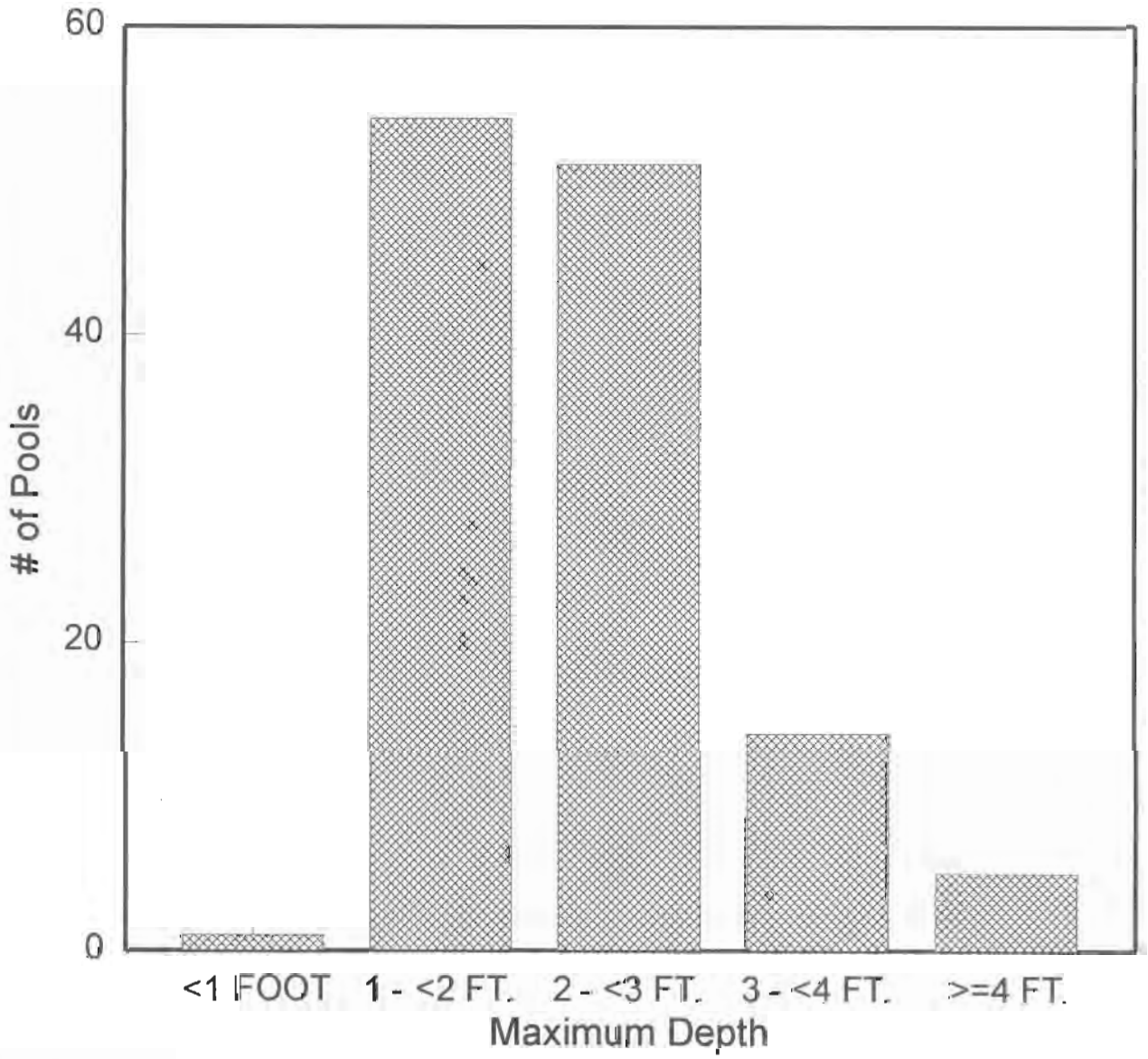
Pool Habitat Types by % Occurrence



Graph 3

Sheephouse Creek

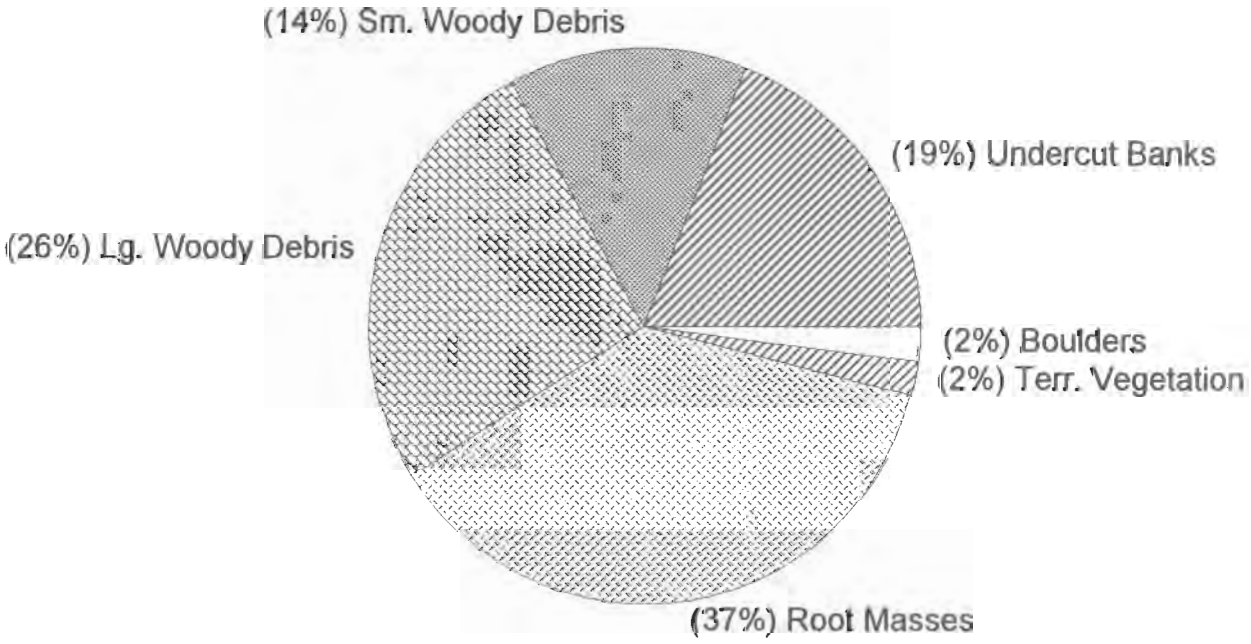
Maximum Depth in Pools



Graph 4

Sheephouse Creek

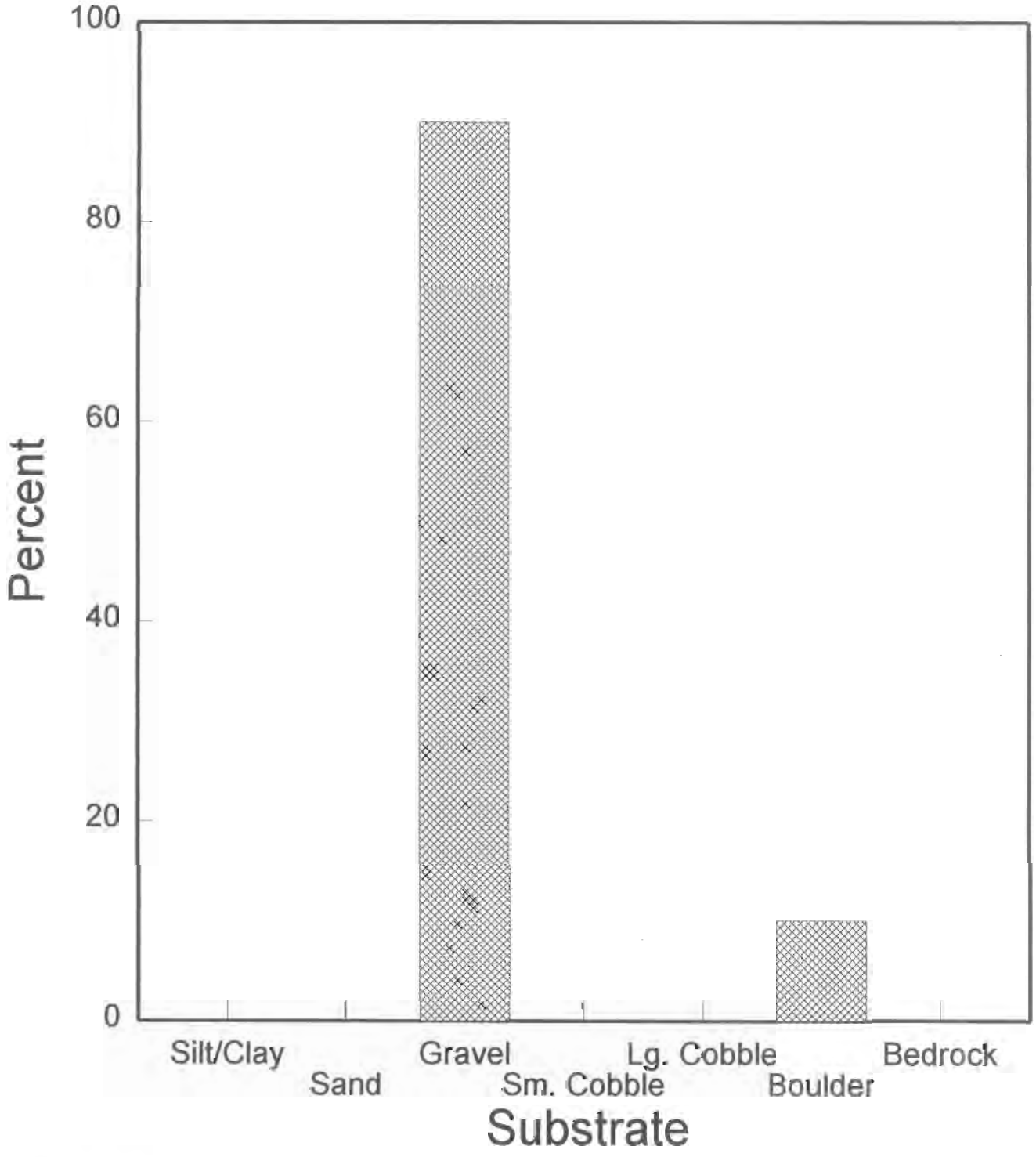
Pool Shelter Types by % Area



Graph 5

Sheephouse Creek

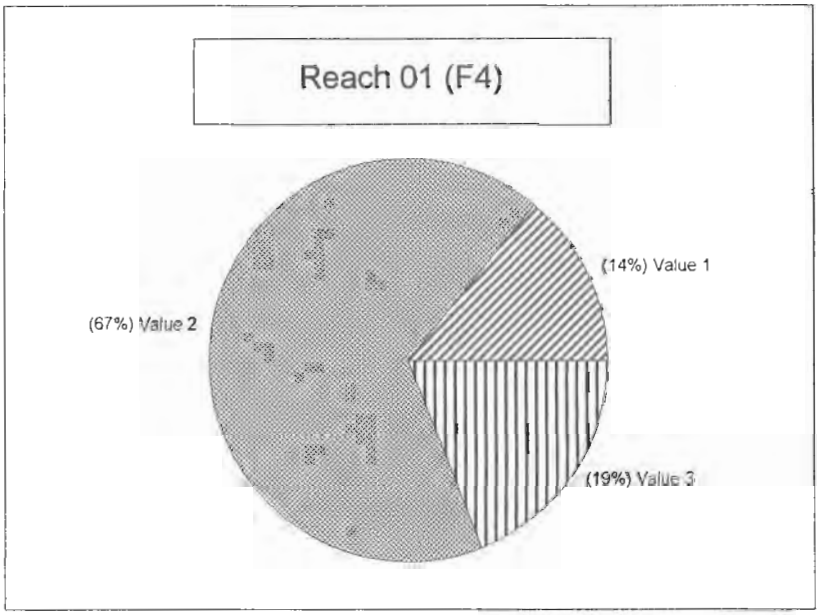
Substrate Composition in Low Gradient Riffles

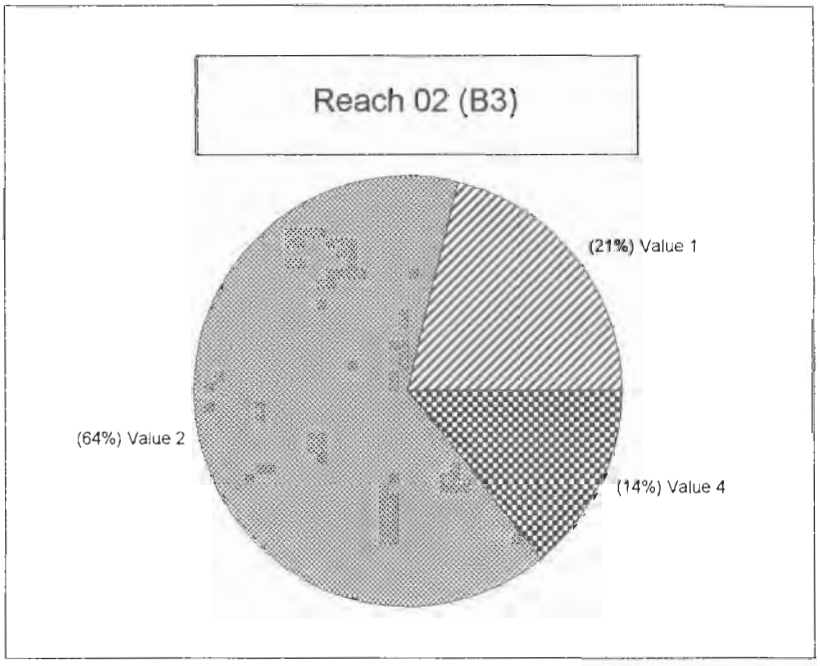


Graph 6

Sheephouse Creek

Percent Cobble Embeddedness by Reach



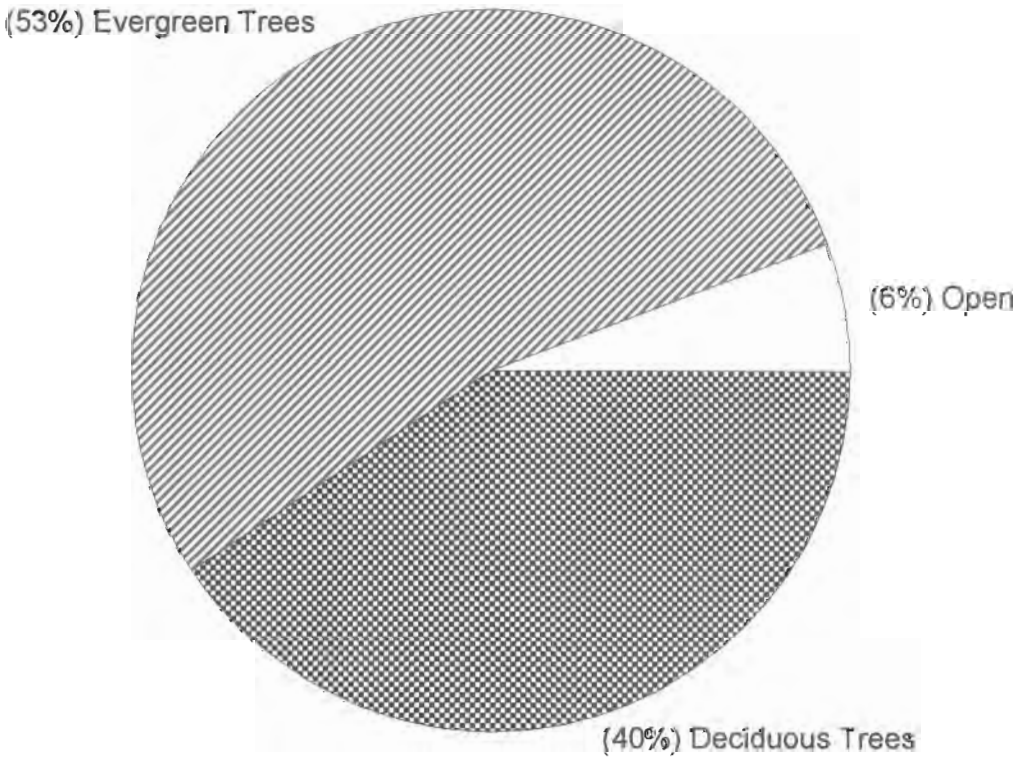


Value 1 = <25% Value 2 = 25-50% Value 3 = 51-75% Value 4 = >76%

Graph 7

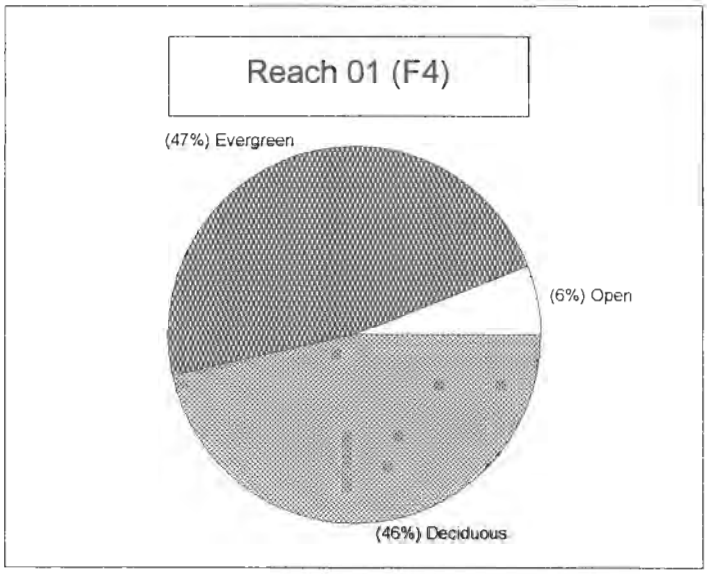
Sheephouse Creek

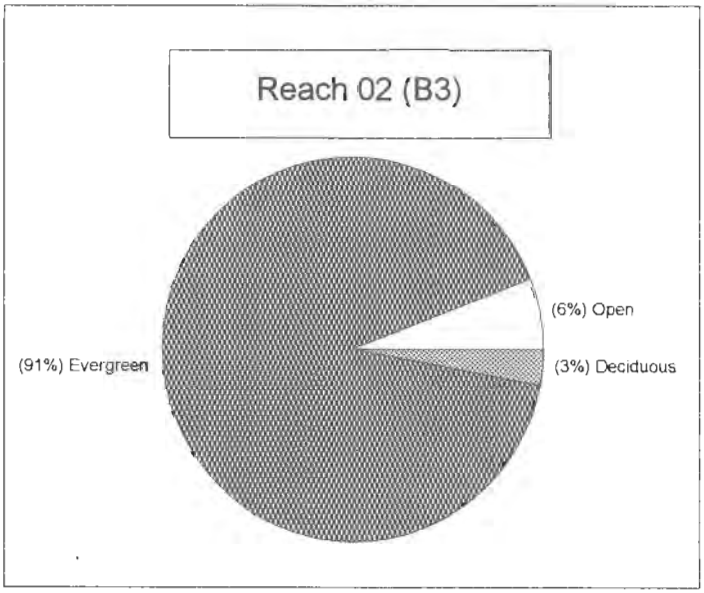
Mean Percent Canopy



Graph 8

Sheephouse Creek
Percent Canopy By Reach

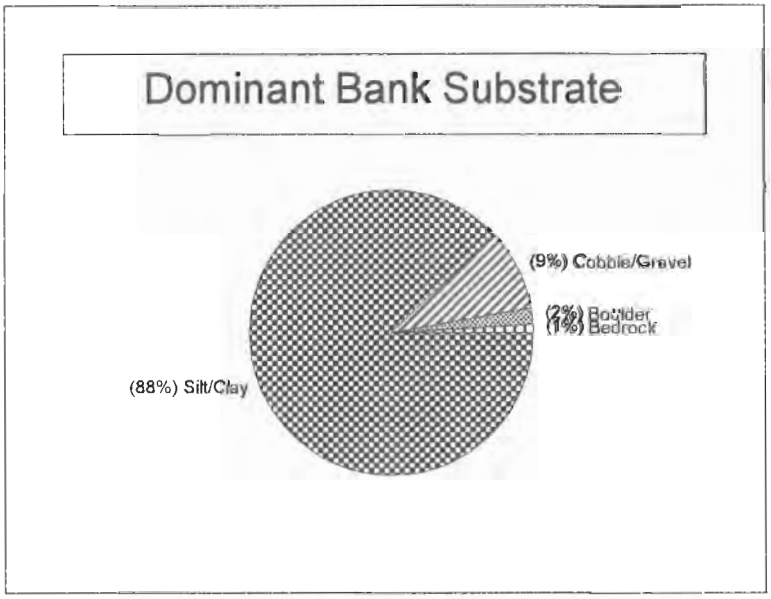


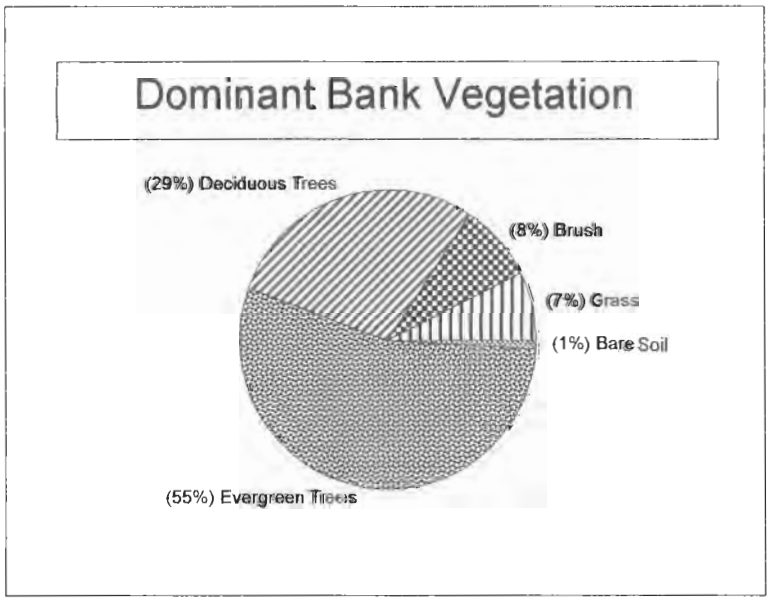


Graph 9

Sheephouse

Percent Bank Composition





Graph 10

Coho Salmon and Steelhead Monitoring Report

Winter 2024/2025

Prepared by:

Mariska Obedzinski, Gregg Horton, Andrew Bartshire, and Aaron Johnson

California Sea Grant and Sonoma Water
July 2025, Santa Rosa, CA.

Contents

Suggested reference: California Sea Grant and Sonoma Water. 2025. Coho salmon and steelhead monitoring report: Winter 2024/25. University of California, Santa Rosa, CA.

Funding acknowledgement: Fish monitoring efforts in four Broodstock Program subwatersheds included in this report were funded by the US Army Corps of Engineers under contract W912P7-21-C-0002. Funding for data collected from additional streams included in this report were provided by California Department of Fish and Wildlife and Sonoma Water as part of the California Monitoring Plan.

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1. Background

In 2004, the Russian River Coho Salmon Captive Broodstock Program (Broodstock Program) began releasing juvenile coho salmon raised at the US Army Corps of Engineer's (USACE) Don Clausen Fish Hatchery into tributaries of the Russian River with the goal of reestablishing populations that were on the brink of extirpation from the watershed. California Sea Grant at University of California (CSG) worked with local, state, and federal biologists to design and implement a coho salmon monitoring program to track the survival and abundance of hatchery-released fish. Since the first Broodstock Program releases, CSG has been closely monitoring smolt abundance, adult returns, survival, and spatial distribution of coho salmon populations in four life cycle monitoring (LCM) subwatersheds: Willow, Dutch Bill, Green Valley, and Mill creeks. Data collected from this effort are provided to the Broodstock Program for use in evaluating the success of hatchery releases and adaptively managing future releases.

In 2013, Sonoma Water (SW), CSG, and California Department of Fish and Wildlife (CDFW) began partnering to implement the California Monitoring Plan (CMP) in the Russian River watershed. The CMP is a statewide effort to document status and trends of anadromous salmonid populations to inform recovery, conservation, and management activities. This work complements the Broodstock Program monitoring by incorporating a basinwide component that includes surveys in over 40 streams and expanding the species monitored to include steelhead and Chinook salmon.

In 2023, CSG began transitioning away from field data collection and subcontracted with SW to conduct field activities associated with Broodstock Program monitoring. Beginning in the summer of 2023, field data has been collected by SW.

The intention of our monitoring is to provide science-based information to stakeholders involved in salmon and steelhead recovery. Our work would not be possible without the support of our partners, including public resource agencies and non-profit organizations, along with hundreds of private landowners who have granted us access to the streams that flow through their properties.

In this seasonal monitoring report, we provide results from our fall and winter field season, including results from coho salmon monitoring at passive integrated transponder (PIT) tag detection sites located throughout the watershed and from spawning surveys conducted through both Broodstock Program and CMP monitoring efforts. Additional information, data dashboards, and previous reports can be found on our website.

2. PIT tag monitoring

2.1. Goals and objectives

PIT tags and PIT detection systems (antennas and transceivers) were used to document the status and trends of Russian River coho salmon populations at both stream-specific and basinwide scales. From September 15, 2024, through March 1, 2025, our goal was to collect PIT tag data at multiple sites to document adult coho salmon return timing, estimate the number of returning coho salmon adults, and estimate coho salmon smolt to adult return (SAR) ratios in four LCM subwatersheds (Willow, Dutch Bill, Green Valley, and Mill creeks). Except for SAR ratios, we were able to estimate these metrics for the

Russian River basin as well. It was not possible to estimate SAR ratios at the basin scale because we do not have the ability to estimate the number of smolts leaving the entire Russian River basin each year.

2.2. Methods

2.2.1. PIT tagging

Beginning in 2007, a portion of juvenile coho salmon released from Don Clausen Fish Hatchery into the Mill Creek subwatershed were implanted with 12.5 mm full duplex PIT tags. Coho salmon destined for tagging were randomly selected from holding tanks, and for all fish ≥ 56 mm and ≥ 2.0 g, a small incision was made on the ventral side of the fish using a scalpel, and a tag was then inserted into the body cavity. Over the next few years, PIT-tagged coho salmon were released into an increasing number of Russian River tributaries, and in 2013, the Broodstock Program began PIT tagging a percentage of all coho salmon released into the Russian River watershed (Table 1). Since then, the hatchery has continued to PIT-tag a proportion of all releases each year.

During the winter of 2024/25, we anticipated the return of PIT-tagged adults from cohorts 2022 (age-3 returns) and 2023 (age-2 returns) that had been released as juveniles into multiple streams (Table 2). In addition, we anticipated the return of adults that we had previously tagged as juveniles at our smolt traps. In spring of 2023 and 2024, approximately half of all natural-origin coho salmon smolts captured in the four LCM stream downstream migrant traps were PIT tagged, with the exception of Mill Creek in 2024 when only one coho smolt was captured (California Sea Grant and Sonoma Water 2023, 2024). To increase the sample size for estimating smolt to adult return (SAR) ratios, we also PIT-tagged approximately one third of all non-PIT-tagged hatchery smolts captured in during the springs of 2023 and 2024 (all four LCM streams). Another potential source of PIT-tagged adult returns was natural-origin coho salmon tagged as young-of-year in 2022 during CMP electrofishing surveys in the following creeks: Willow (125), Dutch Bill (290), Purrington (47), Dry (68), Mill (13), and Palmer (49), and in 2023 in Dutch Bill (111) and Willow (22).

2.2.2. Field methods

As part of the Broodstock Program monitoring effort, SW operated stationary PIT tag detection systems in stream channels near the mouths of Willow, Dutch Bill, Green Valley and Mill creeks (Figure 1). Multiplexing transceivers were placed in waterproof boxes on the stream bank and powered using AC power with DC conversion systems (Willow, Dutch Bill, and Mill creeks) or solar power (Green Valley Creek). Sixteen by two-and-a-half foot antennas, housed in four-inch PVC, were placed flat on top of the streambed and secured with duck bill anchors. The antennas were placed in paired (upstream and downstream), channel-spanning arrays so that detection efficiency could be estimated and the movement direction of individuals could be determined. Based on test tag trials at the time of installation, read-range in the water column above the antennas ranged from 10” to 24” during base flow conditions. During high water storm events, stream depths likely exceeded maximum read range depths, so if PIT-tagged fish were travelling in the water column above the maximum read range depth, they may not have been detected on the antennas. The paired arrays were used to estimate antenna efficiency in order to account for undetected fish. From September 15, 2024 through March 1, 2025, PIT tag detection systems were visited every other week to download data and check antenna status. More frequent visits were made during storm events. Additional antenna arrays were operated throughout the watershed by SW, including a 10-antenna array located in the mainstem of the Russian River near Duncans Mills (see EST-10.46, Figure 1).

Table 1. Number and percent of PIT-tagged coho salmon released into Russian River tributaries by cohort.

Cohort (Hatch year)	Tributaries[1] stocked with coho salmon	Tributaries[1] stocked with PIT-tagged coho salmon	Number coho salmon released into Russian River tributaries	Number PIT-tagged coho salmon released	Percent of Russian River releases PIT-tagged
2007	DRY, DUT, GIL, GRA, GRE, MIL, PAL, SHE	MIL, PAL	71,159	7,456	10%
2008	DRY, DUT, GIL, GRA, GRE, MIL, PAL, SHE	MIL, PAL	91,483	11,284	12%
2009	DRY, DUT, GIL, GRA, GRE, MIL, PAL, SHE	MIL, PAL, GRE	81,231	8,819	11%
2010	DEV, DRY, DUT, EAU, FRE, GIL, GRA, GRE, GRP, MIL, PAL, POR, PUR, THO, SHE	DRY, DUT, GRE, GRP, MIL, PAL	155,388	16,767	11%
2011	ANG, BLA, DEV, DRY, DUT, EAU, FRE, GIL, GRA, GRE, GRP, MAR, MIL, PAL, PEN, POR, PUR, THO, SHE, WIL	ANG, BLA, DEV, DRY, DUT, GIL, GRA, GRE, GRP, MIL, PAL, PEN, PUR, THO, WIL	160,397	18,769	12%
2012	BLA, DEV, DRY, DUT, EAU, FRE, GIL, GRA, GRE, GRP, MAR, MIL, PAL, PEN, POR, PUR, THO, SHE, WIL	BLA, DEV, DRY, DUT, GIL, GRA, GRE, GRP, MIL, PAL, PEN, PUR, THO, WIL	182,370	30,934	17%
2013	AUS, BLA, DEV, DRY, DUT, FRE, GIL, GRA, GRE, GRP, MAR, MIL, PAL, PEN, POR, PUR, SHE, THO, WIL		171,846	34,536	20%
2014	AUS, BLA, DEV, DRY, DUT, EAU, FRE, GIL, GRA, GRE, GRP, MAR, MIL, PAL, PEN, POR, PUR, SHE, THO, WIL		235,327	39,556	17%
2015	DRY, DUT, GIL, GRA, GRE, MIL, WIL		70,510	22,620	32%
2016	AUS, DEV, DRY, DUT, FRE, GIL, GRA, GRE, MAR, MIL, PAL, PUR, SHE, THO, WIL		158,379	26,546	17%
2017	AUS, DEV, DRY, DUT, FRE, GIL, GRA, GRE, MAI, MIL, PAL, PUR, RCA, SHE, WIL		133,853	31,773	24%
2018	AUS, DEV, DRY, DUT, EAU, FRE, GIL, GRA, GRE, MAR, MAI, MIL, PAL, POR, PUR, RCA, SHE, WIL		134,014	27,823	21%
2019	AUS, DEV, DRY, DUT, EAU, GIL, GRA, GRE, MAR, MAI, MIL, PAL, POR, PUR, RCA, WIL		194,277	31,094	16%
2020	AUS, DEV, DRY, DUT, EAU, GIL, GRA, GRE, KID, MAR, MAI, POR, PUR, RCA, WIL, YEL	AUS, DEV, DRY, DUT, EAU, GIL, GRA, GRE, KID, MAR, MAI, POR, PUR, RCA, WIL	196,276	26,805	13%
2021	AUS, DRY, DUT, EAU, FRE, GRA, GRE, MAR, MIL, PAL, POR, PUR, RCA, SHE, WIL, MAI, KID, YEL	AUS, DRY, DUT, EAU, FRE, GRA, GRE, MAR, MIL, PAL, POR, PUR, RCA, SHE, WIL, MAI, KID	215,022	29,730	14%
2022	**MAI, WIL, AUS, KID, EAU, GRA, DUT, GRE, PUR, MAR, DRY,MIL, YEL**	**MAI, WIL, AUS, KID, EAU, GRA, DUT, GRE, PUR, MAR, DRY,MIL**	**118,498**	**28,403**	**24%**
2023	**MAI, WIL, DUT, GRE, POR, DRY**		**118,158**	**29,394**	**25%**

[1]Stream Codes: ANG: Angel Creek, AUS: Austin Creek, BLA: Black Rock Creek, DEV: Devil Creek, DRY: Dry Creek, DUT: Dutch Bill Creek, EAU: East Austin Creek, FRE: Freezeout Creek, GIL: Gilliam Creek, GRA: Gray Creek, GRE: Green Valley Creek, GRP: Grape Creek, KID: Kidd Creek, MAI: Russian River Mainstem, MAR: Mark West Creek, MIL: Mill Creek, PAL: Palmer Creek, PEN: Pena Creek, POR: Porter Creek, PUR: Purrington Creek, RCA: Redwood Creek (Atascadero), SHE: Sheephouse Creek, THO: Thompson Creek, WIL: Willow Creek, YEL: Yellow Jacket Creek.

Table 2. Number and percent of PIT-tagged juvenile coho salmon released into Russian River tributaries by stream and release group, cohorts 2022 and 2023.

Cohort (Hatch year)	Tributary	Release group	Total coho salmon released	PIT-tagged coho salmon released	Percent PIT-tagged coho salmon released
2022	Russian River	smolt	10,203	2,673	26%
	Estuary	smolt	22,315	5,810	26%
	Willow Creek	presmolt	3,018	775	26%
	Austin Creek	fall	7,533	1,949	26%
	Kidd Creek	fall	2,033	520	26%
	East Austin Creek	fall	8,207	2,078	25%
	Gray Creek	fall	3,044	779	26%
	Dutch Bill Creek	fall	6,192	1,612	26%
	Dutch Bill Creek	smolt	3,993	1,045	26%
	Green Valley Creek	smolt	24,291	6,427	26%
	Purrington Creek	presmolt	3,539	785	22%
	Mark West Creek	smolt	6,615	1,714	26%
	Dry Creek	presmolt	3,032	782	26%
	Dry Creek	smolt	400	0	0%
	Mill Creek	fall	4,678	1,454	31%
	Yellowjacket Creek	RSI	9,405	0	0%
2023	Russian River	smolt	21,363	5,335	25%
	Estuary	smolt	4,292	1,073	25%
	Willow Creek	presmolt	7,394	1,850	25%
	Willow Creek	smolt	20,703	5,176	25%
	Dutch Bill Creek	fall	12,230	3,059	25%
	Green Valley Creek	presmolt	8,037	2,011	25%
	Green Valley Creek	smolt	8,159	2,010	25%
	Green Valley Creek	smolt	140	0	0%
	Porter Creek	smolt	2,998	749	25%
	Dry Creek	fall	16,065	4,013	25%
	Dry Creek	smolt	16,917	4,118	24%
	Dry Creek	smolt	450	0	0%

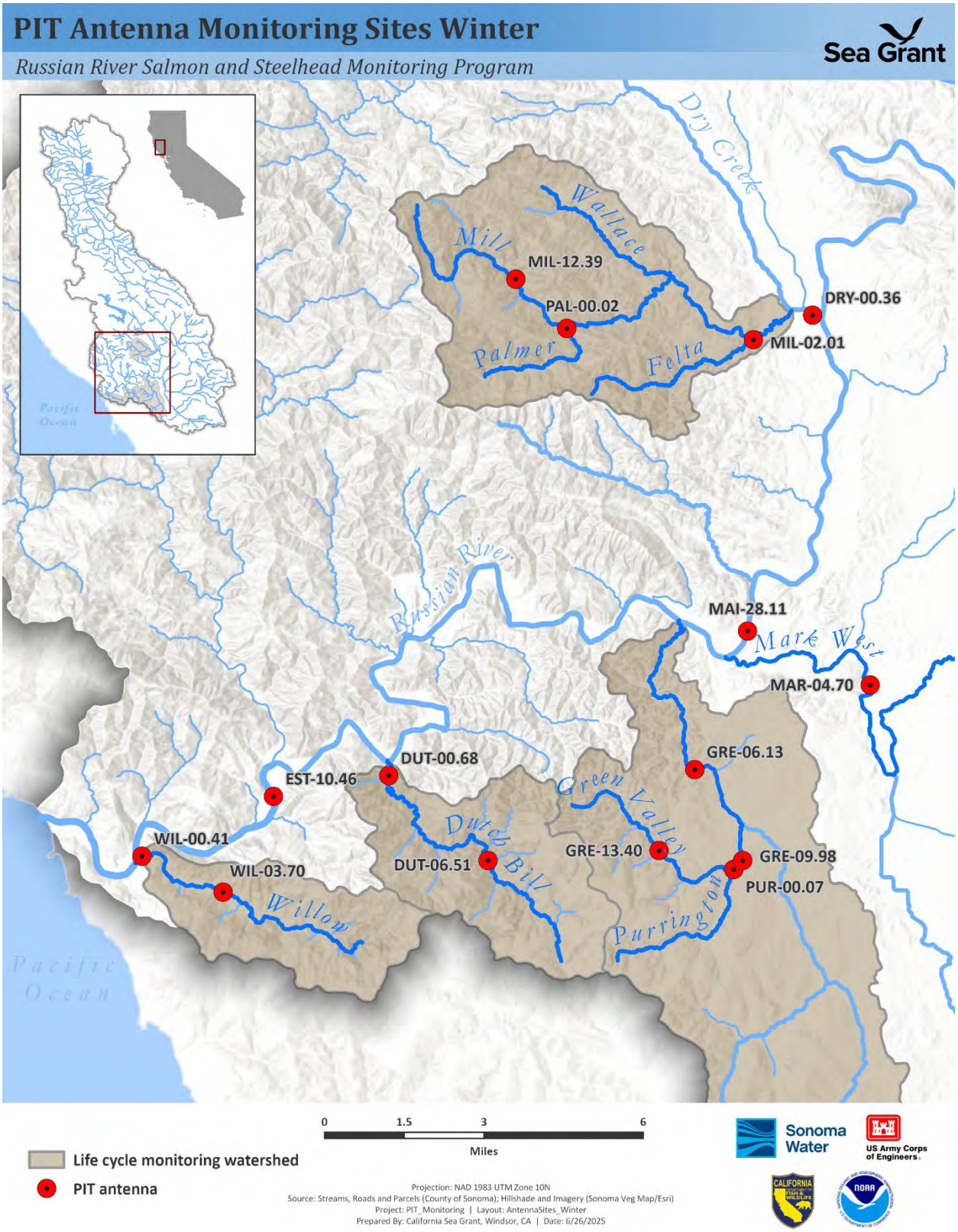


Figure 1. Passive integrated transponder (PIT) antenna locations in the Russian River watershed, winter 2024/25. Labels on antennas include a stream code (first three letters of the stream) and the distance in km from the mouth of that stream.

2.2.3. Data analysis

First, all records of two-, three-, and four-year-old PIT-tagged coho salmon detected on antenna arrays between September 15, 2024 and March 1, 2025 were examined to determine the movement and life history patterns of fish (i.e., returning adults, age-2 juvenile emigrants, or "ghost tags") based on the duration and direction of tag movement. Individuals with a net positive upstream movement during this time frame were categorized as adult returns, which were further evaluated for their return timing relative to flow conditions, and for minimum and estimated return numbers, as described below. We presumed that two-year-olds detected moving in a downstream-only direction were juveniles and they were removed from the adult return dataset. Any tags that were moving very slowly downstream at a given antenna array (approximately one-half hour or more between upper and lower antennas) and that were not previously detected emigrating as smolts, were presumed to be tags from fish that had perished (ghost tags) and these tags were also removed from the adult return dataset.

2.2.3.1. Adult return timing relative to flow conditions

The first detection of each returning PIT-tagged hatchery adult coho salmon between September 15, 2024 and March 1, 2025 was plotted with streamflow or stage data from the nearest available USGS streamflow gage at each antenna site.

2.2.3.2. Adult return minimum and estimated numbers

Estimates of the number of adult coho salmon returning to Willow, Dutch Bill, Green Valley and Mill LCM streams were calculated by 1) counting the number of unique adult PIT detections on the antenna array located furthest downstream in each LCM stream (minimum count), 2) dividing the minimum count for each stream by the proportion of PIT-tagged fish released from the hatchery into each respective LCM subwatershed (expanded hatchery-origin count) or, in the case of natural-origin fish, the proportion of PIT-tagged natural-origin smolts relative to the estimated total number of natural-origin smolts (expanded natural-origin count), and 3) dividing the expanded count by the estimated efficiency of the paired antenna array (estimated count per stream). The efficiency of the antenna array in each LCM stream was estimated by first separately estimating the efficiency of the lower and upper antennas within each array. This was calculated by dividing the number of detections on both upstream and downstream antenna(s) by all detections on the upper or lower antenna(s) (e.g., to calculate the efficiency of the lower antenna(s) in an array, we divided the number of detections on both upstream and downstream antenna(s) by all of the detections on the upper antenna(s)). To estimate the efficiency of the entire array (i.e., combined efficiency of the upper and lower antennas in an array) we used the formula $p^* = 1-((1-p_1) \times (1-p_2))$, where p_1 = antenna efficiency of the upper antenna(s) in an array and p_2 = antenna efficiency of the lower antenna(s) in an array, and p^* = combined efficiency of all antennas in an array.

Individual data recorded at the time of tagging was used to estimate the number of returns by release group (age and season of release). To avoid the potential for duplication in our expansions of hatchery fish, we did not expand the number of hatchery adults that were previously tagged at the downstream migrant traps. Similarly, to avoid duplication of our expansions of natural-origin fish, we did not expand natural-origin adults that were tagged electrofishing and not captured in the downstream migrant trap.

In most winters, to estimate the total number of hatchery coho salmon adults returning to the Russian River mainstem at Duncans Mills, a similar approach was used as described for the LCM streams; however, the efficiency of the Duncans Mills antenna array was estimated by dividing the total number

of unique PIT detections of adults at both Duncans Mills and at antenna arrays upstream of Duncans Mills by the total number of PIT-tagged adults detected on arrays upstream of Duncans Mills. Once Duncans Mills antenna efficiency was estimated, we then 1) counted the number of unique adult PIT detections at Duncans Mills (minimum count), 2) divided the minimum count by the proportion of PIT-tagged fish released from the hatchery (expanded count), and 3) divided the expanded count by the estimated efficiency of the Duncans Mills antenna array (estimated count). Because Willow Creek enters the Russian River downstream of Duncans Mills, an estimate of adults that entered Willow Creek (but were not detected on or upstream of Duncans Mills) was added to the estimate of adults migrating past Duncans Mills. Freezeout and Sheephouse creeks also enter the river downstream of Duncans Mills; however, we have no means of estimating PIT-tagged adults returning to those streams so returns to those creeks were not included in the basinwide estimate.

During the winters of 2020/21 and 2022/23, low antenna efficiencies at the Duncans Mills antenna array prevented us from using the adult estimation approach used in most years (described above). As an alternative, we first summed the number of unique adult PIT detections on any antenna that was operated in the watershed during the winter of 2020/21 or 2022/23, then divided the number of unique individuals from each release group by the proportion tagged for that release group. Finally, we summed the total expanded counts for each release group. This method did not account for PIT antenna efficiency and therefore may be biased low.

2.2.3.3. Smolt to adult return (SAR) ratios

In each of the four LCM subwatersheds, the sum of the estimated number of two-year old hatchery adults returning during the winter of 2023/24 and three-year old adults returning during the winter of 2024/25 was divided by the estimated number of smolts migrating from each stream between March 1 and June 30 of 2023 to derive a SAR ratio. The SAR ratio includes the probability of surviving the riverine, estuarine, and ocean environments from when the fish left the tributary as smolts until they returned to the tributary as adults. Detections of coho salmon adults from any adult releases were excluded from SAR calculations.

2.3. Results

2.3.1. Adult return timing relative to flow conditions

Total precipitation between October 1, 2024 and March 1, 2025 was a little above the 20-year average (Figure 2). The first significant storm event that reconnected the coho spawning tributaries to the mainstem Russian River occurred in mid-November (e.g., Austin Creek, Figure 3). This was followed by a series of storms during the second half of December and in the first half of February, keeping spawning streams connected throughout the coho spawning window.

Hatchery-origin and natural-origin PIT-tagged adult coho salmon were first detected entering the estuary (Duncans Mills PIT antenna array; EST-10.46, Figure 1) in late October (hatchery-origin) and mid-November (natural-origin), prior to the first large storm event that increased streamflow, and detections of new individuals peaked in late November (Figure 4). Further upstream in the mainstem at Mirabel (MAI-28.11, Figure 1), fish were detected only through mid-November, prior to the first significant rain event of the season when the Mirabel monitoring station was removed due to the pending storm (Figure 5). Detections at the mouth of Dry Creek (DRY-000.36, Figure 1) were recorded between late October and mid-February (Figure 6). In Russian River tributaries (LCM tributaries and Mark West Creek), there were two peaks in adult return timing that coincided with storm events: one in late-

November and a second in mid-December (Figure 7 - Figure 11). Very few new adults were detected after December, despite significant rain events in February.

Although the timing of river and tributary entry for natural-origin adults was slightly later than hatchery-origin adults, overall timing (Figure 4, Figure 7 - Figure 11) was similar. Very few natural-origin adults were detected entering Dry Creek and none were detected at Mirabel during the truncated period of operation (removal in late November).

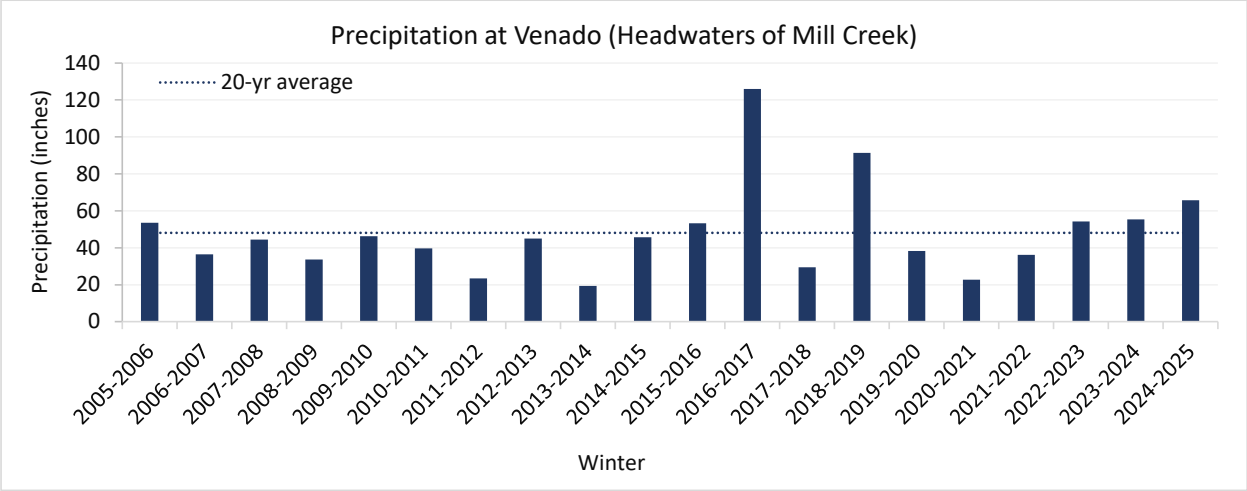


Figure 2. October – February precipitation at Venado gage near Mill Creek headwaters. Data were obtained from the California Data Exchange Center (https://cdec.water.ca.gov).

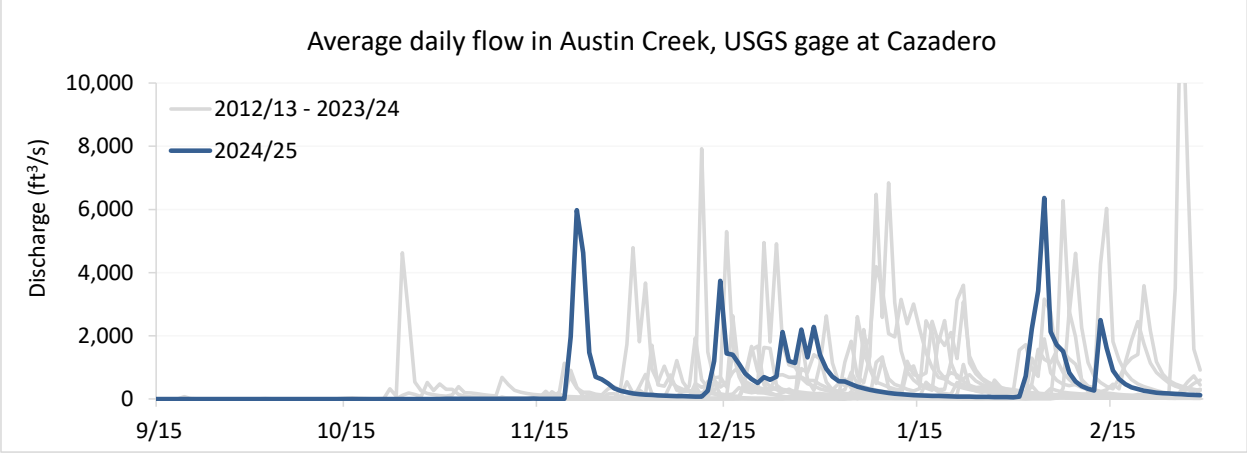


Figure 3. Winter 2024/25 streamflow in Austin Creek near Cazadero as compared to streamflow during the previous 12 winters. Data were obtained from USGS (waterdata.usgs.gov).

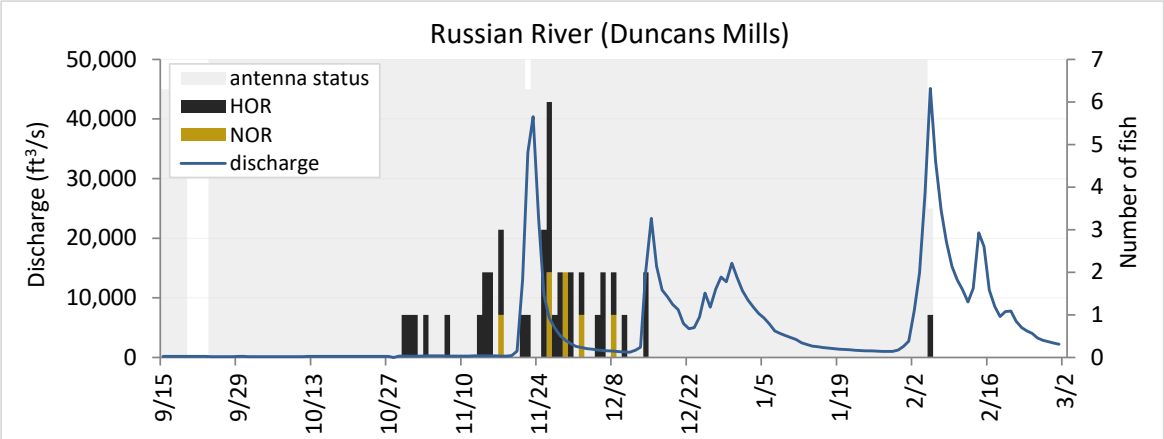


Figure 4. Detections of PIT-tagged coho salmon adults passing upstream of the Russian River antenna array at Duncans Mills (EST-10.46), September 15, 2024 - March 1, 2025. Discharge data were obtained from the USGS gage at Hacienda Bridge (11467000, waterdata.usgs.gov). HOR = hatchery-origin and NOR = natural-origin.

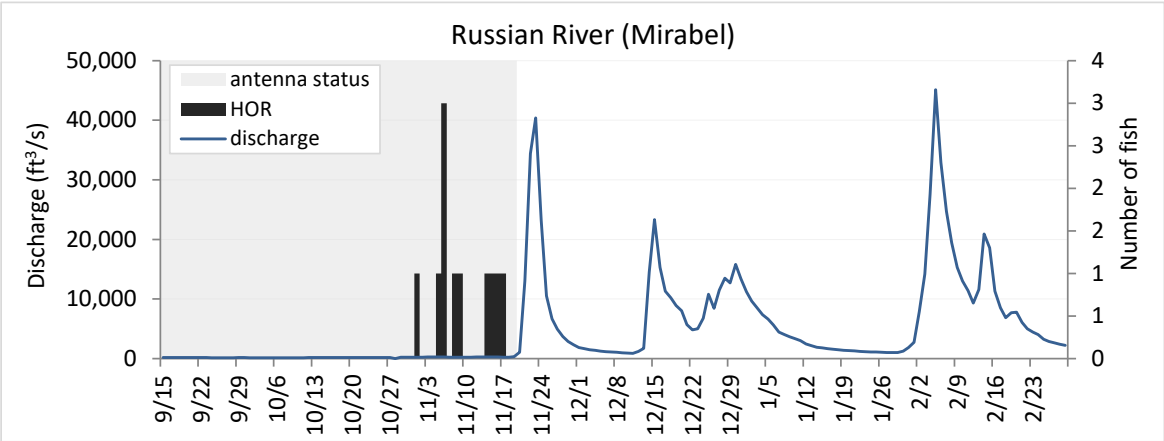


Figure 5. Detections of PIT-tagged coho salmon adults passing upstream of the Russian River antenna array at Mirabel (MAI-28.11), September 15, 2024 - March 1, 2025. Discharge data were obtained from the USGS gage at Hacienda Bridge (11467000, waterdata.usgs.gov). The antennas were removed for the season on 12/13/23. HOR = hatchery-origin and NOR = natural-origin.

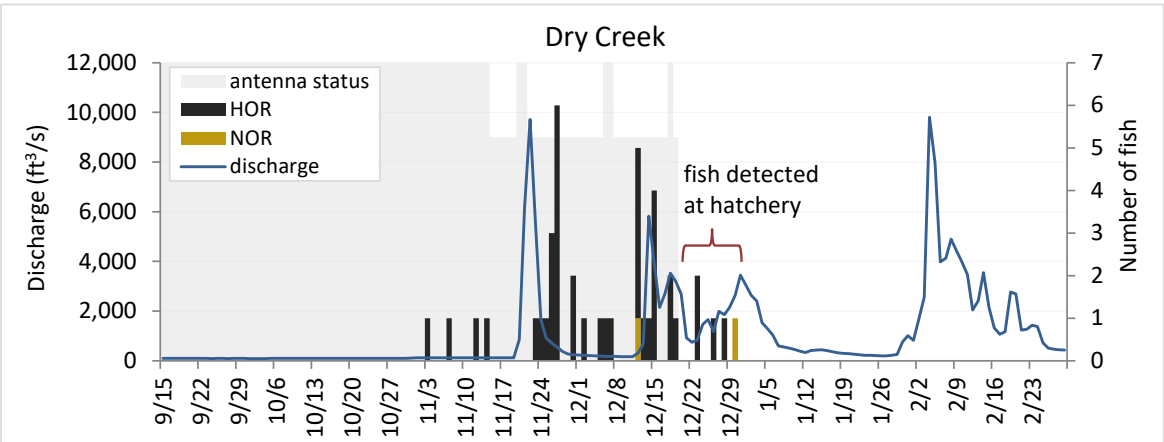


Figure 6. Detections of PIT-tagged coho salmon adults passing upstream of the Dry Creek antenna array (DRY-000.36), September 15, 2024 - March 1, 2025. Discharge data were obtained from the USGS gage at Dry Creek mouth (11465350, waterdata.usgs.gov). HOR = hatchery-origin and NOR = natural-origin.

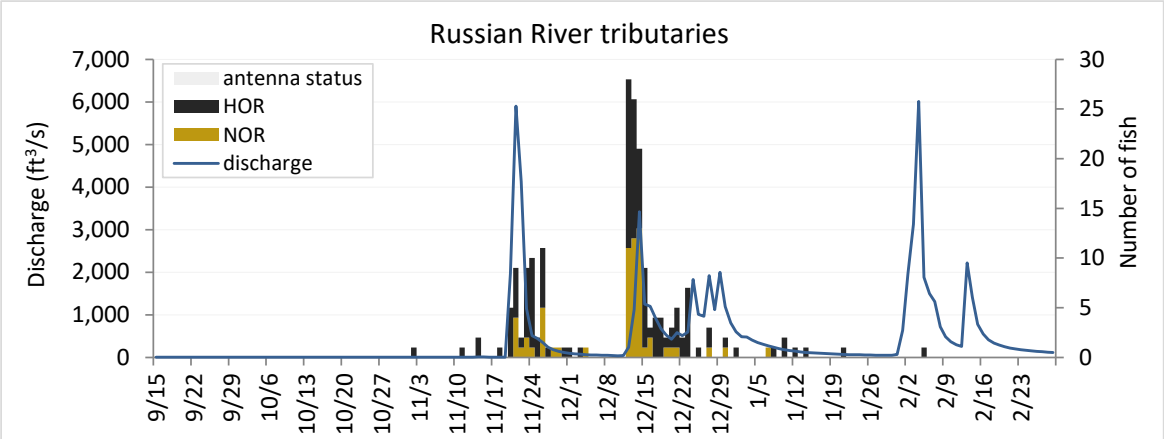


Figure 7. Detections of PIT-tagged coho salmon adults on Willow, Dutch Bill, Green Valley, Mill, and/or Mark West Creek antennas, September 15, 2024 - March 1, 2025. Discharge data were obtained from the USGS gage at Austin Creek (11467200, waterdata.usgs.gov). HOR = hatchery-origin and NOR = natural-origin.

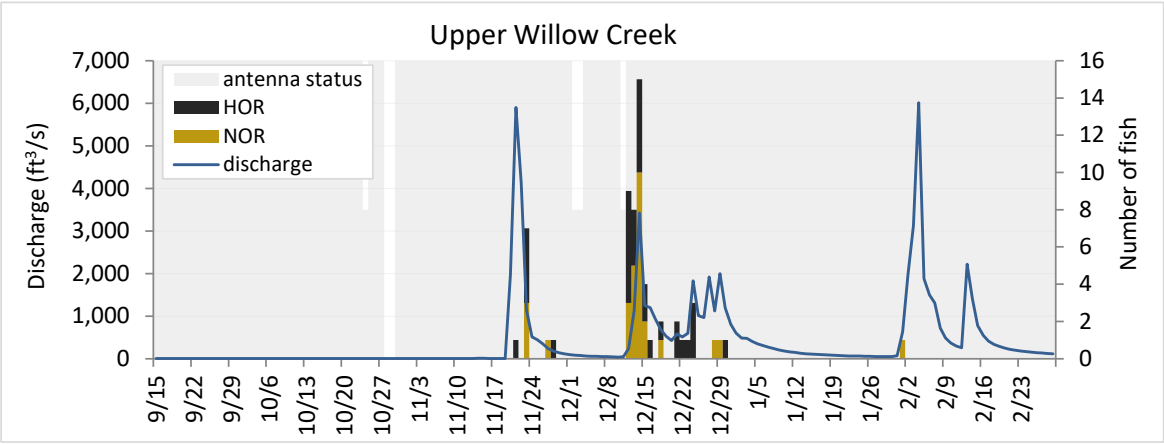


Figure 8. Detections of PIT-tagged coho salmon adults on Willow Creek between September 15, 2024 and March 1, 2025. Discharge data were obtained from the USGS gage at Austin Creek (11467200, waterdata.usgs.gov). HOR = hatchery-origin and NOR = natural-origin.

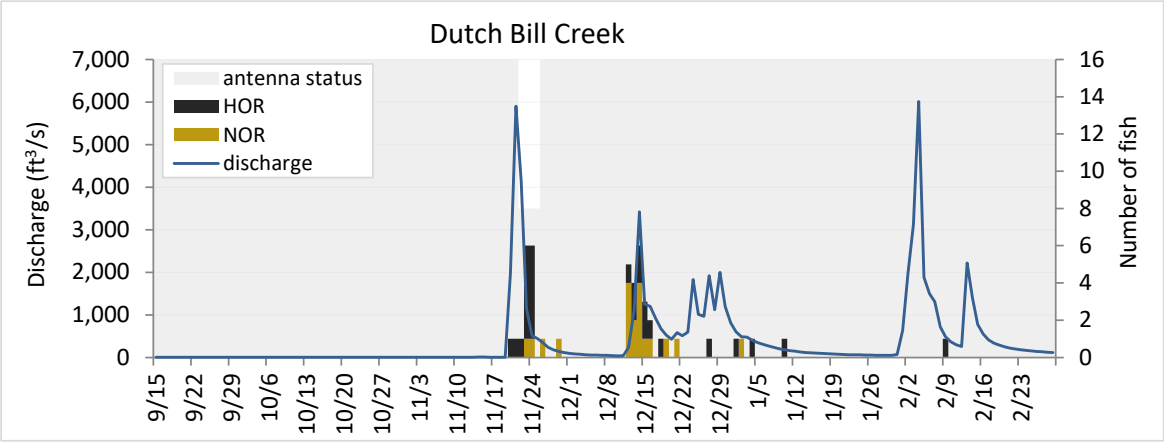


Figure 9. Detections of PIT-tagged coho salmon adults passing upstream of the Dutch Bill Creek antenna array, September 15, 2024 - March 1, 2025. Discharge data were obtained from the USGS gage at Austin Creek (11467200, waterdata.usgs.gov). HOR = hatchery-origin and NOR = natural-origin.

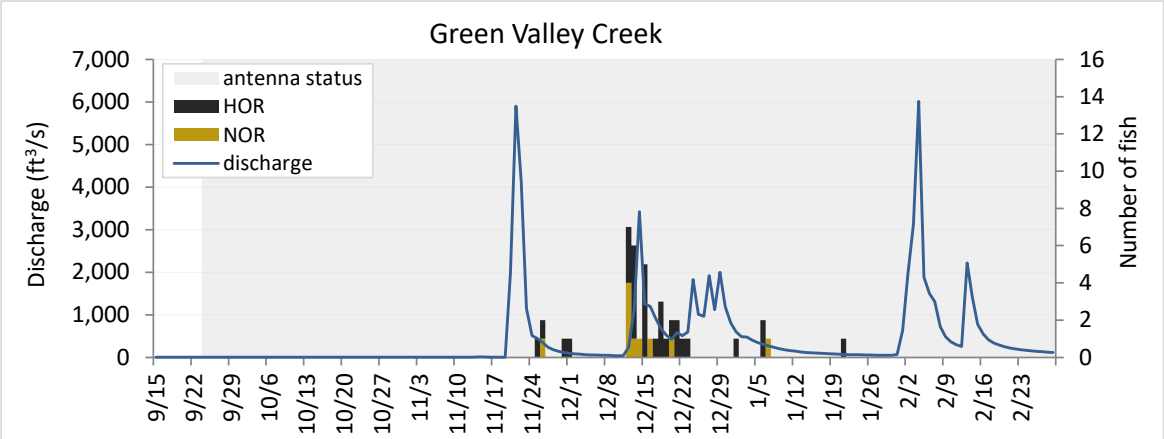


Figure 10. Detections of PIT-tagged coho salmon adults passing upstream of the Green Valley Creek antenna array, September 15, 2024 - March 1, 2025. Discharge data were obtained from the USGS gage at Austin Creek (11467200, waterdata.usgs.gov). HOR = hatchery-origin and NOR = natural-origin.

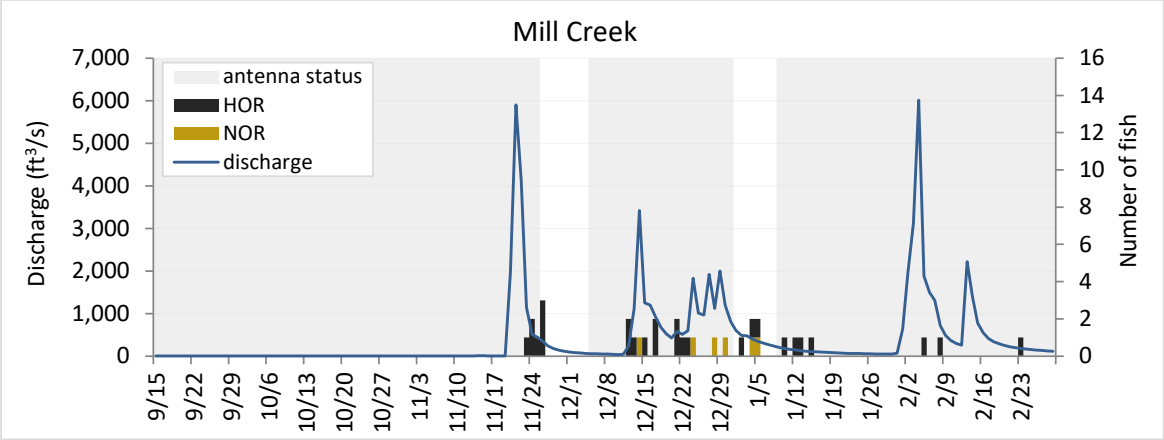


Figure 11. Detections of PIT-tagged coho salmon adults passing upstream of the Mill Creek antenna array, September 15, 2024 - March 1, 2025. Discharge data were obtained from the USGS gage at Austin Creek (11467200, waterdata.usgs.gov). HOR = hatchery-origin and NOR = natural-origin.

2.3.2. Adult return estimates and smolt to adult return (SAR) ratios

A total of 237 unique PIT-tagged adult coho salmon were detected on PIT antennas in the Russian River watershed during the winter of 2024/25 and were comprised of fish originating from the hatchery and natural stream environment, two cohorts (hatch years 2022 and 2023), and multiple hatchery release groups (fall, presmolt and smolt), as well as natural-origin fish tagged as yoy during electrofishing surveys or as smolts at downstream migrant traps (Table 3). PIT-tagged adult coho salmon were detected entering each of the LCM subwatersheds (60 in Willow, 46 in Dutch Bill, 41 in Green Valley and 33 in Mill) (Table 4). Although composition of adult returns to each LCM included fish that originated from that LCM, all four streams also had returns of fish originating from other Russian River tributaries and/or from mainstem Russian River hatchery releases. Age composition of adult returns to LCM streams consisted of a combination of age-3 and age-2 fish. Natural-origin fish were detected in all four LCM streams and were all age-3.

Estimates of adult coho salmon returning to Willow, Dutch Bill, Green Valley, and Mill creeks were 174, 162, 156, and 116, respectively (Table 5), and the estimated number of hatchery coho salmon adults returning to the Russian River at Duncans Mills was 1,041. An additional 129 natural-origin adults originating from the four LCM streams were also detected at the Duncans Mills antenna array, but natural-origin juveniles were not PIT tagged in any other streams so we did not have the ability to estimate the total number of natural-origin adults returning to the Russian River watershed.

Adult return estimates during the winter of 2024/25 were high relative to previous years of monitoring (Figure 12 - Figure 16). In Willow and Dutch Bill creeks, we recorded the highest estimated number of adult returns in 12 years of monitoring. In Green Valley, we observed the second highest returns in 12 years and in Mill Creek, the third highest in 15 years of monitoring. Estimated hatchery returns to the mainstem Russian River at Duncans Mills were the highest on record since Broodstock Program monitoring began, and it was the first winter in which over 1,000 adults were estimated to return (Figure 16). The proportion of age-2 returns was lower relative to previous years, ranging from 14% on Green Valley Creek (Figure 14) to 44% on Willow Creek (Figure 12), and 36% to the Russian River watershed (Figure 17).

Estimated SAR ratios were complicated by the fact that many adults did not return to streams from which they originated (see Table 4). We calculated SAR using the standard method described in the methods section because it is a requirement of our reporting, but caution should be taken with respect to interpretation (see Section 4.1 of Discussion). Nevertheless, SAR was higher than average in all streams (Table 6), suggesting that riverine/estuarine/marine survival was generally higher than in previous years.

Table 3. Detections of unique PIT-tagged coho salmon adults on any Russian River watershed PIT antenna array during winter 2024/25. HOR = hatchery-origin and NOR = natural-origin.

Origin	Age	Release or tagging tributary	Release group	PIT-tagged individuals detected
HOR	3	Austin Creek	fall	1
		Dutch Bill Creek	fall	1
			smolt	6
			tagged at downstream migrant trap	1
		Kidd Creek	fall	2
		Mill Creek	fall	4
			tagged at downstream migrant trap	1
		Dry Creek	presmolt	3
		Green Valley Creek	smolt	27
			tagged at downstream migrant trap	1
		Mark West Creek	smolt	10
		Purrington Creek	presmolt	1
		Russian River	smolt	29
		Willow Creek	presmolt	2
	2	Dry Creek	fall	35
		Dutch Bill Creek	fall	6
			tagged at downstream migrant trap	2
		Dry Creek	smolt	6
		Green Valley Creek	presmolt	1
			smolt	7
		Porter Creek	smolt	4
		Russian River	smolt	6
		Willow Creek	presmolt	4
			smolt	12
			tagged at downstream migrant trap	3
NOR	3	Dry Creek	tagged electrofishing	1
		Dutch Bill Creek	tagged electrofishing	6
			tagged at downstream migrant trap	13
		Willow Creek	tagged electrofishing	5
			tagged at downstream migrant trap	26
		Green Valley Creek	tagged at downstream migrant trap	10
		Mill Creek	tagged at downstream migrant trap	1
			Total unique individuals detected:	**237**

Table 4. Detections of unique PIT-tagged coho salmon adults in each of the four LCM subwatersheds during winter 2024/25. Note that individual fish may have been detected in more than one LCM subwatershed. HOR = hatchery-origin and NOR = natural-origin.

Detection tributary	Age	Origin	Release or tagging tributary	Release group	Minimum count	Total PIT-tagged individuals detected
Willow Creek	3	HOR	Willow Creek	presmolt	2	60
			Russian River	smolt	9	
		NOR	Willow Creek	tagged electrofishing	5	
				tagged at downstream migrant trap	23	
	2	HOR	Willow Creek	presmolt	4	
				smolt	10	
				tagged at downstream migrant trap	2	
			Russian River	smolt	5	
Dutch Bill Creek	3	HOR	Kidd Creek	fall	2	46
			Russian River	smolt	5	
			Dutch Bill Creek	fall	1	
				smolt	5	
			Green Valley Creek	smolt	2	
			Dutch Bill Creek	tagged at downstream migrant trap	1	
		NOR	Dutch Bill Creek	tagged electrofishing	5	
				tagged at downstream migrant trap	13	
			Green Valley Creek	tagged at downstream migrant trap	1	
	2	HOR	Willow Creek	presmolt	1	
			Dutch Bill Creek	fall	6	
				tagged at downstream migrant trap	2	
			Porter Creek	smolt	1	
			Dry Creek	fall	1	
Green Valley Creek	3	HOR	Dutch Bill Creek	smolt	1	41
			Green Valley Creek	smolt	21	
			Russian River	smolt	2	
			Green Valley Creek	tagged at downstream migrant trap	1	
		NOR	Dutch Bill Creek	tagged electrofishing	1	
			Green Valley Creek	tagged at downstream migrant trap	9	
	2	HOR	Willow Creek	presmolt	1	
			Green Valley Creek	presmolt	1	
				smolt	3	
			Dry Creek	fall	1	
Mill Creek	3	HOR	Russian River	smolt	5	33
			Dutch Bill Creek	smolt	2	
			Green Valley Creek	smolt	3	
			Mark West Creek	smolt	3	
			Dry Creek	presmolt	1	
			Mill Creek	fall	4	
				tagged at downstream migrant trap	1	
		NOR	Dutch Bill Creek	tagged electrofishing	1	
				tagged at downstream migrant trap	1	
			Green Valley Creek	tagged at downstream migrant trap	2	
			Dry Creek	tagged electrofishing	1	
			Mill Creek	tagged at downstream migrant trap	1	
	2	HOR	Porter Creek	smolt	2	
			Dry Creek	fall	5	
				smolt	1	

Table 5. Estimated efficiency of PIT antenna arrays and estimated number of adult coho salmon returns to four LCM watersheds and the Russian River at Duncans Mills during winter 2024/25. Note that natural-origin juveniles were only tagged in the four LCM streams so we did not have the ability to detect natural-origin from other subwatersheds. NOR = natural-origin and HOR = hatchery-origin.

Tributary	Efficiency of antenna array	NOR age-3	NOR age-2	HOR age-3	HOR age-2	Total returns
Willow Creek (upper trapsite)	100%	56	0	42	76	174
Dutch Bill Creek	63%	50	0	80	32	162
Green Valley Creek	89%	38	0	95	23	156
Mill Creek	96%	18	0	69	29	116
Russian River at Duncans Mills	14%	129	0	662	379	1,170

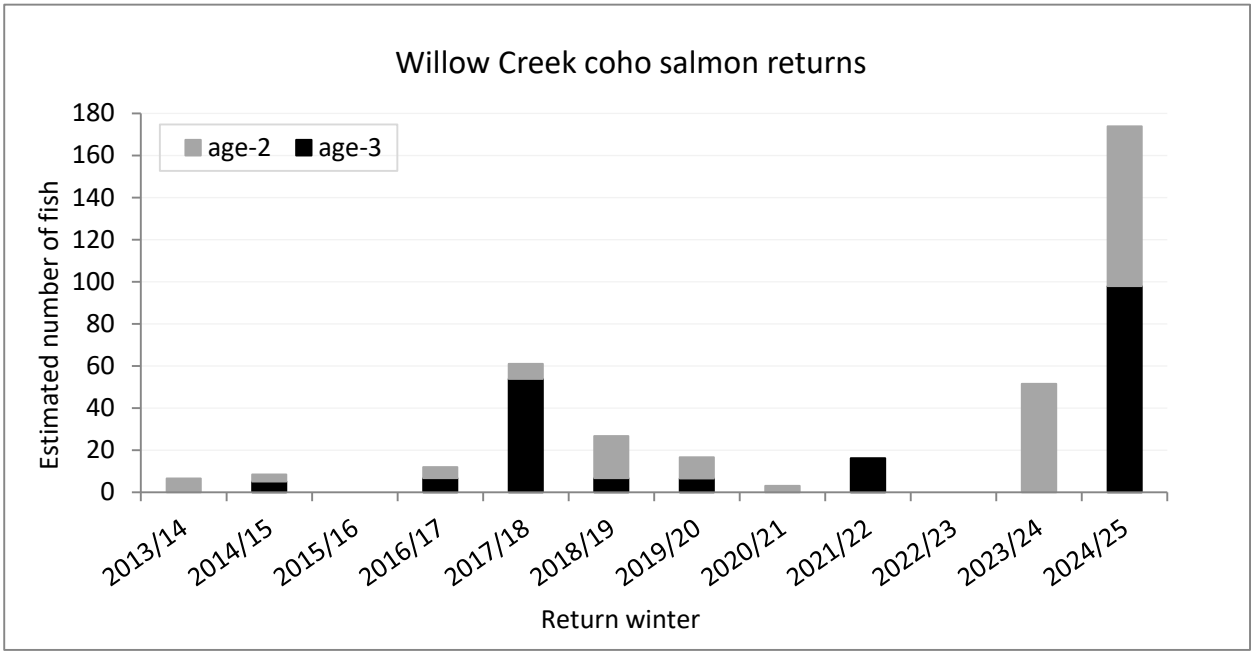


Figure 12. Estimated annual adult coho salmon returns to Willow Creek by age, return seasons 2013/14 – 2024/25. Note that estimates are based on returns to the upper antennas at river km 3.70.

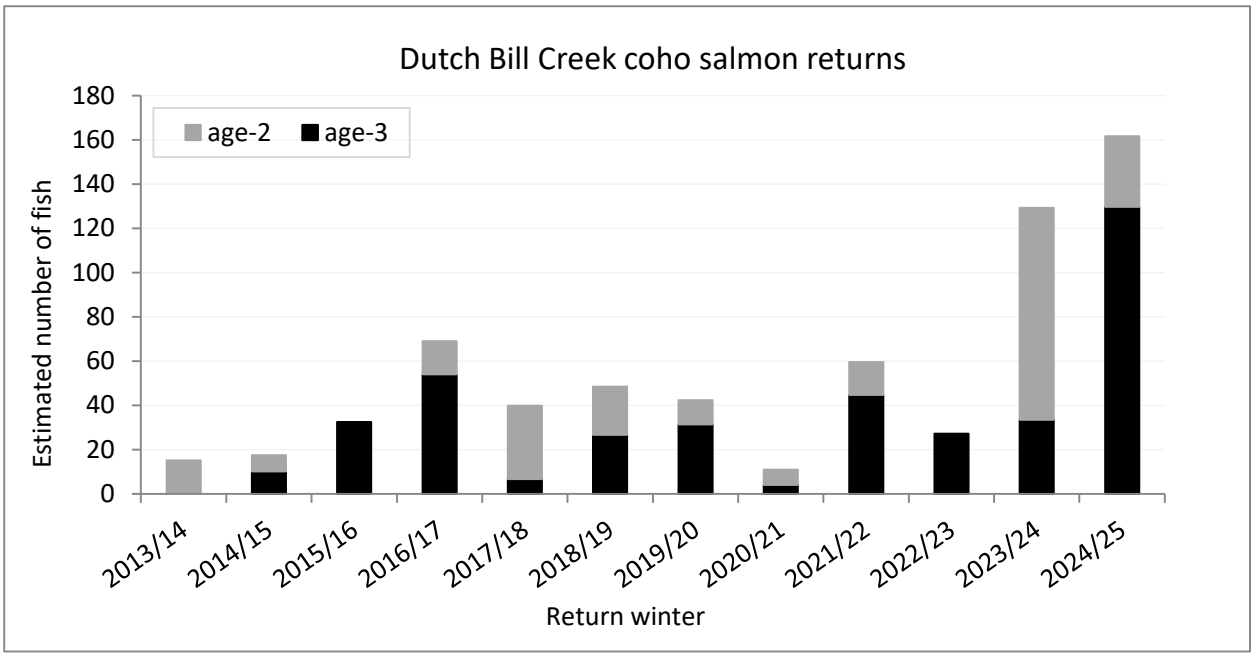


Figure 13. Estimated annual adult coho salmon returns to Dutch Bill Creek by age, return seasons 2013/14 – 2024/25.

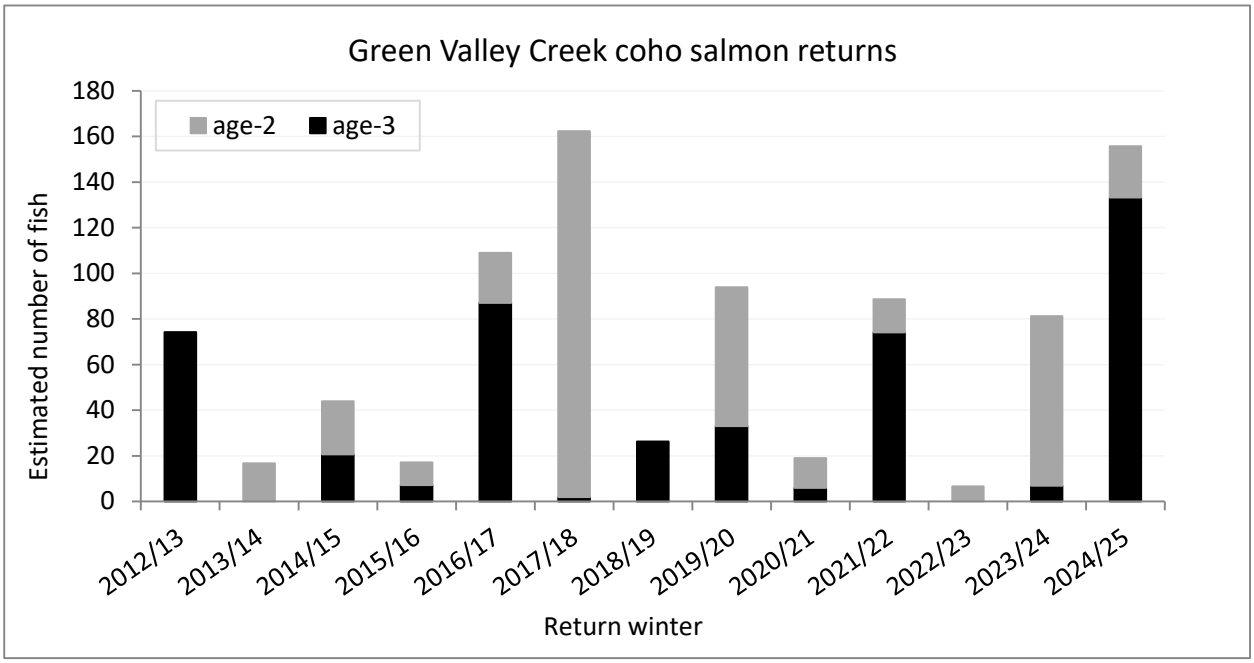


Figure 14. Estimated annual adult coho salmon returns to Green Valley Creek by age, return seasons 2012/13 – 2024/25.

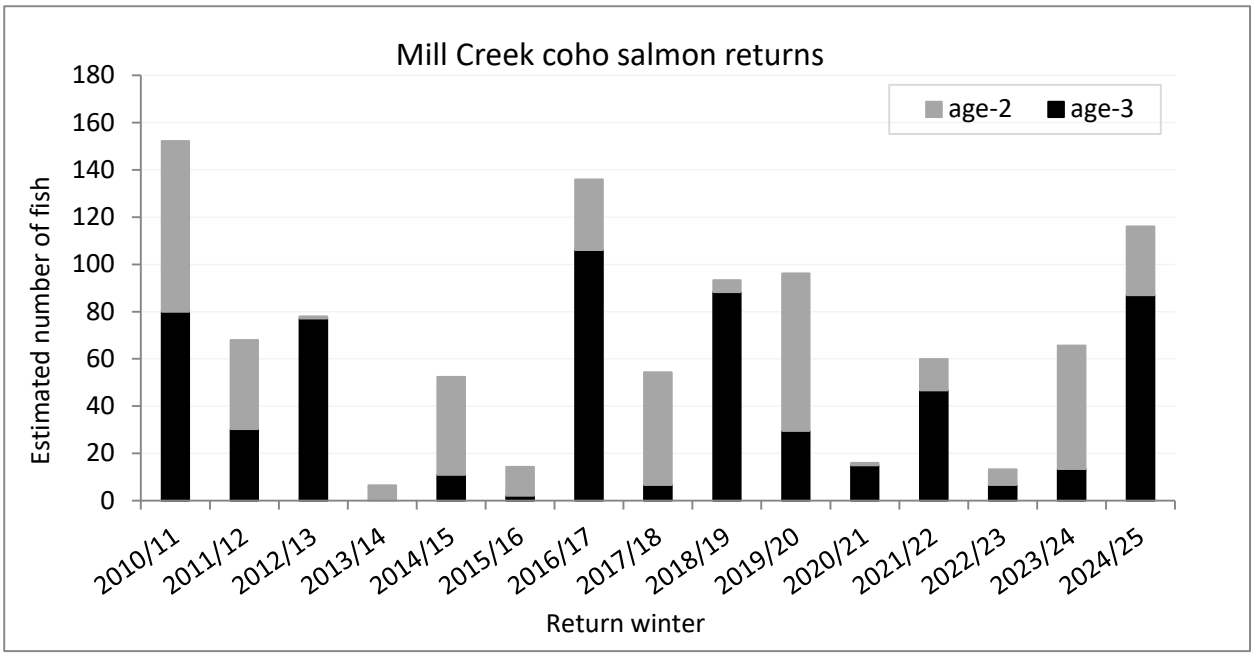


Figure 15. Estimated annual adult coho salmon returns to Mill Creek by age, return seasons 2010/11 – 2024/25.

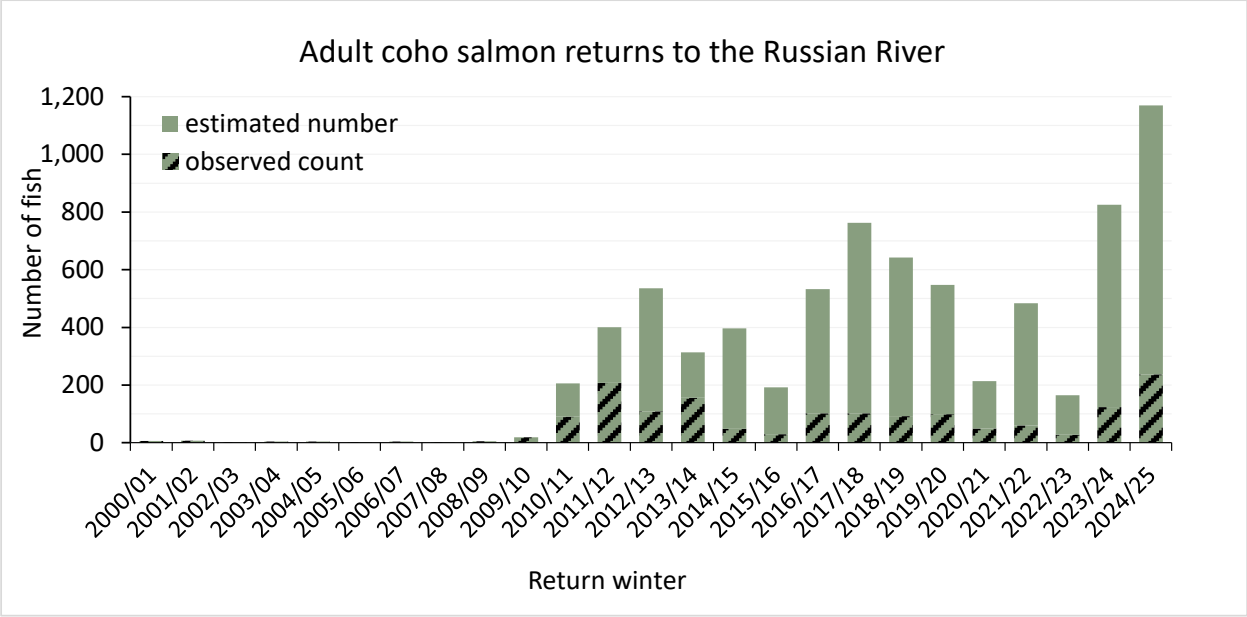


Figure 16. Estimated annual adult hatchery coho salmon returns to the Russian River, return winters 2000/01 through 2023/24. Note that methods for counting/estimating the number of returning adult coho salmon were not consistent among years; prior to 2009/10, spawner surveys were the primary method, from 2009/10 – 2011/12 methods included spawner surveys, video monitoring and PIT detection systems, and beginning in 2012/13, with the installation of the Duncans Mills antenna array, PIT detection systems were the primary method used.

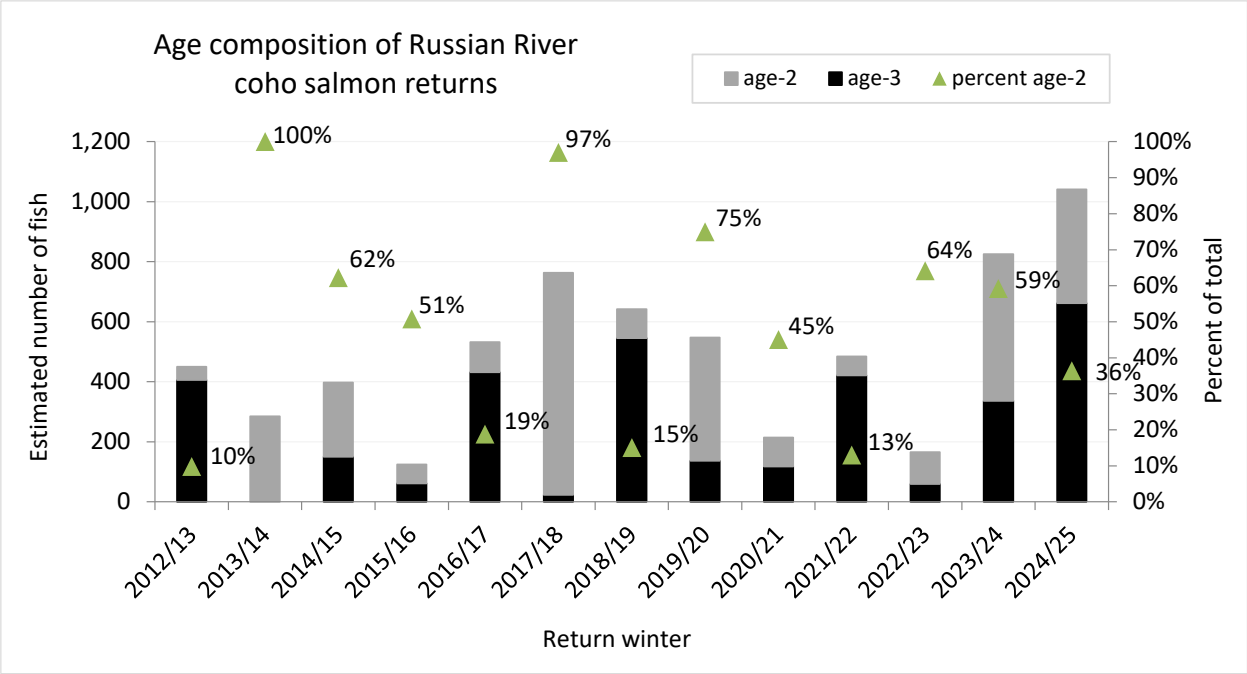


Figure 17. Estimated annual adult hatchery coho salmon returns to the Russian River by age, return seasons 2012/13-2024/25. Note that this figure includes only fish that we were able to age; therefore, totals will be less than adult return estimates shown in Figure 16.

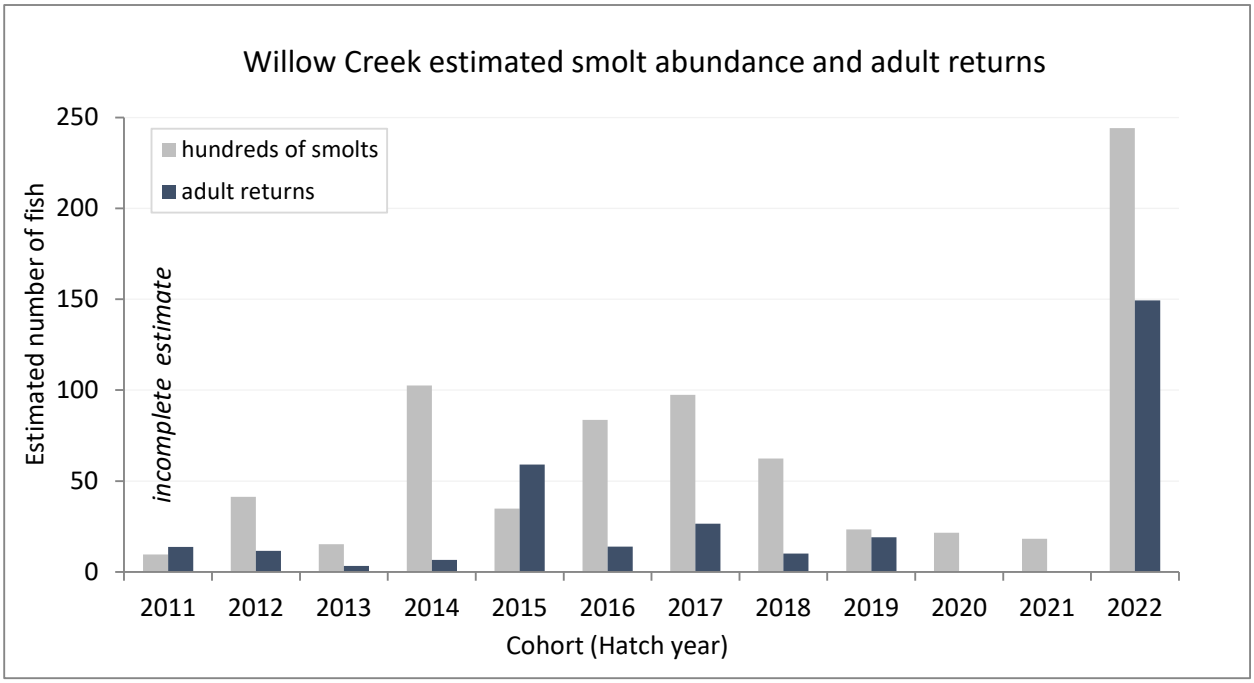


Figure 18. Estimated coho salmon smolt abundance and estimated adult returns to Willow Creek, cohorts 2011-2022. Note that estimates are based on returns to the upper antennas at river km 3.70.

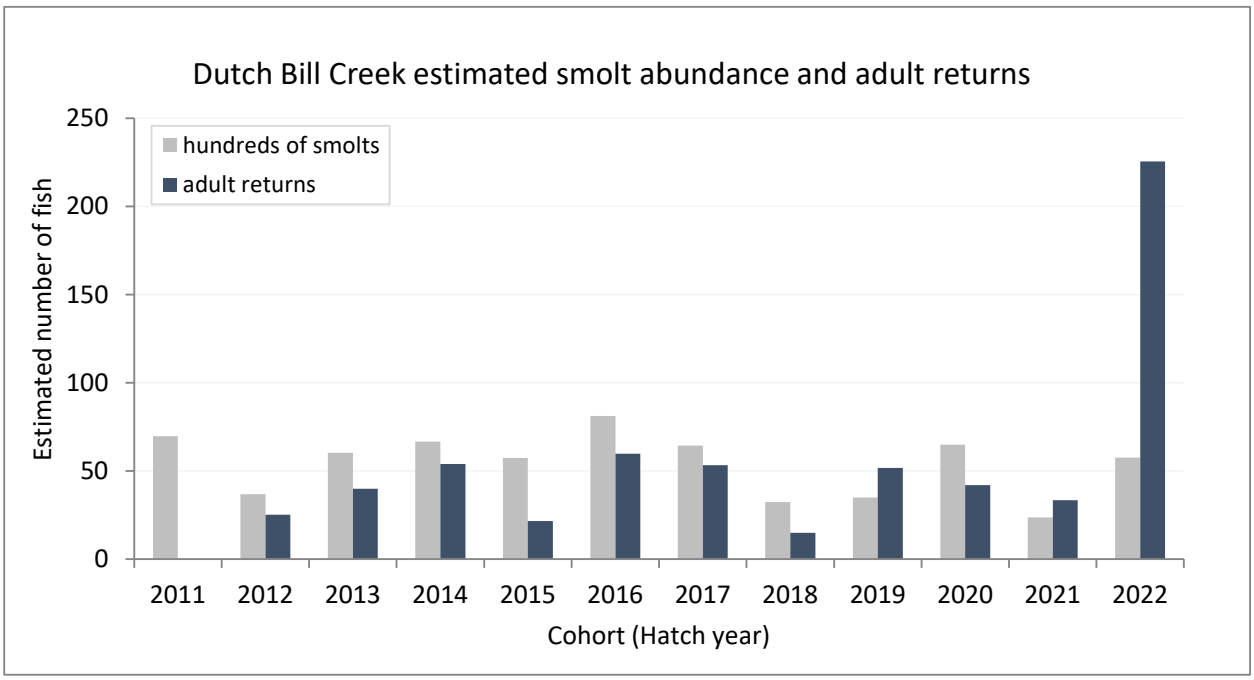


Figure 19. Estimated coho salmon smolt abundance and estimated adult returns to Dutch Bill Creek, cohorts 2011-2022.

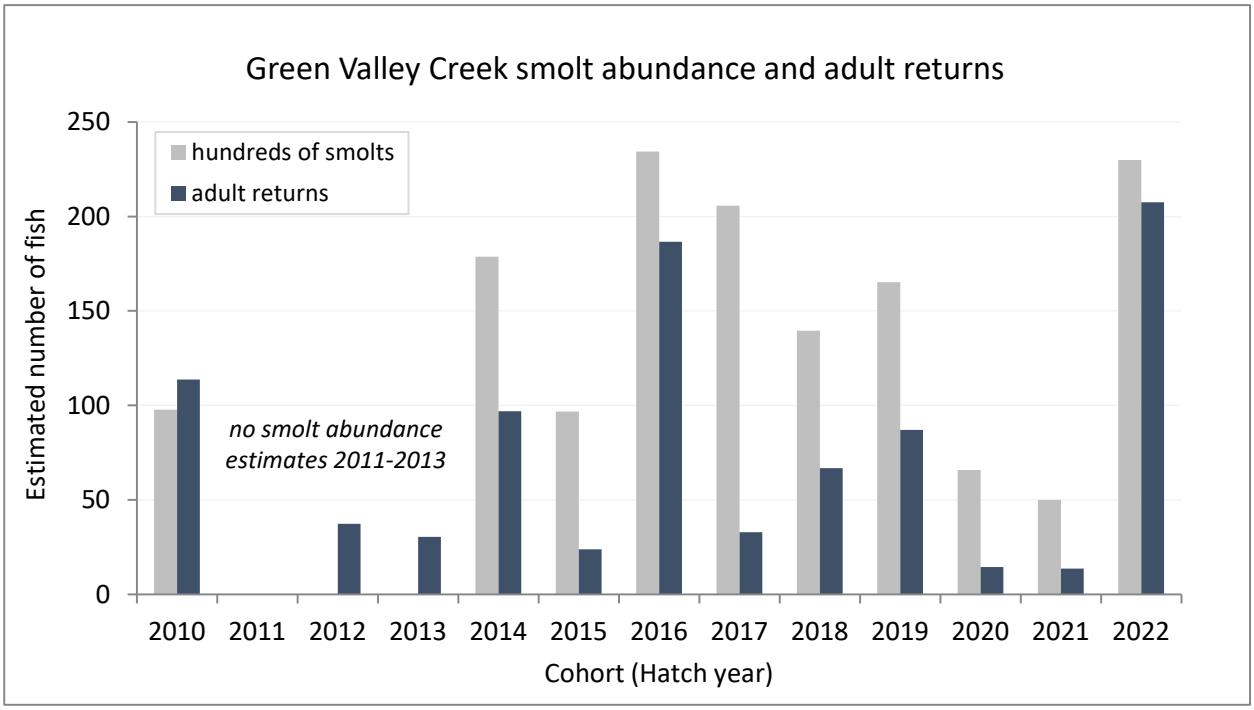


Figure 20. Estimated coho salmon smolt abundance and estimated adult returns to Green Valley Creek, cohorts 2010-2022.

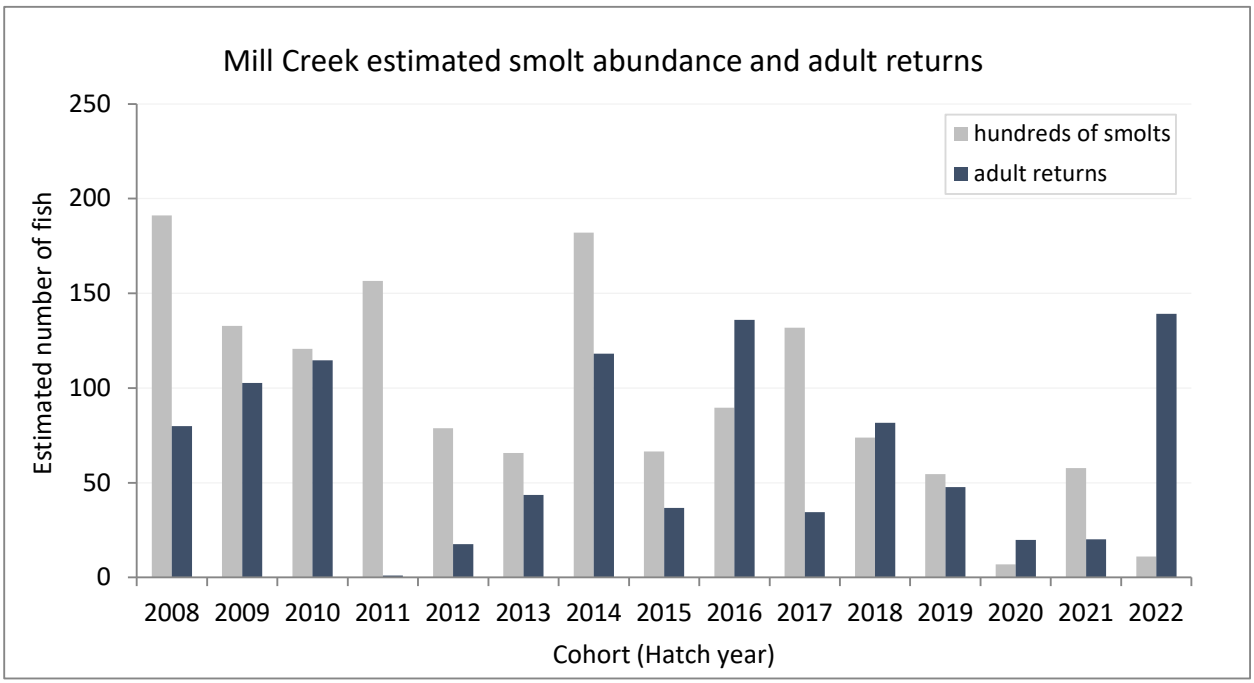


Figure 21. Estimated coho salmon smolt abundance and estimated adult returns to Mill Creek, cohorts 2008-2022.

Table 6. Smolt to adult return (SAR) ratios estimated for Willow, Dutch Bill, Green Valley, and Mill creeks, cohorts 2008 through 2022.

		Smolt to adult return (SAR) ratio			
Cohort (Hatch year)	**Age-3 return winter**	**Willow (River km 3.69)**	**Dutch Bill (River km 0.68)**	**Green Valley (River km 6.13)**	**Mill (River km 2.01)**
2008	2010/11	*NA*	*NA*	*NA*	0.4%
2009	2011/12	*NA*	*NA*	*NA*	0.8%
2010	2012/13	*NA*	0.2%	1.2%	1.0%
2011	2013/14	1.4%	0.0%	*NA*	0.0%
2012	2014/15	0.3%	0.7%	*NA*	0.2%
2013	2015/16	0.2%	0.7%	*NA*	0.7%
2014	2016/17	0.1%	0.8%	0.5%	0.6%
2015	2017/18	1.7%	0.4%	0.2%	0.6%
2016	2018/19	0.2%	0.7%	0.8%	1.5%
2017	2019/20	0.3%	0.8%	0.2%	0.3%
2018	2020/21	0.2%	0.5%	0.5%	1.1%
2019	2021/22	0.8%	1.5%	0.8%	0.9%
2020	2022/23	0.0%	0.6%	0.2%	2.9%
2021	2023/24	0.0%	1.4%	0.3%	0.3%
2022	2024/25	0.6%	3.9%	3.3%	12.6%
	Average	**0.5%**	**0.9%**	**0.8%**	**1.6%**

3. Spawner surveys

3.1. Goals and objectives

The overarching goal of spawner surveys in the Russian River watershed during the winter of 2024/25 was to document the occurrence of coho salmon and steelhead spawning. Broodstock Program monitoring objectives were to estimate the spatial distribution and abundance of coho salmon redds in LCM subwatersheds (Willow, Dutch Bill, Green Valley, and Mill). CMP objectives included estimation of the spatial distribution and abundance of coho salmon and steelhead redds in LCM subwatersheds and in a random, spatially-balanced sample of streams in the Russian River watershed containing coho salmon and steelhead habitat (hereafter, basinwide monitoring). Surveys were conducted using standardized CMP methods (Adams et al. 2011; Sonoma County Water Agency and California Sea Grant 2015) to ensure that data collected for different projects was compatible and could be summarized together.

3.2. Methods

3.2.1. Sampling framework and survey reaches

For stream-specific estimates of redd abundance, we surveyed all accessible adult salmonid spawning reaches of Willow, Dutch Bill, Green Valley, and Mill creeks (LCMs). For basinwide estimates, we used a generalized random tessellation stratified (GRTS) approach with soft stratification to survey a random, spatially-balanced selection of reaches that contain coho salmon habitat (Figure 22) within the Russian River sample frame (a sample frame of stream reaches identified by the Russian River CMP Technical Advisory Committee[1] as having coho salmon, steelhead, and/or Chinook salmon habitat). Although one of the goals of CMP basinwide monitoring is to survey a sample of reaches that represents the full extent of steelhead habitat throughout the Russian River watershed (including streams in the upper basin that do not contain coho salmon habitat), sampling in most winters (including 2024/25) was confined to reaches that contain both coho salmon and steelhead habitat (i.e., the lower part of the basin; e.g., Figure 22). Resulting basinwide steelhead redd estimates in this report therefore reflect trends in steelhead abundance only in the part of the watershed that contains coho salmon habitat.

3.2.2. Field methods

Survey methodology for collecting information on spawning salmonids in the Russian River watershed was adapted from the Coastal Northern California Salmonid Spawning Survey Protocol (Gallagher and Knechtle 2005). We attempted to survey each reach at an interval of 10-14 days throughout the spawning season. Two person crews hiked reaches in a downstream to upstream direction looking for adult salmon (live or carcasses) and redds (e.g. Figure 23). Redds were identified to species based on presence of identifiable adult fish or from observed redd morphology. Measurements were taken on all redds including pot length, width and depth; tailspill length, width and depth; and substrate size. All observed salmonids were identified to species (coho salmon, Chinook salmon, and steelhead), or as unknown salmonids if we could not identify them to species. Species, certainty of species identification, life stage, sex, certainty of sex, and fork length were recorded for all observed fish. When a carcass was encountered, it was scanned for a coded wire tag (CWT) and PIT tag. Based on carcass condition, a genetics sample, scale sample, and the head (for otolith and CWT extraction) was retrieved from all

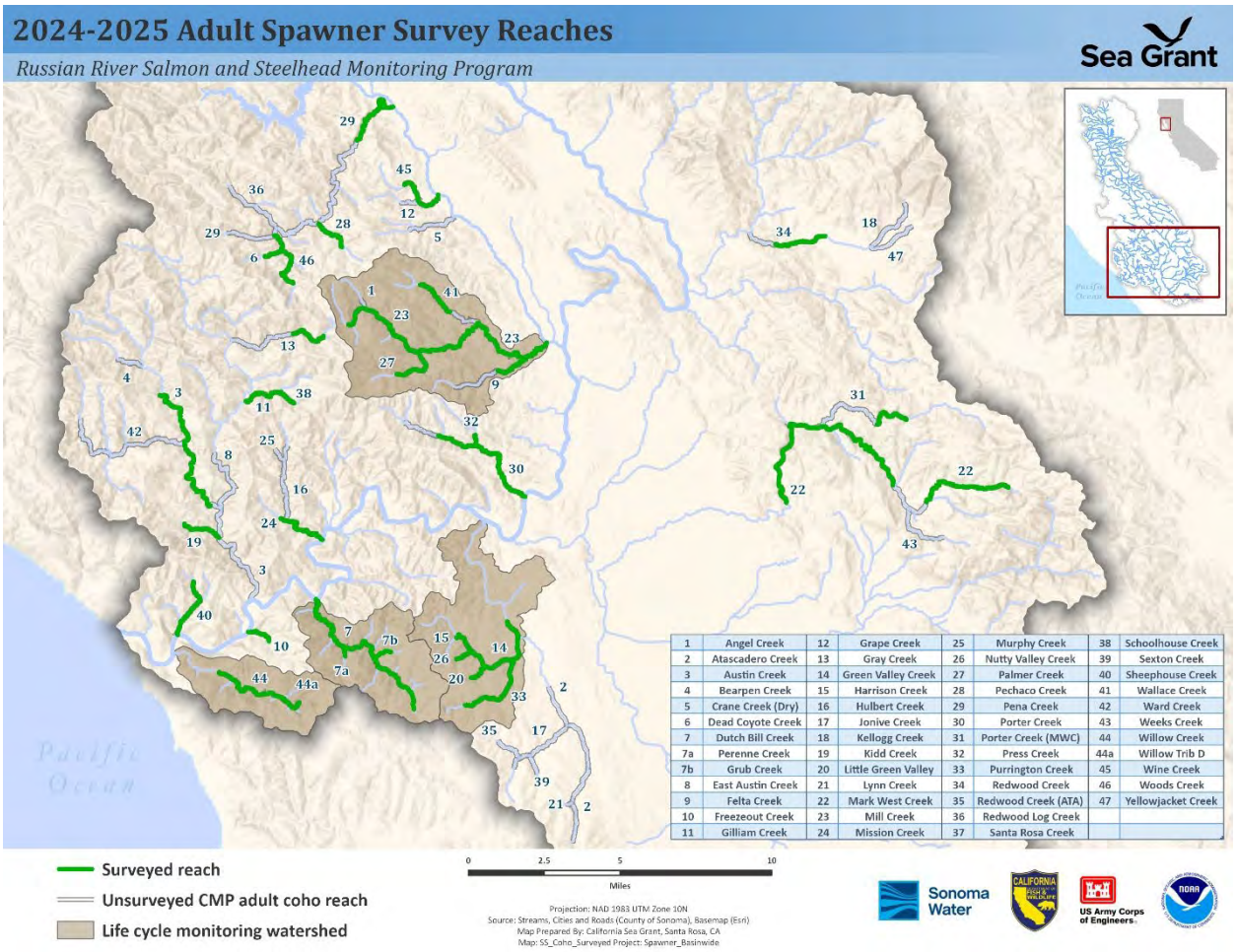
[1] A body of fisheries experts, including members of the Statewide CMP Technical Team, tasked with providing guidance and technical advice related to CMP implementation in the Russian River.

salmonid carcasses when possible. Geospatial coordinates were recorded for all redd and fish observations. Tablets were used for data entry and, upon returning from the field, data files were downloaded, error checked, and transferred into a SQL database.

3.2.3. Redd and adult return estimates

For redds of unknown species or redds with low certainty of identification, redd measurement data was used to estimate redd species following the Gallagher and Gallagher (2005) redd species determination method. In instances where we were unable to collect redd measurements, we used a nonparametric K-nearest neighbor algorithm (KNN, (Ricker et al. 2014a)) to estimate species. The estimated number of unique redds was then summed for each surveyed reach. To account for redds missed by observers due to survey timing, the number of redds observed within each reach was expanded based upon the average observational “life span” of redds observed in that same reach (Ricker et al. 2014b).

For LCM subwatershed estimates we conducted census surveys; therefore, redd estimates from all reaches within each subwatershed were summed. An exception was the Mill Creek subwatershed where the redd estimate was expanded to account for sections of stream that we were unable to sample due to lack of landowner access. The expansion in Mill Creek was made by calculating an average redd per stream length in surveyed reaches and multiplying that ratio by the length of stream that was not surveyed. This total was then added to the sum of redds in the surveyed reaches of Mill Creek. For basinwide estimates, we calculated an average redd density per reach and multiplied that density by the total number of adult coho salmon reaches within the Russian River sample frame that contained coho salmon habitat.



1	Angel Creek	12	Grape Creek	25	Murphy Creek	38	Schoolhouse Creek
2	Atascadero Creek	13	Gray Creek	26	Nutty Valley Creek	39	Sexton Creek
3	Austin Creek	14	Green Valley Creek	27	Palmer Creek	40	Sheephouse Creek
4	Bearpen Creek	15	Harrison Creek	28	Pechaco Creek	41	Wallace Creek
5	Crane Creek (Dry)	16	Hulbert Creek	29	Pena Creek	42	Ward Creek
6	Dead Coyote Creek	17	Jonive Creek	30	Porter Creek	43	Weeks Creek
7	Dutch Bill Creek	18	Kellogg Creek	31	Porter Creek (MWC)	44	Willow Creek
7a	Perenne Creek	19	Kidd Creek	32	Press Creek	44a	Willow Trib D
7b	Grub Creek	20	Little Green Valley	33	Purrington Creek	45	Wine Creek
8	East Austin Creek	21	Lynn Creek	34	Redwood Creek	46	Woods Creek
9	Felta Creek	22	Mark West Creek	35	Redwood Creek (ATA)	47	Yellowjacket Creek
10	Freezeout Creek	23	Mill Creek	36	Redwood Log Creek		
11	Gilliam Creek	24	Mission Creek	37	Santa Rosa Creek		

Figure 22. Life cycle monitoring (LCM) subwatersheds and 2024/2025 spawner survey reaches sampled in the Russian River watershed that contain spawning habitat for both coho salmon and steelhead.

Figure 23. Female coho salmon guarding a completed redd on Willow Creek.

3.3. Results

3.3.1. Redd estimates and spawning distribution

We began surveys on November 24, 2024, following the first rain event of the season, and continued surveying through April 30, 2024. Despite persistently high (Figure 3) and turbid flow conditions during the winter of 2024/25, we were generally able to maintain our goal of conducting surveys within each reach on a 10-14 day cycle, resulting in the number of days surveyed similar to the average for the previous 10 years since 2014/15, (74.8 days, Figure 24). Overall, we conducted a total of 492 surveys on 55 reaches in 36 streams within the Russian River basin. A total of 591 salmonid redds were observed: 251 coho salmon redds, 197 steelhead redds, 34 Chinook salmon redds, and 109 redds of unknown salmonid species origin (Table 7). Coho salmon redds were observed in 25 of the 36 streams surveyed (50%), and steelhead redds were observed in 25 of the 36 streams surveyed (67%). Of the 251 coho redds observed, the highest number of coho redds were observed in the Willow subwatershed (110 or 44%) and the second highest in Green Valley (41 or 16%). Of the 197 steelhead redds observed, nearly half (46%) were observed in Mill (25) and Pena (66) subwatersheds combined. In addition to redd presence, there were two streams where adult coho were observed but no coho redds (Harrison and Hulbert creeks) and one stream where adult steelhead were observed but no steelhead redds (Hulbert Creek). Overall, adult coho and/or coho redds were observed in a total of 27 streams (Figure 25) and adult steelhead and/or steelhead redds were observed in a total of 26 streams (Figure 26).

We first observed coho salmon redds in the watershed on December 2, 2024 and our last coho redd was observed on March 10, 2025 (Figure 27). There were two peaks for coho redds: one in mid-December and a second in early January. Steelhead redd observations began in early December and extended into late April, peaking in early January which was earlier than the average timing of previous years (Figure 28). The average number of observed redds per km for coho salmon was 1.9 and the average number of observed redds per km for steelhead was 1.5. Coho redd density was higher in most streams compared to the previous 10-years average and much higher in Willow Creek (Figure 29).

Coho salmon redd estimates in LCM subwatersheds ranged from 11 in Dutch Bill Creek to 151 in Willow Creek (Figure 30), and steelhead redd estimates ranged from 15 in Dutch Bill Creek to 60 in Mill Creek (Figure 31). The extremely high coho salmon redd estimate in Willow was over 6.5 times higher than the previous high of 23 in 2015/16. At the basinwide scale (coho stratum only), the 2024/25 redd estimate for coho (417, 95% CI: ±188) was 2.3 times higher than the previous high of 184 in 2016/17 and the 2024/25 steelhead redd estimate (708, 95% CI: ±307) was also the highest since basinwide surveys in coho space began in 2014/15 (Figure 32).

Eighty-two coho salmon carcasses were observed in the four LCM subwatersheds: 20 in Willow, 42 in Dutch Bill, 15 in Green Valley, 5 in Mill. An additional 18 were observed from other subwatersheds. Not all carcasses were intact enough to allow CWT scanning (31 were scanned), PIT tag scanning (45), scale sampling (47), genetics sampling (48) or collection of heads for otolith and CWT extraction (30). Based on the seven fish with CWTs and four fish with PIT tags, we determined that 8 of the carcasses were hatchery-origin, 24 were natural-origin and 68 were of unknown origin. Origin could not be assigned to live fish observed.

The distribution of coho salmon redds in the four LCM subwatersheds (Figure 33 - Figure 36) was more widespread than other years and included small tributaries in all four LCMs. The distribution of steelhead redds was similarly widespread. In Willow, the high number of coho redds observed (110)

reflected the high adult abundance estimate (174, Table 5) but this was not the case in Dutch Bill where we only observed nine coho redds yet an adult estimate of 162 (Table 5). The disparity in Green Valley (41 redds vs. adult abundance of 156) and Mill (5 redds vs. adult abundance of 116) was also striking.

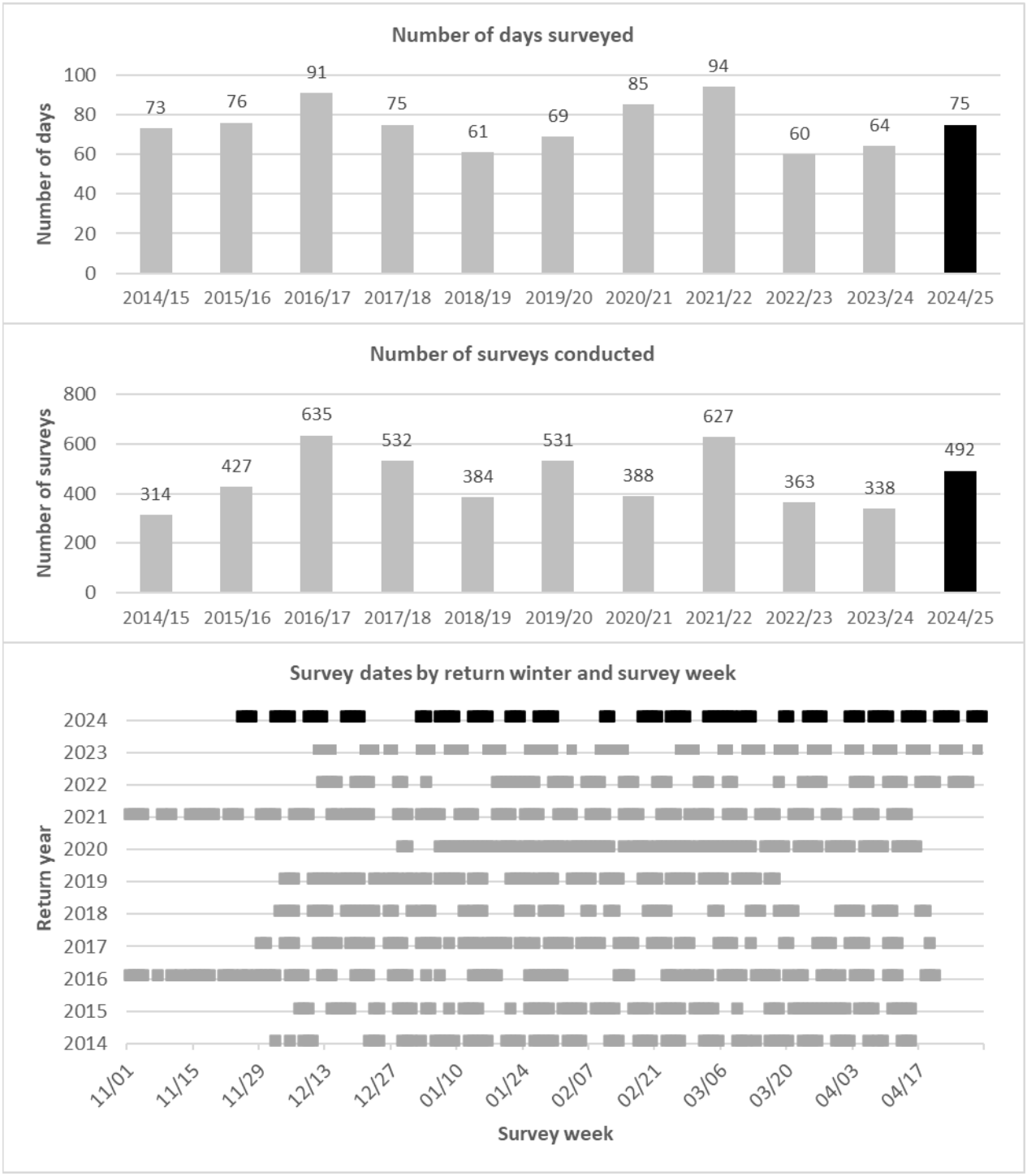
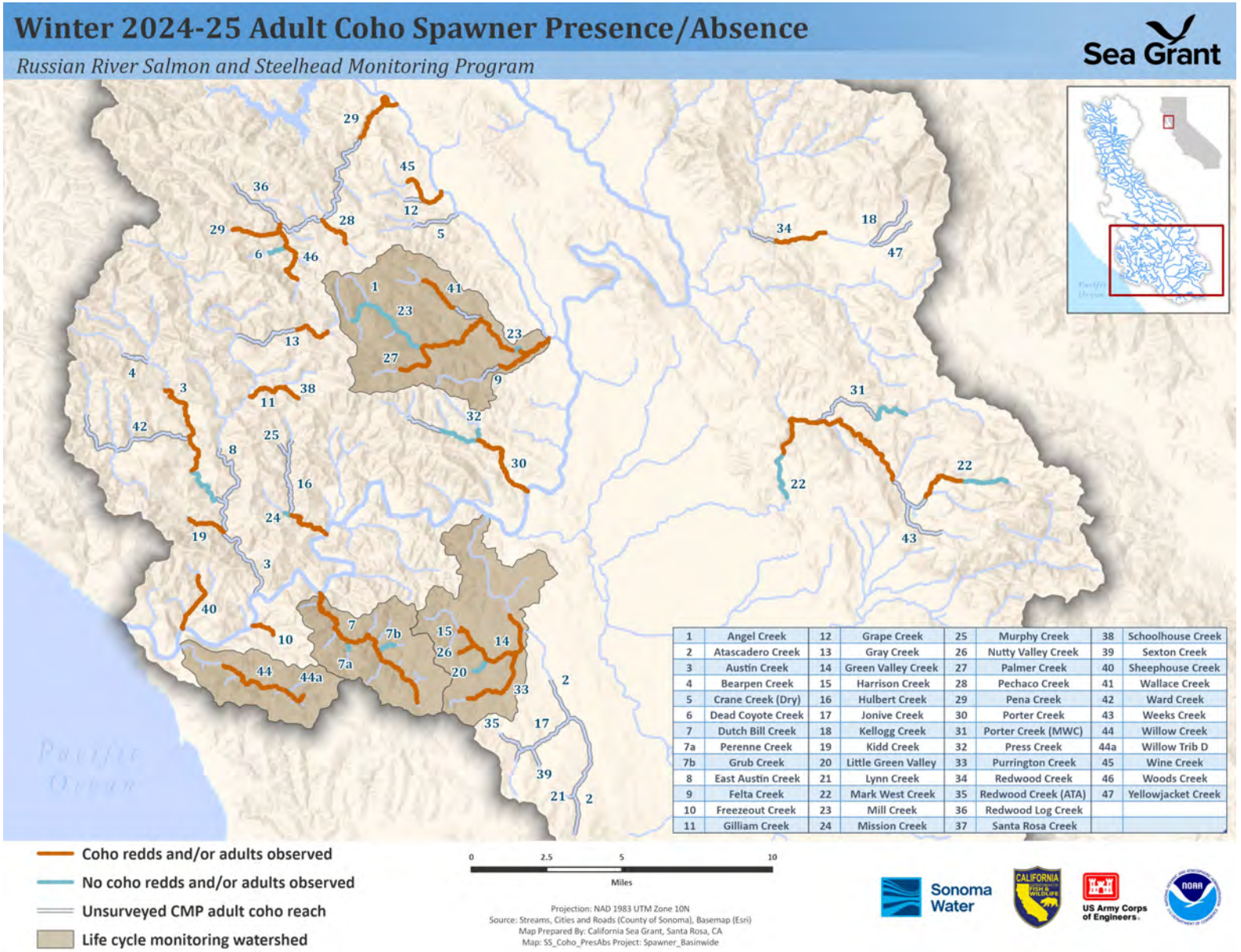


Figure 24. Historical spawner survey effort in California Monitoring Plan streams. Note, this does not include surveys that were conducted in steelhead-only reaches located primarily in the upper basin.

Table 7. Number of salmonid redds (and species percentage among survey streams) observed by species during winter 2024/25 in Russian River tributaries.

Tributary	Length surveyed (km)	Coho salmon	Steelhead	Chinook salmon	Salmonid sp	Total
Angel Creek	0.5	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Austin Creek	8.9	3 (1.2%)	14 (7.1%)	0 (0%)	4 (3.7%)	21 (3.6%)
Dead Coyote Creek	1.1	0 (0%)	2 (1.0%)	0 (0%)	2 (1.8%)	4 (0.7%)
Dutch Bill Creek	11.4	9 (3.6%)	5 (2.5%)	0 (0%)	4 (3.7%)	18 (3.0%)
Duvoul Creek	0.2	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Felta Creek	3.7	5 (2.0%)	8 (4.1%)	0 (0%)	1 (0.9%)	14 (2.4%)
Freezeout Creek	1.5	1 (0.4%)	0 (0%)	0 (0%)	0 (0%)	1 (0.2%)
Gilliam Creek	2.6	9 (3.6%)	1 (0.5%)	0 (0%)	2 (1.8%)	12 (2.0%)
Grape Creek	1.5	8 (3.2%)	8 (4.1%)	2 (5.9%)	5 (4.6%)	23 (3.9%)
Gray Creek	2.2	2 (0.8%)	7 (3.6%)	0 (0%)	1 (0.9%)	10 (1.7%)
Green Valley Creek	7.0	30 (12.0%)	6 (3.0%)	0 (0%)	5 (4.6%)	41 (6.9%)
Grub Creek	1.1	0 (0%)	1 (0.5%)	0 (0%)	1 (0.9%)	2 (0.3%)
Harrison Creek	0.2	0 (0%)	1 (0.5%)	0 (0%)	2 (1.8%)	3 (0.5%)
Hulbert Creek	3.2	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Kidd Creek	2.5	4 (1.6%)	2 (1.0%)	0 (0%)	2 (1.8%)	8 (1.4%)
Little Green Valley Creek	1.2	0 (0%)	2 (1.0%)	0 (0%)	1 (0.9%)	3 (0.5%)
Mark West Creek	19.2	10 (4.0%)	16 (8.1%)	0 (0%)	2 (1.8%)	28 (4.7%)
Mill Creek	16.6	6 (2.4%)	16 (8.1%)	0 (0%)	3 (2.8%)	25 (4.2%)
Mission Creek	0.4	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Nutty Valley Creek	1.2	5 (2.0%)	0 (0%)	0 (0%)	1 (0.9%)	6 (1.0%)
Palmer Creek	2.9	3 (1.2%)	1 (0.5%)	0 (0%)	2 (1.8%)	6 (1.0%)
Pechaco Creek	2.3	7 (2.8%)	8 (4.1%)	0 (0%)	5 (4.6%)	20 (3.4%)
Pena Creek	4.2	6 (2.4%)	39 (19.8%)	17 (50.0%)	15 (13.8%)	77 (13.0%)
Perenne Creek	0.5	0 (0%)	0 (0%)	0 (0%)	1 (0.9%)	1 (0.2%)
Porter Creek	7.4	3 (1.2%)	11 (5.6%)	0 (0%)	1 (0.9%)	15 (2.5%)
Porter Creek (MWC)	2.4	0 (0%)	3 (1.5%)	0 (0%)	0 (0%)	3 (0.5%)
Press Creek	0.6	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Purrington Creek	4.8	6 (2.4%)	2 (1.0%)	0 (0%)	2 (1.8%)	10 (1.7%)
Redwood Creek	3.0	1 (0.4%)	2 (1.0%)	2 (5.9%)	1 (0.9%)	6 (1.0%)
Schoolhouse Creek	1.1	6 (2.4%)	0 (0%)	0 (0%)	0 (0%)	6 (1.0%)
Sheephouse Creek	3.7	3 (1.2%)	2 (1.0%)	0 (0%)	5 (4.6%)	10 (1.7%)
Wallace Creek	2.5	2 (0.8%)	0 (0%)	0 (0%)	0 (0%)	2 (0.3%)
Willow Creek	6.0	106 (42.2%)	15 (7.6%)	0 (0%)	14 (12.8%)	135 (22.8%)
Willow Creek Trib D	0.1	4 (1.6%)	0 (0%)	0 (0%)	0 (0%)	4 (0.7%)
Wine Creek	1.8	4 (1.6%)	8 (4.1%)	0 (0%)	3 (2.8%)	15 (2.5%)
Woods Creek	4.1	8 (3.2%)	17 (8.6%)	13 (38.2%)	24 (22.0%)	62 (10.5%)
Total	**133.3**	**251 (100%)**	**197 (100%)**	**34 (100%)**	**109 (100%)**	**591 (100%)**



1	Angel Creek	12	Grape Creek	25	Murphy Creek	38	Schoolhouse Creek
2	Atascadero Creek	13	Gray Creek	26	Nutty Valley Creek	39	Sexton Creek
3	Austin Creek	14	Green Valley Creek	27	Palmer Creek	40	Sheephouse Creek
4	Bearpen Creek	15	Harrison Creek	28	Pechaco Creek	41	Wallace Creek
5	Crane Creek (Dry)	16	Hulbert Creek	29	Pena Creek	42	Ward Creek
6	Dead Coyote Creek	17	Jonive Creek	30	Porter Creek	43	Weeks Creek
7	Dutch Bill Creek	18	Kellogg Creek	31	Porter Creek (MWC)	44	Willow Creek
7a	Perenne Creek	19	Kidd Creek	32	Press Creek	44a	Willow Trib D
7b	Grub Creek	20	Little Green Valley	33	Purrington Creek	45	Wine Creek
8	East Austin Creek	21	Lynn Creek	34	Redwood Creek	46	Woods Creek
9	Felta Creek	22	Mark West Creek	35	Redwood Creek (ATA)	47	Yellowjacket Creek
10	Freezeout Creek	23	Mill Creek	36	Redwood Log Creek		
11	Gilliam Creek	24	Mission Creek	37	Santa Rosa Creek		

Figure 25. Coho salmon redd and/or adult presence or absence, winter 2024/25.

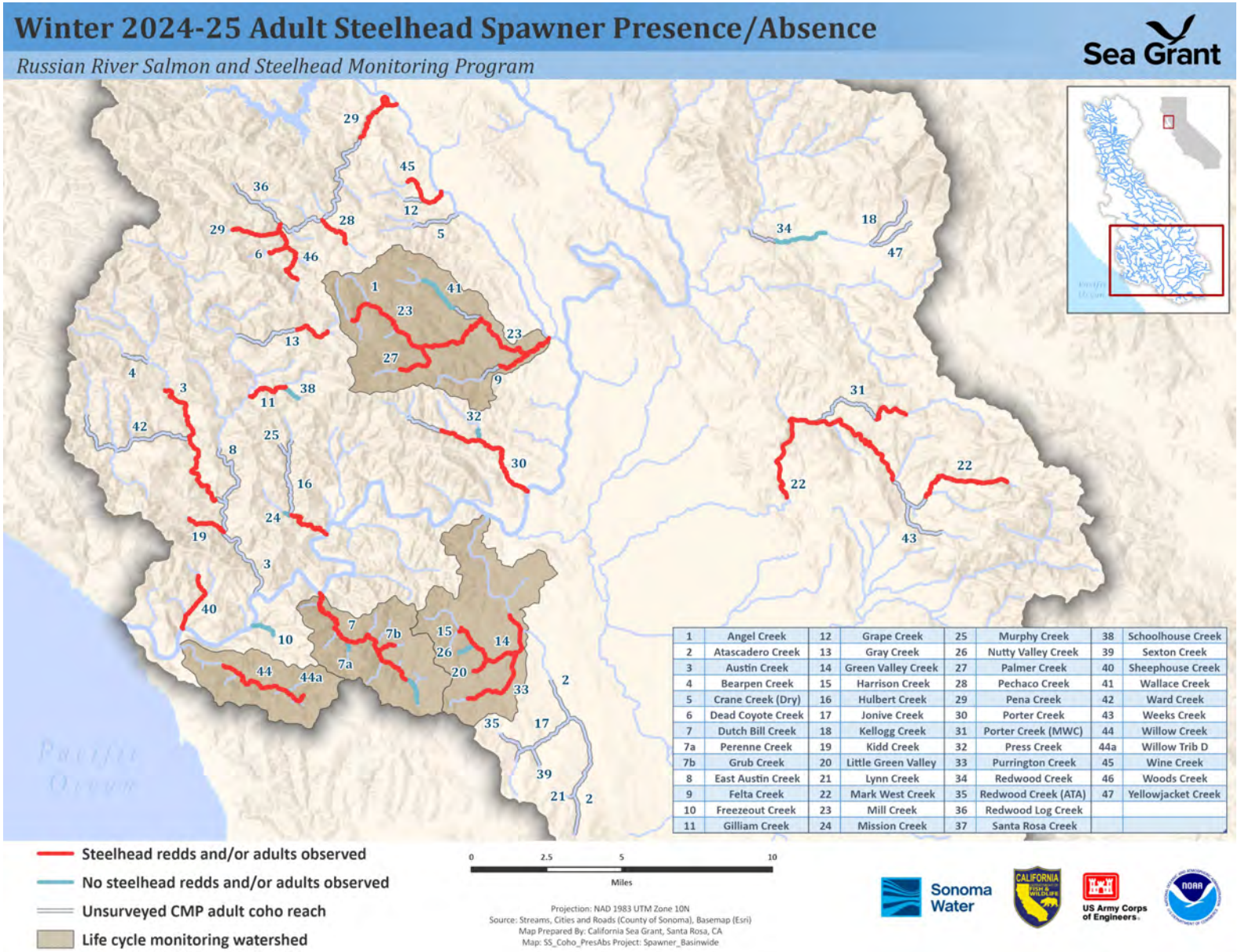


Figure 26. Steelhead redd and/or adult presence or absence, winter 2024/25.

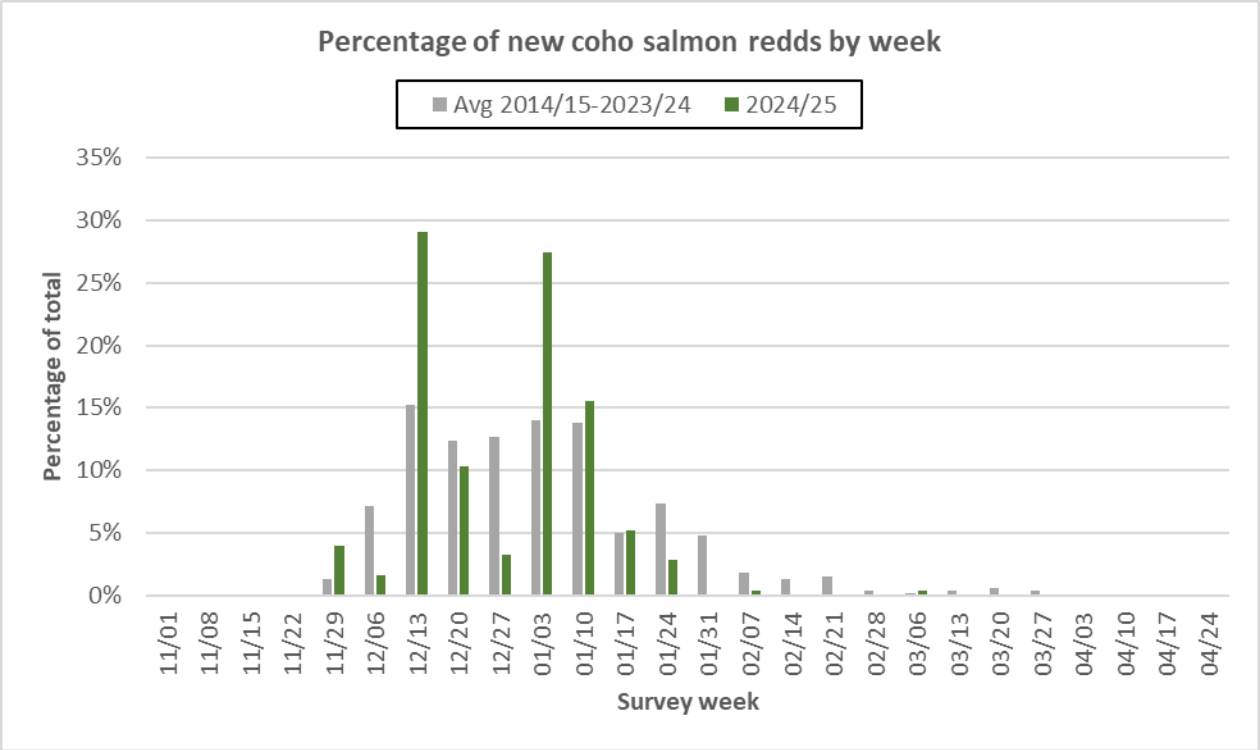


Figure 27. Percentage of new coho salmon redds observed each week in Russian River California Monitoring Plan survey streams, winter 2024/25 in comparison to long-term average.

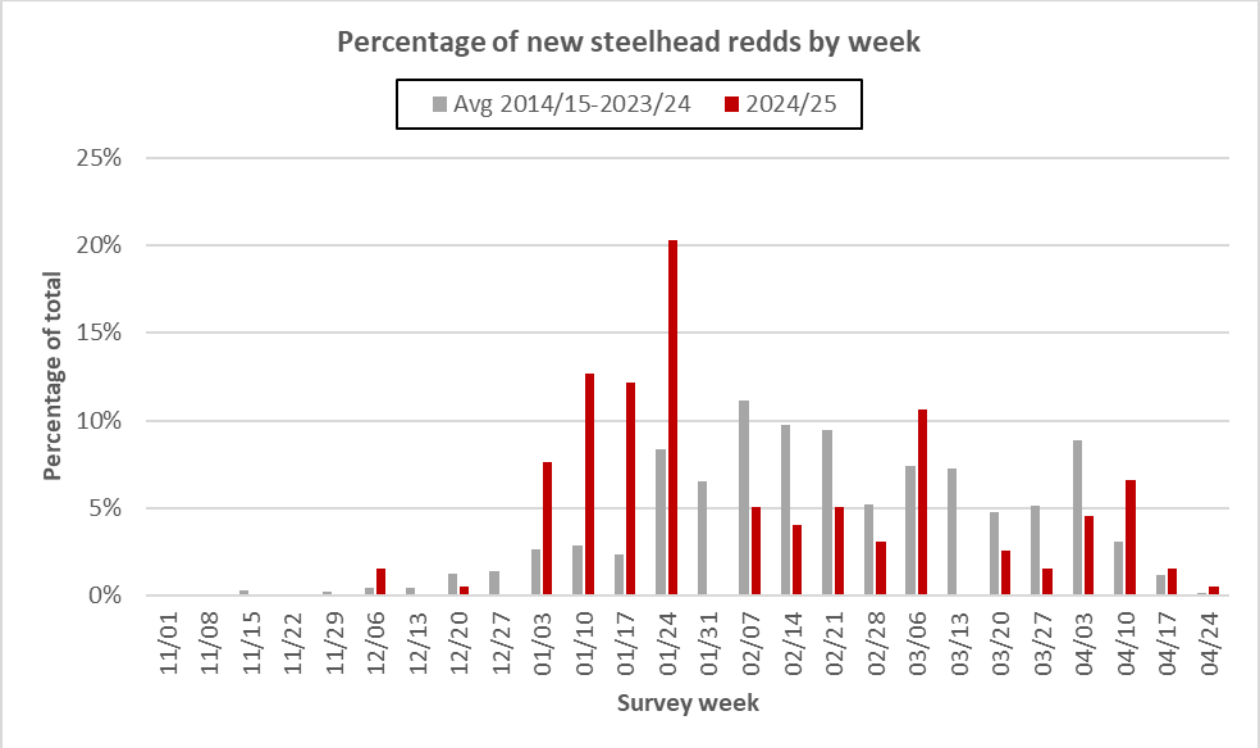


Figure 28. Percentage of new steelhead redds observed each week in Russian River California Monitoring Plan survey streams, winter 2024/25 in comparison to long-term average.

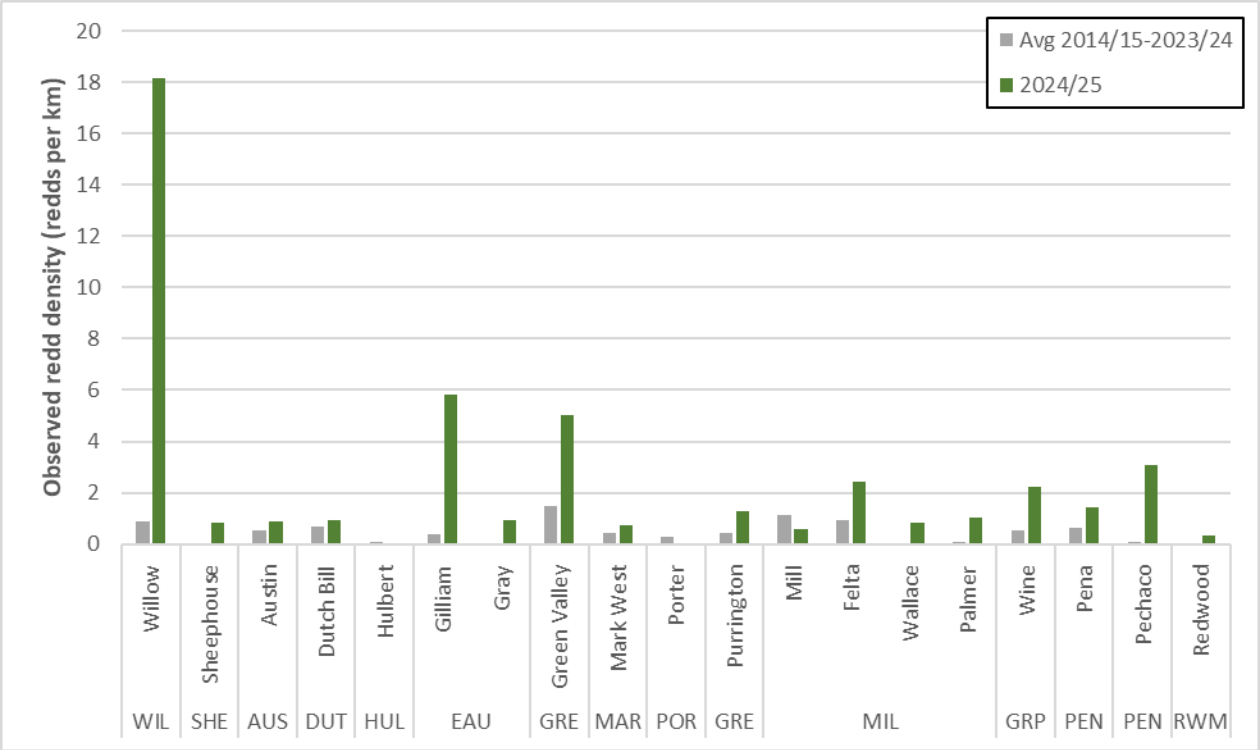
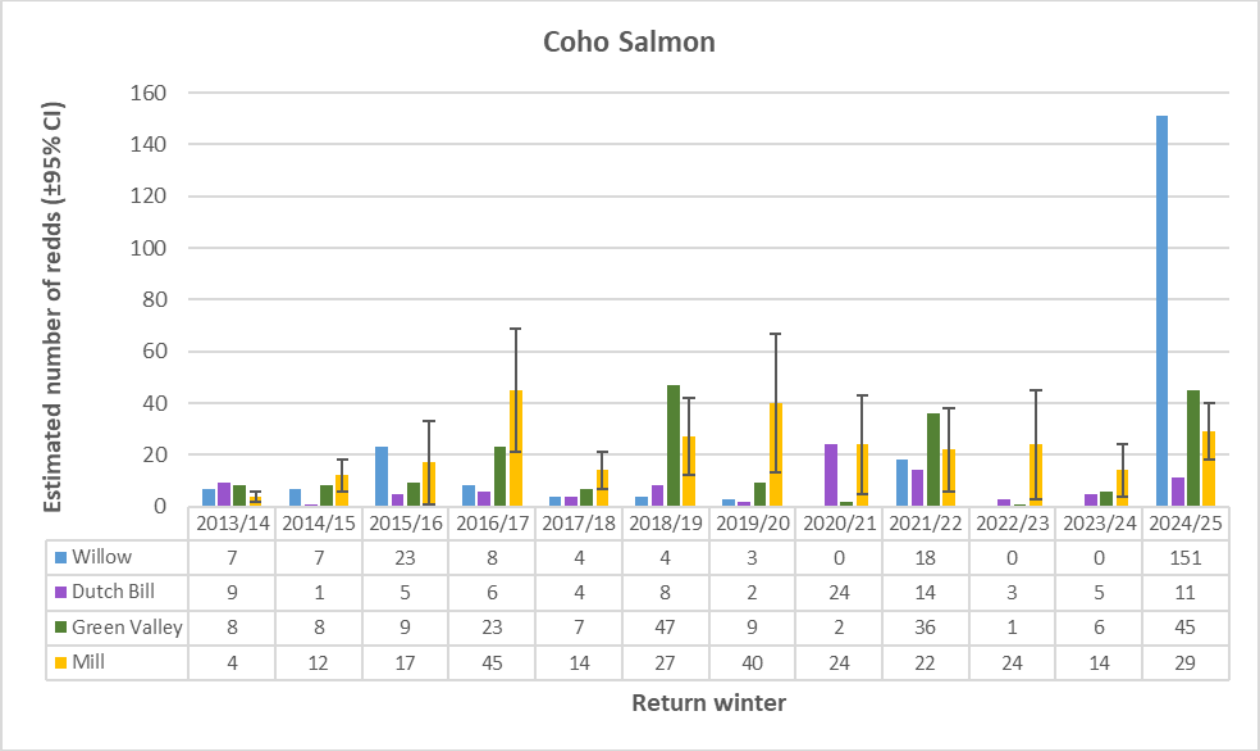
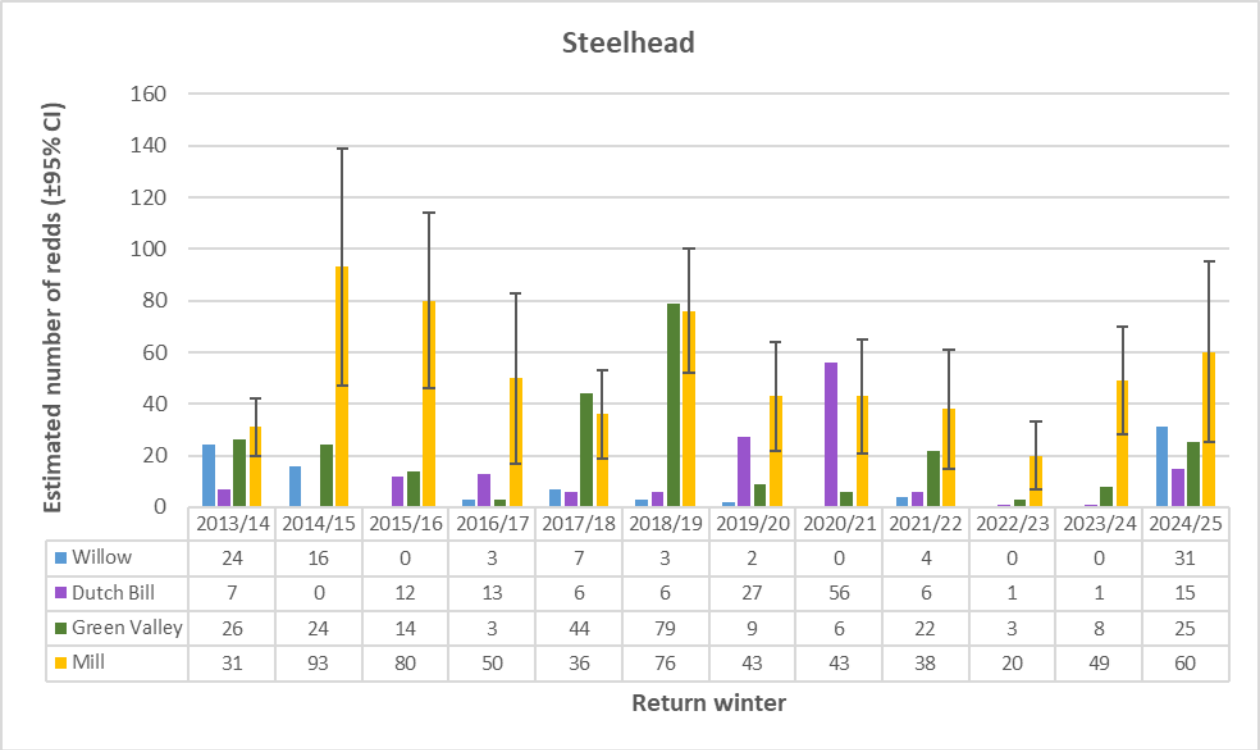


Figure 29. Observed coho salmon redds per km in reaches that are sampled each season since 204/15 (i.e., coho rotating panel 1) summed by tributary, winter 2024/25 in comparison to long term average.



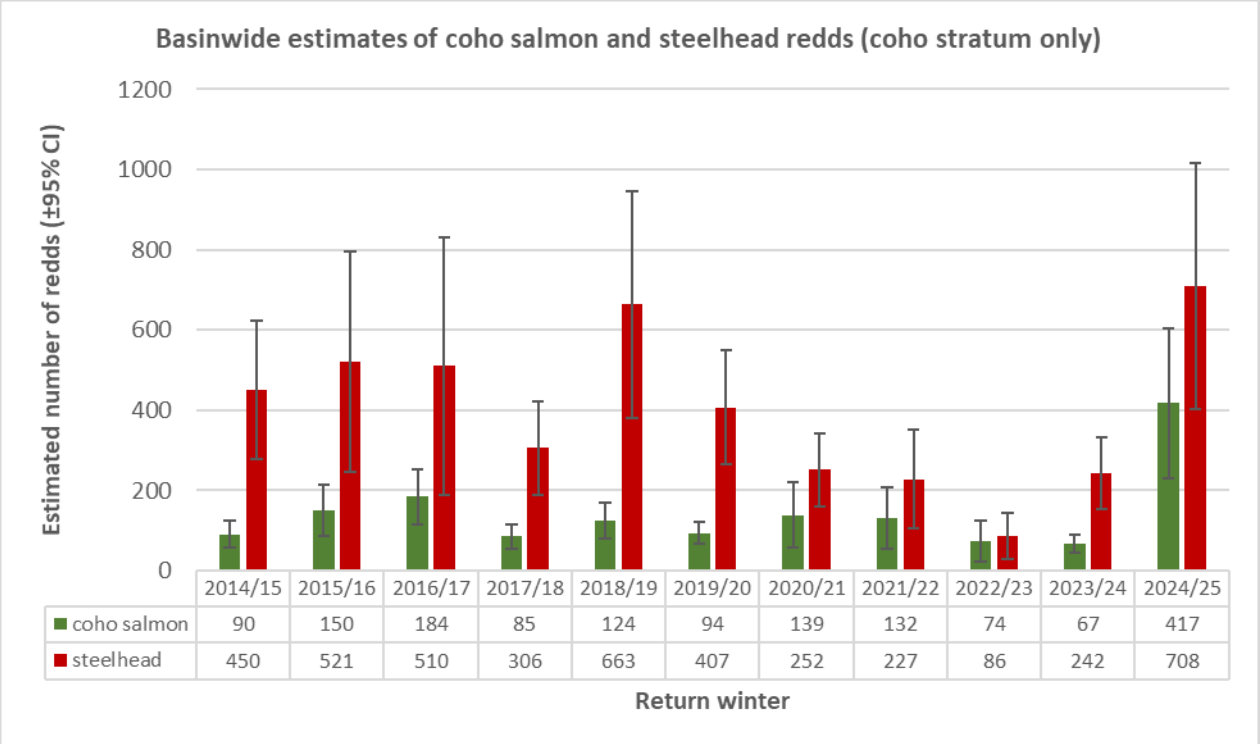
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Willow	7	7	23	8	4	4	3	0	18	0	0	151
Dutch Bill	9	1	5	6	4	8	2	24	14	3	5	11
Green Valley	8	8	9	23	7	47	9	2	36	1	6	45
Mill	4	12	17	45	14	27	40	24	22	24	14	29

Figure 30. Estimated coho salmon redds in LCM subwatersheds, return winters 2013/14 through 2024/25. Note that the Mill subwatershed has 95% CI because of incomplete coverage due to lack of landowner access in 1 reach.



	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Willow	24	16	0	3	7	3	2	0	4	0	0	31
Dutch Bill	7	0	12	13	6	6	27	56	6	1	1	15
Green Valley	26	24	14	3	44	79	9	6	22	3	8	25
Mill	31	93	80	50	36	76	43	43	38	20	49	60

Figure 31. Estimated steelhead redds in LCM subwatersheds, return winters 2013/14 through 2024/25. Note that the Mill subwatershed has 95% CI because of incomplete coverage due to lack of landowner access in 1 reach.



	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
coho salmon	90	150	184	85	124	94	139	132	74	67	417
steelhead	450	521	510	306	663	407	252	227	86	242	708

Figure 32. Basinwide estimates of coho salmon and steelhead redds in the Russian River watershed (coho stratum only), return winters 2014/15 through 2024/25.

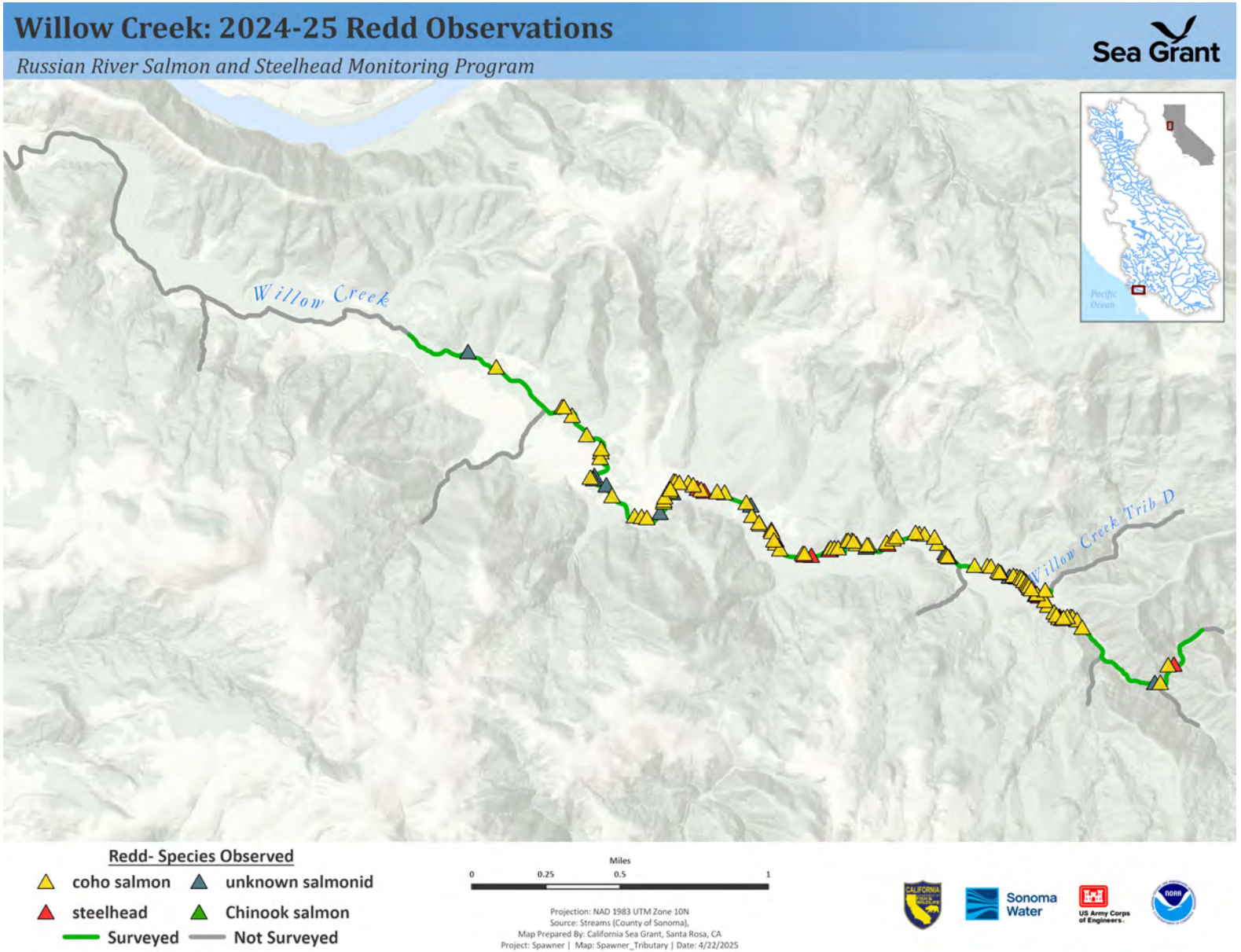


Figure 33. Distribution of salmonid redds observed in Willow Creek during winter 2024/25.

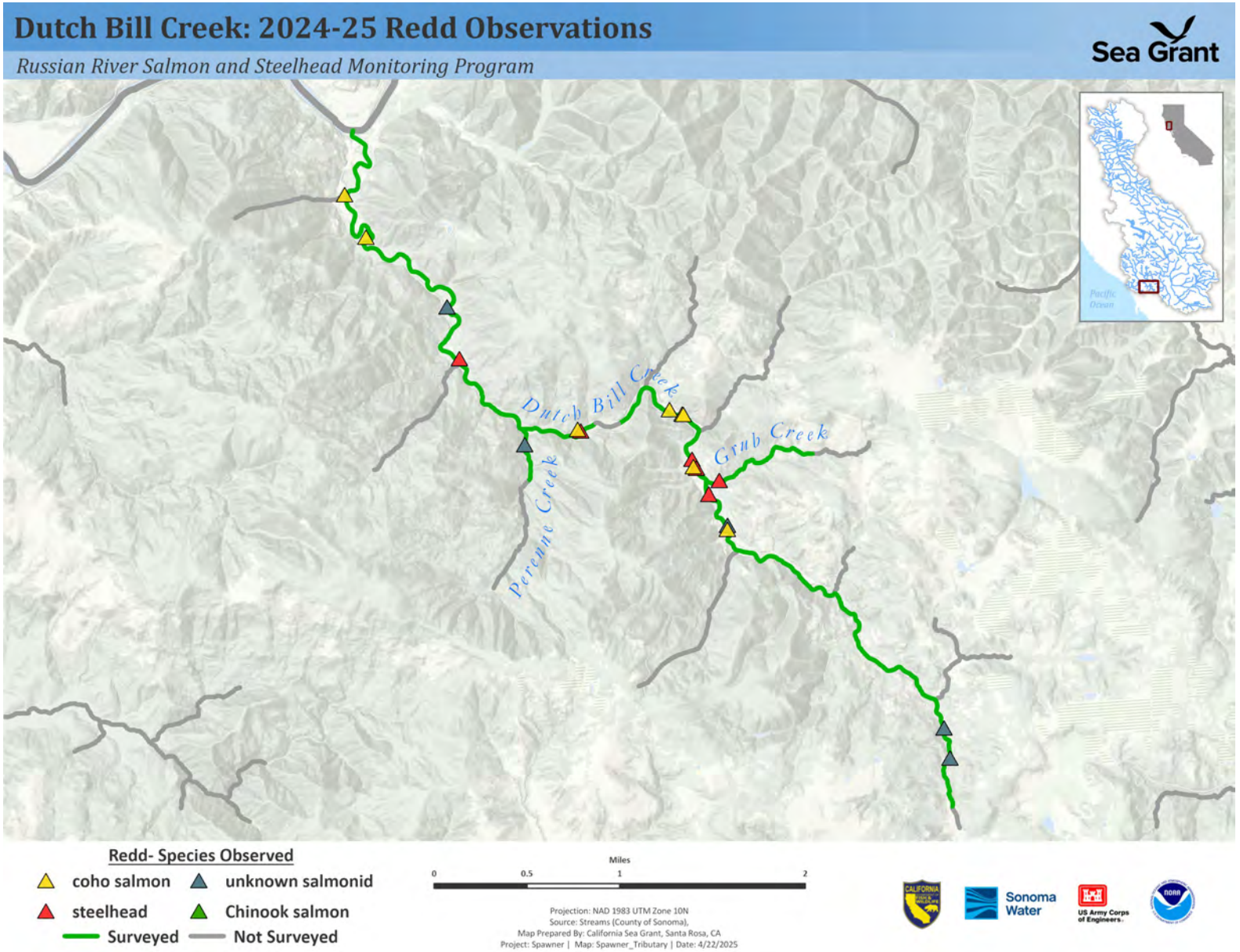


Figure 34. Distribution of salmonid redds observed in Dutch Bill Creek during winter 2024/25.

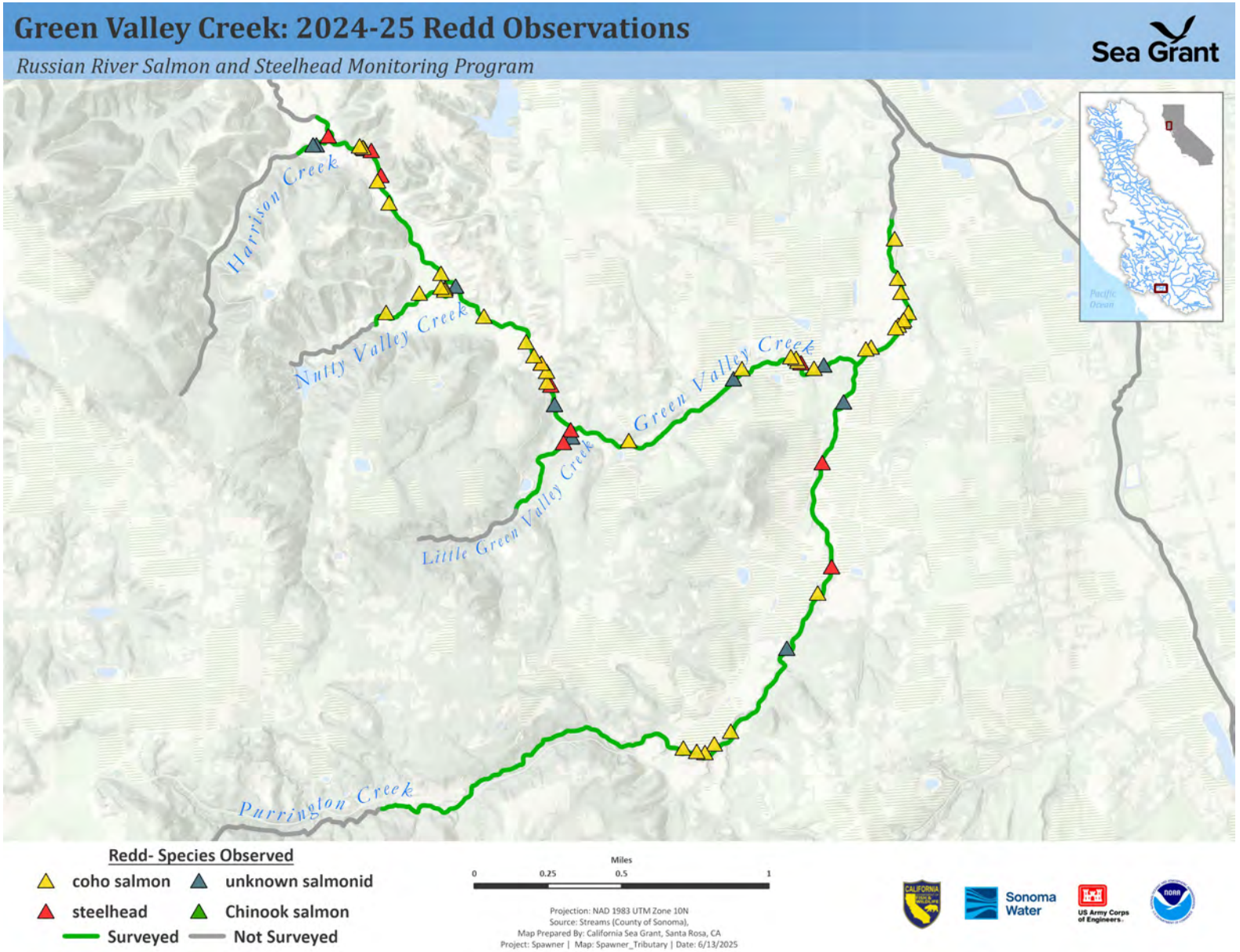


Figure 35. Distribution of salmonid redds observed in the Green Valley Creek subwatershed during winter 2024/25.

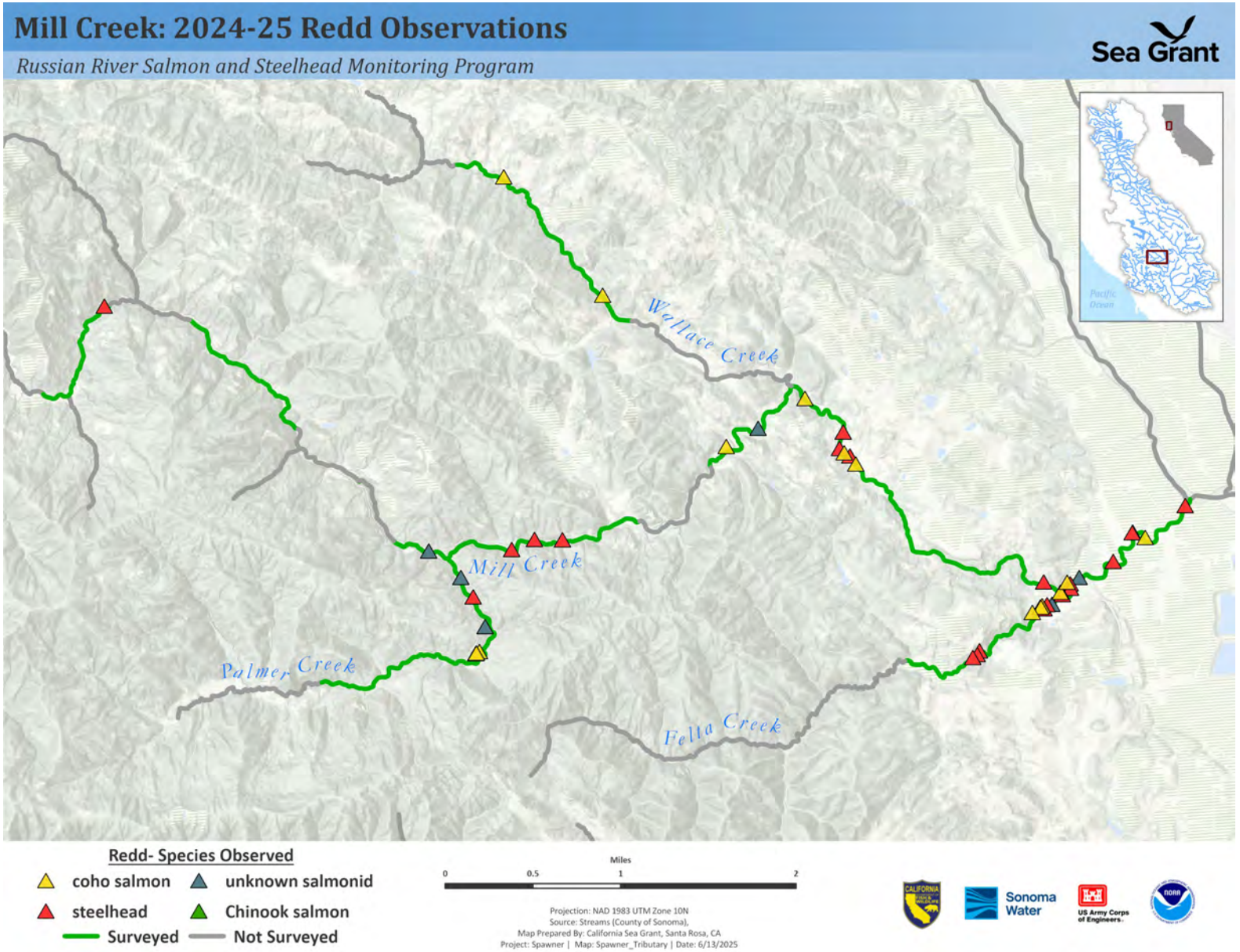


Figure 36. Distribution of salmonid redds observed in the Mill Creek subwatershed during winter 2024/25.

4. Discussion and recommendations

4.1. Adult returns and redds

In winter 2024/25, adult returns of coho salmon to the Russian River watershed were the largest documented since the Broodstock Program began releasing fish in 2004 (Figure 16). Over 1,000 adults were estimated to pass the Duncans Mills PIT antenna array and adult returns to the four LCM streams were either the highest or among the two or three highest estimates in the history of Broodstock Program monitoring (Figure 12 - Figure 15). The basinwide estimate of coho redds was also the highest on record (Figure 32) as well as in Willow Creek, and redd estimates were average to high in the other LCM streams (Figure 30). Potential reasons for the high number of adult returns in winter 2024/25 are a stronger cohort of natural-origin fish relative to other years as well as favorable environmental conditions during both the freshwater and marine phases of the life cycle which likely benefitted both natural- and hatchery-origin fish.

The 2022 cohort (coho returning as age-3 adults in winter 2024/25) experienced average or higher streamflow conditions throughout the freshwater phase of their life cycle. In summer of 2022, a relatively high number of natural-origin juvenile coho salmon were observed during snorkel counts throughout the Russian River watershed, with an expanded count of over 50,000 coho salmon yoy and a basinwide percent area occupied of 0.45, both metrics the highest on record since the inception of the Broodstock Program (California Sea Grant 2023). Unlike the previous two drought years (2020, 2021) where extensive stream drying contributed to high mortality of summer rearing salmonids, the dry season of 2022 provided surface flow connection in more reaches thus providing this cohort with a higher chance of surviving the summer ((California Sea Grant 2022); also see wetted habitat dashboard for a comparison of stream drying conditions among years).

Relatively high streamflow conditions also occurred in the LCM tributaries and Russian River mainstem during the spring of 2023, when natural-origin and hatchery-origin fish from the 2022 cohort were migrating to the ocean as yearling smolts (California Sea Grant and Sonoma Water 2023). Based on a four-year unpublished data set collected by Sonoma Water from 2021-2024 on coho smolt migration through the mainstem Russian River, survival was higher in 2023 than any other study year. Favorable flow conditions continued to the age-3 adult stage during winter of 2024/25. The winter began with a significant rain event in November (Figure 3), reconnecting tributaries with the mainstem Russian River and allowing adults to access spawning habitat earlier than most years. Adults were first detected entering the river in late October (Figure 4, Figure 5). Many fish moved up into the tributaries during the late November storm event with an even larger pulse of fish moving during a series of storms in December (Figure 7 - Figure 11). Additional storms in February prevented redd desiccation and stranding of adults. Based on SAR estimates for the 2022 cohort (Table 6), there is also evidence that “marine survival” (i.e., combined survival of riverine, estuarine, and marine survival) was higher than for previous cohorts. This could be related to ocean upwelling conditions that led to higher growth and survival. It is also possible that closure of the Chinook salmon fishery led to less incidental catch of coho salmon, further increasing survival.

The number and proportion of natural-origin adult returns of coho salmon in 2024/25 was higher in all LCM streams compared to previous winters (Table 8, Figure 37), averaging 40 and 0.25 across all four LCM streams and ranging from 18 and 0.16 in Mill Creek to 56 and 0.32 in Willow Creek. Because we are unable to account for natural-origin adults returning to the four LCM streams that originated from other

Russian River tributaries, it is possible that this ratio was even higher. Unfortunately, we did not detect any age-2 natural-origin adults returning to the LCM streams, suggesting a weaker cohort for the upcoming winter of 2025/26.

As in most years, there was no single release group (i.e., release life stage, release tributary, etc.) that comprised the majority of the returning adult coho salmon. Rather, we documented fish returning from fall, presmolt, and smolt release groups released into 10 tributaries as well as the mainstem Russian River (Table 3). Composition of adult coho salmon returns to each LCM subwatershed included fish that originated from the same LCM subwatershed. However, returns to Dutch Bill, Green Valley and Mill creeks also included a high proportion of coho that originated from other Russian River tributaries (Table 4). Similar movement patterns among subwatersheds within the Russian River basin have been observed each year since winter of 2012/13 (Figure 38). In winter 2024/25, the percentage of adults returning to non-natal streams varied by LCM subwatershed, with higher fidelity to Willow (68%) and Green Valley (86%) creeks and the lowest fidelity to Mill Creek (16%). These percentages were similar to overall percentages aggregated over 12 winters (Figure 39). Across all streams in 2024/25, 57% of coho returning to each LCM subwatershed originated from their natal or release streams. This high level of movement among subwatersheds highlights the importance of considering a suite of habitats and tributaries when thinking about population recovery. In terms of release strategies, we suggest that it is more important to release fish in locations where they have a high chance of survival rather than ensuring that they imprint on specific streams. Because we cannot predict which release strategy will result in the highest survival for a given cohort, we recommend continuing to release fish at different life stages and into several streams.

Smolt to adult return (SAR) ratios were higher than average in all LCM streams (Table 6). However, the high level of movement among subwatersheds within the Russian River basin makes interpretation of SAR estimates difficult and results can be misleading. For example, estimated SAR for the 2022 Mill Creek cohort was 12.6%, but this high percentage was a result of the fact that 84% of the adults that returned to Mill Creek originated from other Russian River streams which artificially inflated SAR. In Willow Creek, our estimate of SAR for the 2022 cohort was much lower than in other LCMs, but we attribute this to the unusually high number of hatchery smolts released downstream of the lower Willow Creek trap site in 2023 (22,315) which may have masked potentially higher SAR of fish that spent more of their juvenile phase within Willow Creek (see 4.2. Willow Creek section for more detail). To address these confounding factors, we would ideally estimate SAR at the Russian River watershed scale; however, due to river's large size, we are unable to estimate the total number of smolts emigrating to the ocean each year. Despite these complications, it is reasonable to conclude that SAR was better than average for the 2022 cohort compared to most other cohorts (Table 6).

The large disparity between estimated redd abundance (Figure 30) and estimated adult abundance (Table 5) in three of the four LCM subwatersheds (Dutch Bill, Green Valley, Mill) leads us to question the reliability of redd abundance in some streams in some years. We believe that large flow events in 2024/25 immediately following the peak of coho spawning obscured redd visibility. Because we were not able to survey all streams before those storms occurred (see late December gap in surveys, Figure 24), we undoubtedly missed redds which led to an underestimate of redd abundance. This suggests that unless surveys can be consistently well-timed with respect to winter storms, it can be misleading to rely on redd estimates alone to account for adult returns. However, when spawner surveys can be conducted without storm-related impacts, they are useful not only as an indicator of adult abundance

but also for depicting spawning distribution. This information in conjunction with snorkel surveys the following summer is useful for planning future hatchery releases and guiding broodstock collection and fish rescues or relocations.

The 2023 cohort (coho stocked in 2023 and 2024 and returning as age-2 adults in 2024/25), was the first cohort subject to stocking restrictions due to the recently discovered presence of invasive New Zealand mud snail (NZMS) at Don Clausen Fish Hatchery. To avoid the potential introduction of NZMS into tributaries where NZMS has not been identified, releases of coho from the hatchery can only occur in (or downstream of) sites where NZMS have been positively identified by CDFW. Beginning in 2023, this severely restricted the habitat in which juvenile coho could be released (Figure 40), and excluded many of the stream reaches used for spring and fall releases in previous years. Available stocking habitat was effectively reduced from 260 km to 94 km (36%). For the 2023 cohort, these restrictions resulted in more fish being released at mainstem locations at later life stages. Because the hatchery infrastructure was not designed to release higher numbers of presmolts and smolts, it also had the effect of extending the timeframe of releases into late June and July when it was difficult to find locations with suitable water quality conditions in which to release fish. Consequently, we anticipate low adult returns from these release groups and recommend prioritizing actions to prevent this from occurring in the future. Potential resolutions discussed at Broodstock Program technical advisory committee meetings include completing the development of protocols and policies to decontaminate fish, surveying more tributary habitat to identify NZMS positive reaches, and increasing hatchery infrastructure to release more fish at later life stages earlier in the spring.

As with coho salmon, basinwide steelhead redd abundance was also the highest on record since winter CMP monitoring began in 2014/15 in the Russian River (Figure 32). It was somewhat surprising that the steelhead basinwide redd estimate was higher than that for coho because the number of steelhead redds observed was lower than that of coho salmon (Table 7). However, the majority of the redds that could not be assigned to species during field surveys were later assigned as steelhead redds based on our estimators that consider redd morphology and timing (Gallagher and Gallagher 2005) or proximity to redds of known species (Ricker et al. 2014a). The basinwide steelhead redd estimate should be considered a minimum estimate for the Russian River watershed because it was not expanded to all steelhead reaches within the Russian River CMP sample frame. Furthermore, while steelhead have been observed at multiple life stages in the mainstem of Dry Creek, mainstem reaches are not included in the sample frame due to an inability to conduct spawner surveys in the high, regulated flows.

Table 8. Estimated natural-origin (NOR) and hatchery-origin (HOR) coho salmon adult returns by stream and return winter.

Return winter	Willow		Dutch Bill		Green Valley		Mill	
	NOR	HOR	NOR	HOR	NOR	HOR	NOR	HOR
2012/13	0	14	0	9	0	74	0	78
2013/14	0	7	0	15	0	17	0	7
2014/15	0	8	0	18	0	44	0	52
2015/16	0	0	0	33	0	17	1	13
2016/17	2	10	2	67	2	107	4	132
2017/18	3	58	0	40	2	160	0	54
2018/19	0	27	0	49	0	26	0	93
2019/20	0	17	0	42	0	94	3	93
2020/21	0	3	0	11	0	19	2	14
2021/22	1	15	0	60	0	89	0	60
2022/23	0	0	1	26	0	7	0	13
2023/24	5	46	7	122	16	65	7	59
2024/25	56	118	50	112	38	118	18	98

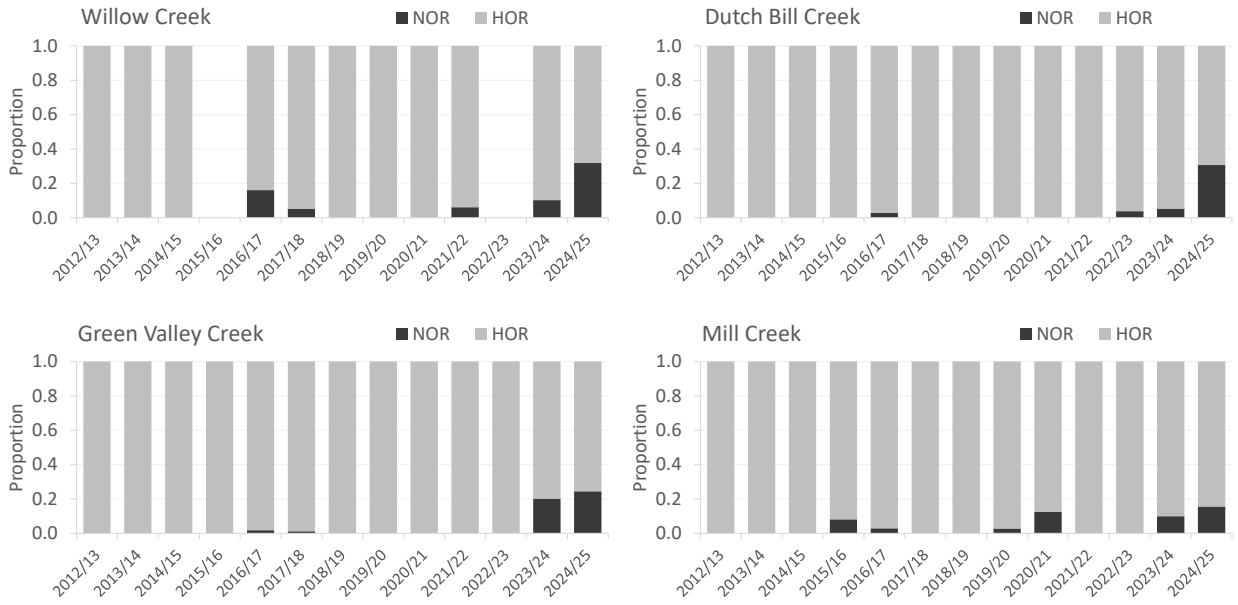


Figure 37. Annual proportion of natural-origin (NOR) and hatchery-origin (HOR) adult returns to four LCM streams, winters 2012/13 – 2024/25.

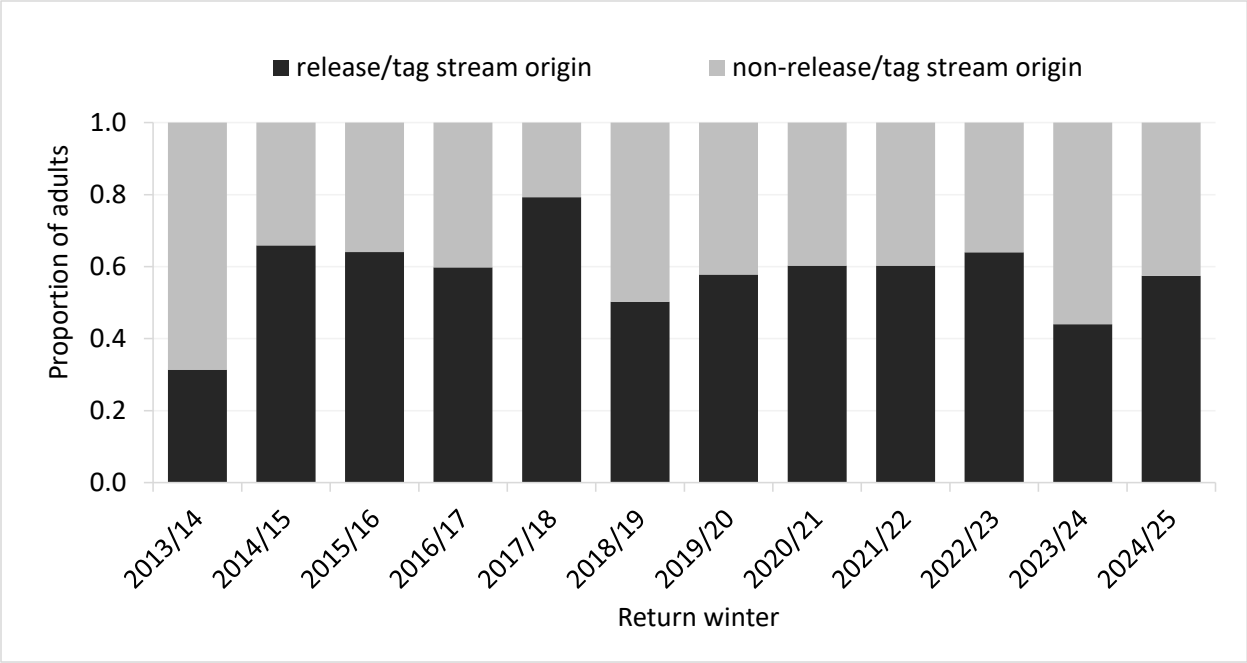


Figure 38. Composition of adult coho salmon returning to four LCM subwatersheds. Black represents the proportion of adults that returned to the stream in which they were released or tagged and gray represents the proportion that originated from a tributary other than the one to which they returned.

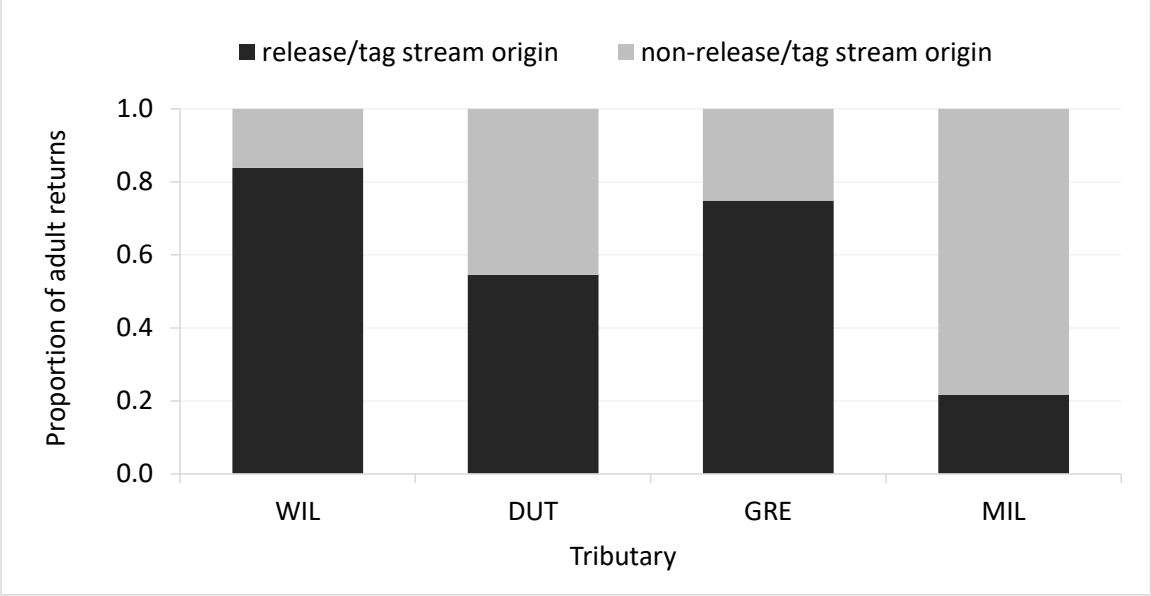


Figure 39. Composition of adult coho salmon returning to each LCM subwatershed (WIL = Willow Creek, DUT = Dutch Bill Creek, GRE = Green Valley Creek, MIL = Mill Creek). Black represents the proportion of adults that returned to the stream in which they were released or tagged and gray represents the proportion that originated from a tributary other than the one to which they returned.

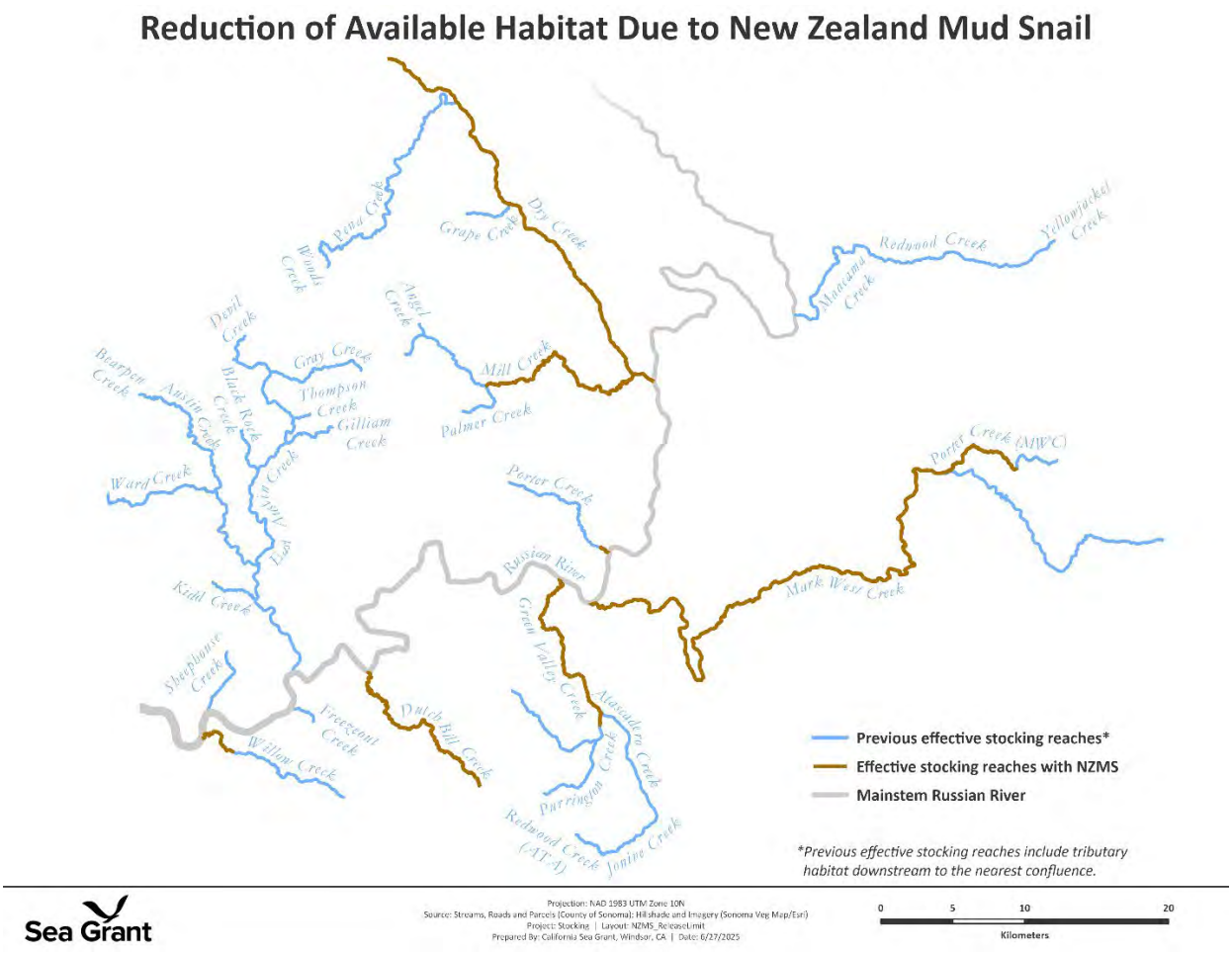


Figure 40. Available coho stocking habitat before and after identification of New Zealand mud snail at Don Clausen Fish Hatchery.

4.2. Unusually high returns to Willow Creek

Despite its small watershed size relative to the other three LCM streams (Figure 1), Willow Creek had the highest estimated number of adult returns in winter 2024/25 (Table 6) and much higher redd densities than any other surveyed tributary (Figure 29, Figure 33). Returning adults originated from several sources: presmolt and smolt releases into Willow Creek, smolt releases into the Russian River mainstem and estuary, natural-origin juveniles tagged electrofishing during summer of 2022, and natural-origin smolts tagged at downstream migrant traps during the springs of 2023 and 2024 (Table 9, Figure 41, Figure 42). There was high variation in return rates among the many groups of fish tagged or released within proximity to Willow Creek, ranging from no returns to a return rate of over 5% (Table 9). For the 2022 cohort (age-3 adult returns), the natural-origin juveniles were particularly successful, with 5.7% and 5.6% of the fish tagged electrofishing or at the downstream migrant trap, respectively, returning as adults. The rate of return for presmolts released upstream of Third Bridge (river km 5.85-6.02, Figure 42) also had a relatively high return rate of 1.3%. Smolts released in late May or early June in the estuary near the mouth of Willow Creek also returned to Willow Creek, though at lower rates than natural-origin or presmolt hatchery-origin fish. We did not detect adults from later smolt release

groups returning to Willow Creek. We also detected age-2 adults (cohort 2023) from 2024 presmolt releases and from the two earliest groups of smolts released in the Russian River mainstem at Cassini (river km 10.99) in 2024 (Figure 42). While we will need to wait for one more year of adult return data to fully evaluate the different release groups, our initial conclusions are that the 3/5/24 smolt release was particularly successful. After one more year of adult return data, we will be able to perform a more comprehensive comparison of return rates of groups released at different sites across a range of times.

Table 9. Sources of PIT-tagged fish potentially contributing to adult coho returns to Willow Creek during winter 2024/25. Note that this table does not include fish from these release or taggig groups that returned to other locations in the watershed.

Cohort (hatch year)	Origin	Release or tagging tributary	Release group	River km	Site	Release/tagging date(s)	PIT released or tagged	Age-2 adults detected	Age-3 adults detected	Percent of release detected as adults in upper Willow
2022	HOR	Willow Creek	presmolt	5.85 - 6.02	reach upstream of 3rd bridge	1/27/2023	775	**8**	**2**	**1.29**
		Russian River	smolt	0.21	Casini	5/11/2023	1,115	0	0	0
						5/18/2023 - 5/19/23	1,558	0	0	0
		Estuary	smolt	4.14	mouth of Willow	5/25/2023 - 5/26/2023	1,536	0	**2**	**0.13**
						6/1/2023 - 6/2/2023	2,097	**2**	**7**	**0.43**
						6/7/2023 - 6/9/2023	2,036	0	0	0
						6/27/2023	141	0	0	0
		Willow Creek	tagged at downstream migrant trap	3.69	upper trap	spring 2023	94	0	0	0
	NOR	Willow Creek	tagged electrofishing	3.69 - 9.16	upstream of 3rd bridge	fall 2022	122	**2**	**5**	**5.74**
			tagged at downstream migrant trap	3.69	upper trap	spring 2023	465	**3**	**23**	**5.59**
2023	HOR	Willow Creek	presmolt	2.57	between 2nd and 3rd bridge	2/6/2024	925	**4**	TBD	**0.43**
						2/20/2024	925	0	TBD	0
			smolt			3/5/2024	924	**10**	TBD	**1.08**
			smolt	0.89	downstream of lower trap	6/6/2024	1,074	0	TBD	0
						6/12/2024	1,075	0	TBD	0
						6/20/2024	1,075	0	TBD	0
						6/26/2024	952	0	TBD	0
						7/12/2024	76	0	TBD	0
		Russian River	smolt	0.21	Casini	4/16/2024	1,059	**1**	TBD	**0.09**
						4/23/2024	1,057	**4**	TBD	**0.38**
						5/7/2024	1,071	0	TBD	0
						5/16/2024	1,074	0	TBD	0
						5/30/2024	1,074	0	TBD	0
		Estuary	smolt	4.14	mouth of Willow	5/23/2024	1,073	0	TBD	0
		Willow Creek	tagged at downstream migrant trap	3.69	lower trap	spring 2024	145	**2**	TBD	**1.38**
	NOR	Willow Creek	tagged at downstream migrant trap	3.69	lower trap	spring 2024	31	0	TBD	0

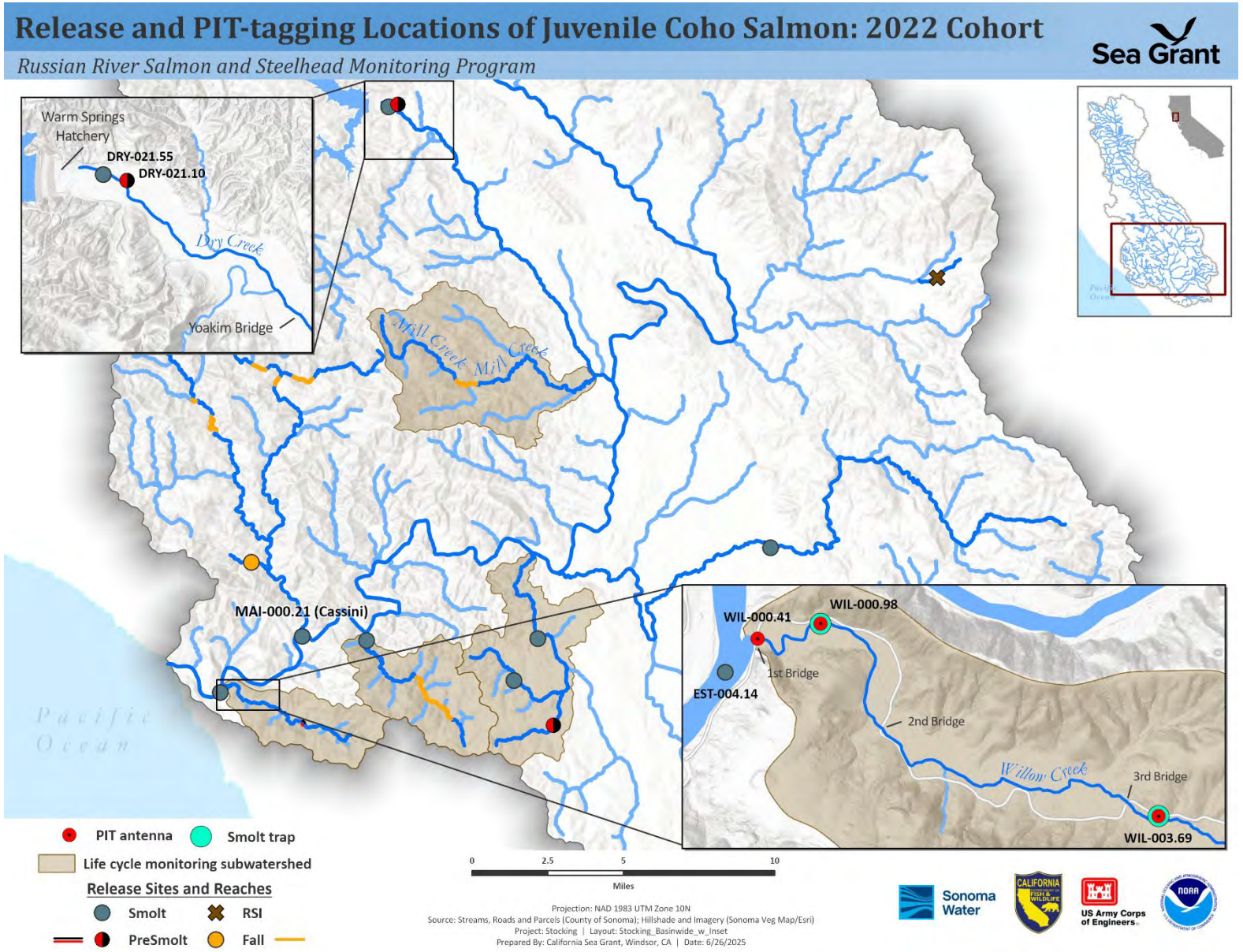


Figure 41. Release locations and tagging sites of cohort (hatch year) 2022 juvenile coho salmon.

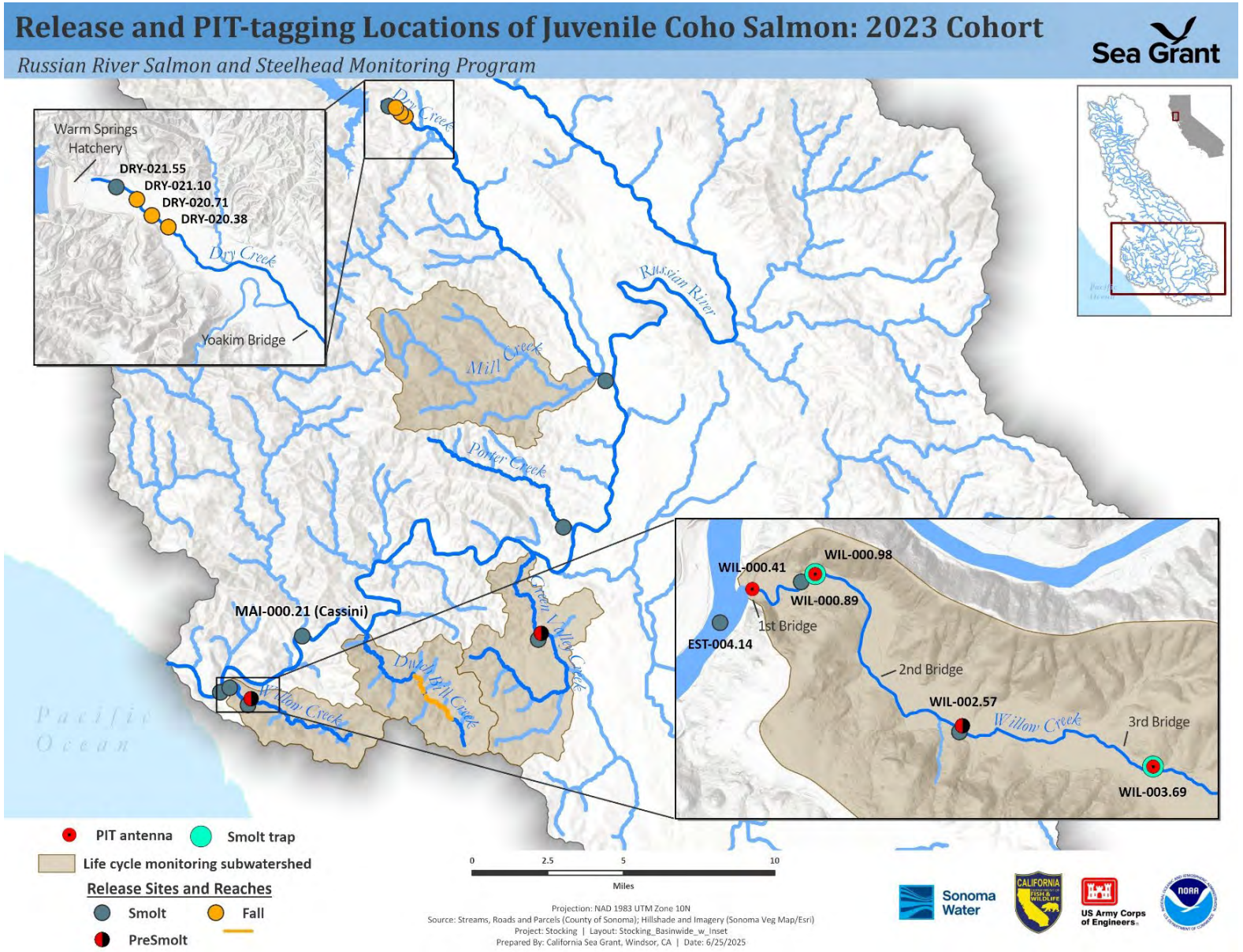


Figure 42. Release locations and tagging sites of cohort (hatch year) 2023 juvenile coho salmon.

4.3. Preliminary comparison of releases into Dry Creek

In recent years, the Broodstock Program has been releasing an increasing number of hatchery fish into Dry Creek during the spring and/or fall seasons. In drought years, this has been to avoid stocking juveniles in tributary habitat that is predicted to become dry in the summer (as a regulated stream, Dry Creek retains high flows and cool temperatures throughout the dry season). With the restrictions on stocking locations to avoid the spread of NZMS, Dry Creek is also a desireable release stream because it is one of the few streams where NZMS has been identified. In 2023, 16,065 hatchery coho were released as fall parr into three different off-channel sites in Dry Creek. To deter fish from immediately fleeing from those habitat features, a subset of each release was held in a net pen onsite for one week and then permitted to leave volitionally. To begin comparing the success of fish released into the different off-channel sites (net pen or not), we tracked the number of PIT-tagged adults returning from each group (Table 10). We will need to wait one more year for age-3 adults to return before we can formalize our conclusions, but preliminary results suggest that releases directly into the stream at the USACE 14 and Weinstock sites were particularly successful.

Table 10. Return rates of PIT-tagged coho salmon released as parr into Dry Creek during the fall season in 2023.

Cohort (hatch year)	Origin	Release group	River km site	Release or tagging site	Release type	Release/tagging date(s)	PIT released or tagged	Age-2 adults detected	Age-3 adults detected	Percent of release detected as adults
2022	HOR	presmolt	DRY-021.15		stream	1/11/2023	782	**4**	**3**	**0.90**
	NOR	tagged electrofishing	DRY-021.10	USACE 14	stream	7/18/2022 - 9/27/22	68	0	**1**	**1.47**
2023	HOR	fall	DRY-020.38	Gallo	net pen	11/22/2023	670	**4**	TBD	**0.60**
					stream	11/15/2023	670	**2**	TBD	**0.30**
			DRY-020.71	Weinstock	net pen	11/22/2023	669	**2**	TBD	**0.30**
					stream	11/15/2023	670	**14**	TBD	**2.09**
			DRY-021.10	USACE 14	net pen	11/22/2023	664	**4**	TBD	**0.60**
					stream	11/16/2023	670	**9**	TBD	**1.34**
		smolt	DRY-000.36	USGS gage	stream	4/17/2024	1,058	**4**	TBD	**0.38**
					stream	4/24/2024	911	**1**	TBD	**0.11**
					stream	5/8/2024	1,075	0	TBD	0
					stream	5/17/2024	1,074	0	TBD	0

5. References

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BIOS California Fish Passage Assessment Database [ds69]

Accessed 10/17/2025 at https://apps.wildlife.ca.gov/bios6/?al=ds69

Confluence of Willig Gulch and Sheephouse Creek (NTMP Map Point #1.0)

PAD_ID	765691
PassageID	417373
StreamName	Willig Gulch
TributaryT	Sheephouse Creek
SiteName	Private Culvert
SiteType	Road crossing
BarStatus	Temporal
Species	Multiple Anadromous Salmonids
Lifestage	All stages
Direction	Upstream
SpBarStatus	Temporal
SpProtocol	FishXing Software
SpAssessedBy	California Department of Fish and Wildlife
NumStructures	
Protocol	FishXing Software
AssessedBy	California Department of Fish and Wildlife
SurveyDate	1/24/2018
TrtStatus	

YrTreated	
TreatedBy	
StructOwner	
LandOwner	
Notes	1.8 foot diameter by 19.5 foot long double barrel circular culvert used as an access road to property barn. Culvert is collapsing and ripping apart at inlet. FishXing estimated this was 10.1% passable for adult salmonids and 10.7% passable for juvenile salmonids. For adult salmonids, the culvert is not a barrier during low flows. During high flows, the culvert is a velocity barrier. For juvenile salmonids, the culvert is not a barrier during low flows. During high flows, the culvert is a velocity barrier. No salmonids observed downstream or upstream at time of survey.
FishWayType	
FishWayStatus	
TrtNeeded	Yes
TrtRecom	Replace and remove.
Watershed	Russian
County	Sonoma
CalWatHR	North Coast
CalWatHU	RUSSIAN RIVER

CalWatHA	Lower Russian River
CalWatHSA	Guerneville
CalWatNo	111411
NHDCOMID	109396347
NHDComMeas	6.23902842123967
LLID	
BegFt	
Route	
PostMile	
DivOper	
DivMobile	
Updated	9/17/2020
Source	
WebLegend	Partial Barrier
Point_X	-123.093042431252
Point_Y	38.4555227158357
Photo	
Miles_Upst	

Confluence of Sheephouse Creek and Russian River

PAD_ID	732831
PassageID	28093

StreamName	Sheephouse Creek
TributaryT	Russian River
SiteName	Hwy 116 Bridge
SiteType	Road crossing
BarStatus	Not a barrier
Species	
Lifestage	
Direction	
SpBarStatus	
SpProtocol	
SpAssessedBy	
NumStructures	
Protocol	Field Survey
AssessedBy	California Department of Transportation
SurveyDate	12/7/2016
TrtStatus	
YrTreated	
TreatedBy	
StructOwner	California Department of Transportation
LandOwner	
Notes	15-ft wide bridge with continuous gravel and cobble sediment and unrestricted stream flow through

	the bridge before the stream joins the Russian River approximately 100 feet downstream of the small bridge. Previously surveyd by DWR on 4/8/2003 using the first-pass/reconnaissaince protocol and passage status listed as unknown passage status.
FishWayType	
FishWayStatus	
TrtNeeded	
TrtRecom	
Watershed	Russian
County	Sonoma
CalWatHR	North Coast
CalWatHU	RUSSIAN RIVER
CalWatHA	Lower Russian River
CalWatHSA	Guerneville
CalWatNo	111411
NHDCOMID	109396359
NHDComMeas	4.12323379021
LLID	
BegFt	
Route	116
PostMile	1.13
DivOper	

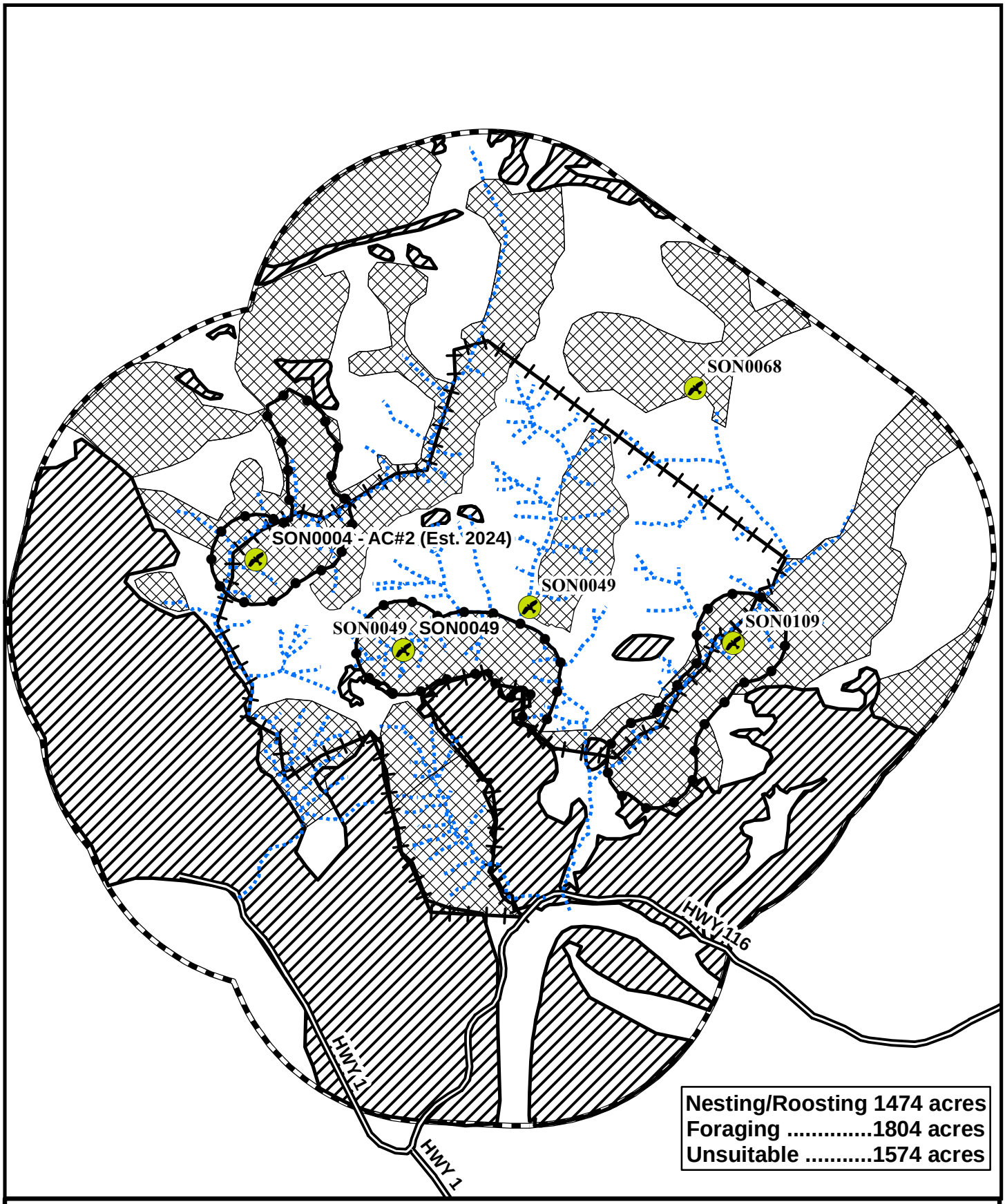
DivMobile	
Updated	4/17/2017
Source	Caltrans
WebLegend	Not a Barrier
Point_X	-123.094844796411
Point_Y	38.4494978106286
Photo	View
Miles_Upst	

Confluence of Sawmill Gulch and Russian River

PAD_ID	732830
PassageID	28092
StreamName	Sawmill Gulch
TributaryT	Russian River
SiteName	Culvert Hwy 116
SiteType	Road crossing
BarStatus	Total
Species	Unknown
Lifestage	All stages
Direction	Upstream
SpBarStatus	Total
SpProtocol	Professional Judgement
SpAssessedBy	California Department of Water Resources

NumStructures	
Protocol	Professional Judgement
AssessedBy	California Department of Transportation
SurveyDate	
TrtStatus	
YrTreated	
TreatedBy	
StructOwner	California Department of Transportation
LandOwner	
Notes	48 inch diameter corrugated steel pipe with a 3-foot drop from the downstream end of the culvert to the cobble bed that joins the Russian river ~40 feet downstream of culvert. This culvert is a fish passage barrier. At flood stage, the Russian River would over-top the culvert, eliminating the large drop. But at that point, the site would likely be a velocity barrier. Requires a detailed survey per the results of the first-pass (reconnaissance) survey.
FishWayType	
FishWayStatus	
TrtNeeded	
TrtRecom	

Watershed	Russian
County	Sonoma
CalWatHR	North Coast
CalWatHU	RUSSIAN RIVER
CalWatHA	Lower Russian River
CalWatHSA	Guerneville
CalWatNo	111411
NHDCOMID	109396357
NHDComMeas	6.3594224371
LLID	
BegFt	
Route	116
PostMile	1.03
DivOper	
DivMobile	
Updated	7/5/2017
Source	Caltrans
WebLegend	Total Barrier
Point_X	-123.095929738788
Point_Y	38.4494531842679
Photo	View
Miles_Upst	



N

1:36,000

0 3,000 Feet

NSO Pre Harvest Habitat
Berry's Knotfarm NTMP

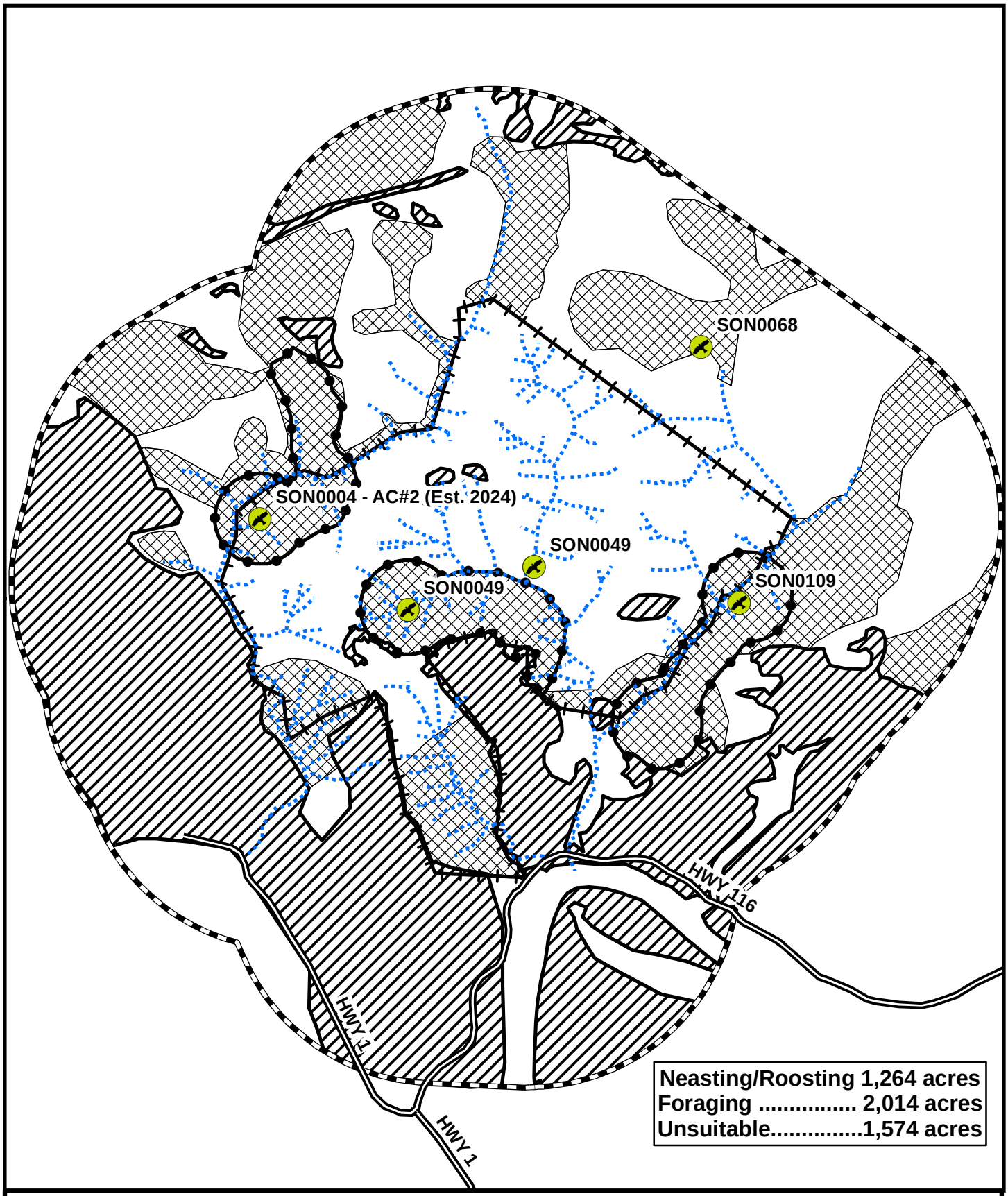
Portion of Muniz Rancho
Portions of Projected Sections 5,7,8,9,17,18
T7N, R 11W
MDB&M
Duncans Mills, CA Quadrangle

.7 mile radius
NTMP Boundary
Activity Center
AC Core Area

Nesting Roosting
Foraging
Unsuitable Habitat
Watercourses
Hwy

Environmental Resource Solutions, Inc.

12/4/2025



N

1:36,000

0 3,000 Feet

NSO Post-Harvest Habitat
Berry's Knotfarm NTMP

Portion of Muniz Rancho
Portions of Projected Sections 5,7,8,9,17,18
T7N, R 11W
MDB&M
Duncans Mills, CA Quadrangle

NTMP_Boundary
.7 Mile Radius
Activity Center
AC Core Area
Nesting Roosting
Foraging
Unsuitable
Watercourses
Highway

Environmental Resource Solutions, Inc.
446
October 23, 2025

Forest Ecosystem Management
1692 East Road * Deary, ID 83823
(406) 490-7427 * Pamtown30@gmail.com

June 19, 2025

Harlan Tramner, RPF 2850
Environmental Resource Solutions, Inc.
1221 Gravenstein Hwy South
Sebastopol, CA 95472
HTramner@eresourcesolutions.com

RE: Northern Spotted Owl Surveys for Berry's Knotfarm
1-25NTMP-00001 SON
Sec(s) 5, 7 – 9, 17 & 18 T07N, R11W MDB&M

Harlan,

I have completed Northern Spotted Owl surveys (Attachment #1) for the Berry's Knotfarm at 28201 Hwy 116 in Jenner, California. Per the request of CDFW, I am including the 2023, 2024, and 2025 survey data to revise/update the 09JUL24 survey information to address specific protocols and attachments used. In addition, I have included an explanation of how the core area acreages were developed.

Northern Spotted Owl Surveys (*CDFW Request – Disclose Specific Survey Protocol and Attachments*):
Northern Spotted Owl surveys adhered to USFWS Protocol for Surveying Proposed Management Activities that may Impact Northern Spotted Owls (USFWS 02FEB11 and revised 09JAN12) as well as following the USFWS Northern Spotted Owl Take Avoidance Analysis and Guidance for Private Lands in California – Scenario 4 (Avoidance of Disturbance and Direct Take through Habitat Retention) - Attachment A (Coast Redwood Region) (USFWS 15MAR11 and revised 01NOV19). As the ownership is a small portion of a much larger privately owned watershed, the survey stations (Attachment #2) were placed where they would effectively cover the NSO habitat within the property and the suitable habitat on adjacent private property, without trespassing (some stations occur along the property boundary to obtain this coverage).

As shown in the attached NSO Survey Forms, survey visits for the NTMP used 10-minute spot-calling, occurring between sunset and sunrise within the appropriate survey season for the coastal area (01MAR – 31JUL).

In addition to evening surveys, daytime surveys were completed using continuous walking and calling (broadcast calling) near accessible historic NSO Activity Centers. During the daytime surveys, the surveyor would look for owl sign (birds/wash/pellets/feathers).

As required by Protocol, survey visits were completed at least 7 calendar days apart, with at least 3 survey visits completed before 30JUN and at least 1 survey visit after 15MAY in 2023 and 2024. Spot Check Surveys (3 survey visits) occurred in 2025.

In all cases, a digital caller (Wildlife Technologies – Mighty Atom) was used to broadcast sounds. Calls included male NSO 4-note calls, female NSO 4-note calls, NSO begging calls (whistle), and NSO agitated calls (monkey call). Calls were varied between and during survey visits.

Before 2023, the property had an extensive survey history with surveys approved under now closed THPs and monitoring known northern spotted owls. Please note the following:

- The same 18 survey stations have been used since 2023 (Attachment #2), with some of the stations surveyed since 2016.
- Protocol Visits by Year:
    - 2016 = 6 survey visits on 8 stations (Barred Owls detected)
    - 2017 = 6 survey visits on 8 stations (Barred Owls detected)
    - 2018 = 3 survey visits on 8 stations (NSOs [SON049] and Barred Owls detected)
    - 2019 = 3 survey visits looking for NSO (Nesting NSO – SON0049)
    - 2020 = NSO Monitoring 3 survey visits (no NSO [SON049] or Barred Owls)
    - 2021 = NSO Monitoring 4 survey visits (no NSOs [SON049] or Barred Owls)
    - 2022 = NSO Monitoring on Random Stations (NSOs [SON109] and Barred Owls)
      For 1-25NTMP-00001 SON approval:
    - 2023 = 6 survey visits on 18 stations (NSOs [SON0004, SON109] and Barred Owls)
    - 2024 = 6 survey visits on 18 stations (NSOs [SON0004, SON109] and Barred Owls)
    - 2025 = 3 survey visits on 18 stations (NSOs [SON0004, SON109] and Barred Owls

Surveys are valid until the beginning of the next year's breeding season (01FEB). If timber harvest operations have not been completed by 01FEB26, a current year's survey must occur before the start of operations. For this Project, a minimum of three (3) survey visits (spot checks) would be required in 2026.

Northern Spotted Owl Territories: There are four known NSO territories (SON004, SON0049, SON068, and SON0109) within 0.7 miles of the NTMP Boundary (Attachment #3). Only 3 of these territories are within 0.7 miles of the proposed NTO 2025 (Attachment #4). Barred Owls have been detected near all 4 territories.

Due to the increased presence of barred owls within the range of the NSO, both the number of surveys and the number of required survey years were increased in 2010 to address reduced detectability of northern spotted owls. Specific to this NTMP, the surveyor remained at each station for the required 10 minutes, recording all owl species identified. The surveyor further examines the survey stations with a red light before leaving the station, to assure no silent owls have flown in.

As stated within the NTMP, to protect northern spotted owls, to the extent feasible for only owning a small portion of an NSO 0.7-mile assessment area; all known NSO territories within the 0.7-mile assessment area of the NTMP, regardless of occupancy status, will follow USFWS – Attachment A: Take Avoidance Analysis and protocol NSO surveys will be completed before timber harvest operations occur.

Core Area Establishment (*CDFW Request: Discuss if and how the core area acreages were developed*):
Once an activity center has been mapped, a 100-acre Core Use Area polygon should be identified that contains the highest-quality nesting/roosting habitat, contiguous with the activity center.

In 2024, I contacted Natural Resource Professionals with the Jenner Headlands Preserve (Wildlands Conservancy) to share survey data and discuss NSO Core Area establishments (Attachment #5). Core Areas were provided and accepted under an approved, now closed, THP. The following briefly describes the establishment of Core Areas using Northern Spotted Owl Take Avoidance Analysis and Guidance for California Coast Forest District (Attachment A) (USFWS 15MAR11 and revised 01NOV19).

SON0004 (Attachment #6): The Jenner Headlands Preserve reported responses within the historic Activity Center (AC) had declined significantly since 2022, and it appears the owls have moved further downstream to the Berry's Knotfarm property. The Core Area includes 117 acres going out 1,000' from the AC point (no nest site has been located, and the "point" is based upon where the owls were often located) and follows the watercourse toward the historic activity center within Jenner Headlands Preserve. This core area not only includes the better nesting/roosting habitat, but also provides a corridor for the owls between the 2 known activity centers.

SON0068 (Attachment #7): Jenner Headlands Preserve shared a nest location that had been successful 2 of the last 5 years (as of 2024). This territory has not been detected from survey stations for this project. A Core Area was not established for this territory as it would occur outside Berry's Knotfarm Property Boundary.

SON0049 (Attachment #8): The Activity Center and Core Area are located within the Berry's Knotfarm property (NTMP). This Core Area was established in 2021 under an approved, now closed, THP. The Core Area includes 107 acres going out 1,000' from 2021 owl detections, which includes both the 2018 and 2019 nest trees. The Core Area follows the watercourse and more suitable nesting/roosting habitat, towards the historic (2012 and before) NSO detections.

SON0109 (Attachment #9): This territory has 2 activity centers. In 2023, the non-nesting pair was located near station #8 on numerous occasions. In 2024, the pair was located both near station #8 and near the historic AC (by station #15), appearing to move up and down Sheephouse Creek. The Core Area includes 114 acres going out 1,000' from the historic AC (2002 nest site) and downstream AC (where they were detected numerous times), and includes the nesting/roosting habitat along Sheephouse Creek between the 2 activity centers. This core area not only includes the better nesting/roosting habitat, but also provides a corridor for the owls between the 2 known activity centers.

Within any Core Area of an NSO Activity Center:

- Outside the NSO breeding season (01AUG – 31JAN), limited timber operations (i.e. road use and maintenance, map point work, tail-hold placements, use of existing skid roads, and loading) may be conducted provided no trees > 11" DBH are cut or removed by the operations, and no new cable corridors, skid trails, or roads are constructed in the core use area.

- During the NSO breeding season (01FEB – 31JUL), timber operations (including use of roads before July 9) should not occur within any Core Use Area, except:
    a. For NSO activity centers where the current nesting status has been determined (to protocol) to be non-nesting or failed nesting, or when fledglings are greater than ¼ mile from the nest tree:
        i. Limited timber operations (road use and maintenance, map point work, use of existing skid trails, tail-hold placements and loading) may be conducted within any core use area of the activity center provided no trees > 11" dbh are cut or removed by the operations, and no new cable roads or corridors or skid roads or tails are created in the core use area.
    b. For NSO activity centers, where status has been determined to be nesting, nesting unknown, or nesting is presumed according to protocol:
        i. For activity centers where fledging status has not been determined, timber operations should be conducted only in approved areas that are > ¼ mile from the activity center until the end of the breeding season (31JUL).

Timber operations outside any Core Use Area, but within ¼ mile of an NSO Activity Center:

- Outside the breeding season (01AUG – 31JAN), timber operations may be conducted.
- During the breeding season (01FEB – 31JUL), timber operations should not proceed unless protocol surveys determine that nesting NSOs are not present or that nesting has failed.

For any NSO activity center, regardless of current nesting status:

- If NSO moves to a new location (> 1,000' from the activity center), the appropriate protection measures should be provided to each Activity Center, or consulting with NSO review agencies should occur.

Northern Spotted Owl Protection Measures Specific for 2025 Breeding Season – NTO 2025:

- NTO 2025 is 171 acres of selection timber harvest. A minimum of foraging NSO habitat will be maintained post-harvest.
- There are 3 NSO territories within 0.7 miles of the NTO 2025 (SON0004, SON0049 & SON0068 – Attachment #4).
- SON0068 (Attachment #7) – This territory is located further than ½ mile from NTO 2025. There are no additional seasonal or harvest restrictions proposed for this territory.
- SON0049 (Attachment #8) – No Northern Spotted Owls were detected within this territory in 2025. The Core Area is outside the NTO 2025 boundary; however, existing haul roads travel through the Core Area and are within ¼ mile of the Activity Center. In 2025, timber harvest operations are not expected to begin until after the breeding season (01FEB25 - 31JUL25), at which time existing roads can be used. It is not anticipated that any trees > 11" dbh will be cut along these roads.
- SON0004 (Attachment #6) – A pair of Northern Spotted Owls was detected in early March; however, continued monitoring was unable to detect any NSOs. The Core Area is outside the NTO 2025 boundary; however, existing haul roads travel through the Core Area and are within ¼ mile of the Activity Center. Selection timber harvest is expected to occur between the 1,000' and ¼ mile assessment area of the Activity Center, outside the Core Area. In 2025, timber

harvest operations are not expected to begin until after the breeding season (01FEB25 - 31JUL25), at which time timber harvest activities (and road use) can be used. It is not anticipated that any trees > 11" dbh will be cut along the haul roads.

If you need further assessment for this project, let me know.

Gone Hooting,

Pam Town

Pamela Town
Consulting Wildlife Biologist

Attachments:

Attachment #1: Northern Spotted Owl Surveys
Attachment #2: Map of Project Area and NSO Survey Stations
Attachment #3: NSO Database and Owls within 0.7 miles of NTMP Boundary
Attachment #4: Map of NSOs within 0.7 miles of NTO 2025
Attachment #5: Map of Core Areas for NTMP
Attachment #6: Map of Core Area for SON0004
Attachment #7: Map of SON0068
Attachment #8: Map of Core Area for SON0049
Attachment #9: Map of Core Area for SON0109

CALIFORNIA DEPARTMENT OF FISH AND GAME

SPOTTED OWL FIELD SURVEY

DFG TERRITORY NO. _____

GENERAL LOCATION Jenner Ca **REQUEST NUMBER** _____

PROPERTY NAME Willig Ranch **COUNTY** Sonoma

DATE @ START 3-16/*17*-23 **T** _____ **R** _____ **S** _____ **B&M** MD

OBSERVERS Matt Greene **SUNRISE/SUNSET** 19:21

START TIME (2400 Clock) 21:40/20:33 **END TIME** 3:36/00:37 **TOTAL TIME** 6 hr 13 min/3 hr 24 min

WEATHER: [clear] cloudy mist/fog light/rain heavy/rain snow (outline one) **WIND :** [calm] breeze mod/wind strong/wind (outline one)

TIME 2400 Clock	LOCATION	PLOT #	CALLING METHOD Leap Frog=LF Point=P Cruise=C	SPECIES/ SEX VOCAL =V OBSV =O	RESPONSE (Yes/No)	COMMENTS (legal location of owl(s), compass & distance to owl(s) from observer's location, misc. owl info., other observations, or change in weather/wind)
21:40	CL2 Tributary of Sheephouse Creek	15	P	NA	No	BAOW Responded from SW to me. Silent during NSO calling. Fired up immediately when BAOW calling started.
			P	NA	No	Checked mill pond for CRLF, none seen.
22:50	NE Landing	14	P	NA	No	Dog, creek, frogs
23:35	Three-way intersection	13	P	NA	No	River
00:03	Northern Property Line	4	P	NA	No	Slight breeze begins to pick up, jet
1:38	West/East Willig Gulch Junction	6	P	NA	No	Creek very loud, jet
1:57	Willig Gulch	7	P	NA	No	Creek
2:14	Corporation Yard	8	P	NA	No	Creek, BAOW, ESE ~ 1,000 ft
2:33	Lower Sawmill Gulch	17	P	NA	No	GHOW, creek
3:15	Upper Sawmill Gulch	16	P	NA	No	BAOW still audible from Station 8
3:36	Sawmill Gulch and 116	18	P	NA	No	GHOW N
20:33	Lower Zigadene Landing	1	P	NA	No	Screech owl, W
21:30	Saddle Junction	2	P	NA	No	Ocean
22:09	East Willig Gulch	3	P	NA	No	BAOW in Jenner Gulch near bottom, began calling during BAOW call session.
22:28	Top of Zigadene Road	5	P	NA	No	Crickets, jet

23:16	Jenner Gulch washout area	9	P	V/O	NSO	Ocean very loud, NSO heard, couldn't tell direction. Called once and then stopped.
00:03	Jenner Gulch	10	P	NA	No	Creek, BAOW NW ~ 500 feet
00:37	Jenner Gulch end landing	11	P	NA	No	Creek

Note: this survey was broken up over two nights to deal with the massive amount of deadfall across the roads.

11:14	Jenner Gulch Washout area	9	P	NA	No	Creek, no sign of bird heard night before. Called for 30 min. Searched for an hour in rough location for any sign. No white wash or pellets observed.

CALIFORNIA DEPARTMENT OF FISH AND GAME

SPOTTED OWL FIELD SURVEY

DFG TERRITORY NO. _____

GENERAL LOCATION Willig Gulch – Jenner, CA **REQUEST NUMBER** _____

PROPERTY NAME Willig Ranch – Berry Family **COUNTY** Sonoma

DATE @ START 3-24-23 **T** 7N **R** 11W **S** 7, 8, & 17 **B&M** MD

OBSERVERS Matt Greene **SUNRISE/SUNSET** 19:28

START TIME (2400 Clock) 19:48 **END TIME** 23:00 **TOTAL TIME** 3 hr 12 min

WEATHER: clear [cloudy] mist/fog [light/rain] [heavy/rain] snow (outline one)

WIND : [calm] breeze mod/wind strong/wind (outline one)

TIME 2400 Clock	LOCATION	PLOT #	CALLING METHOD Leap Frog=LF Point=P Cruise=C	SPECIES/ SEX VOCAL =V OBSV =O	RESPONSE (Yes/No)	COMMENTS (legal location of owl(s), compass & distance to owl(s) from observer's location, misc. owl info., other observations, or change in weather/wind)
19:48	Creek Crossing adjacent to old AC Activity Center	6	P	NA	NA	Creek running below
20:12	Landing adjacent to 2018 Activity Center	1	P	V	Y	creek
21:20	Saddle	2	P	V	Y	Bird, probable male calling approximately 2,000 feet NW towards station 9/10. Called once and stopped calling. Couldn't get another response.
21:44	Jenner Gulch washout area	9	P	NA	NA	Ocean, creek
22:20	Jenner Gulch	10	P	V	Y	Male NSO heard calling 200 feet north of station 9 after 10 min of calling over the sound of my atv. Stopped and tried to get a response, but none to be heard. Never responded again. Waited and tried for 40 minutes, but rain started.
23:00						Rain started to fall heavy, so end of survey effort.
						Daytime follow-up not possible the next day due to rain. Next day that survey was possible was 3-26-23

CALIFORNIA DEPARTMENT OF FISH AND GAME

SPOTTED OWL FIELD SURVEY

DFG TERRITORY NO. _____

GENERAL LOCATION Willig Gulch – Jenner, CA **REQUEST NUMBER** _____

PROPERTY NAME Willig Ranch – Berry Family **COUNTY** Sonoma

DATE @ START 3-26/27-23 **T** 7N **R** 11W **S** 7, 8, &17 **B&M** MD

OBSERVERS Matt Greene **SUNRISE/SUNSET** 19:29

START TIME (2400 Clock) 21:36 **END TIME** 4:43 **TOTAL TIME** 7 hr 7 min

WEATHER: [clear] cloudy mist/fog light/rain heavy/rain snow (outline one) **WIND :** calm [breeze] mod/wind strong/wind (outline one)

TIME 2400 Clock	LOCATION	PLOT #	CALLING METHOD Leap Frog=LF Point=P Cruise=C	SPECIES/ SEX VOCAL =V OBSV =O	RESPONSE (Yes/No)	COMMENTS (legal location of owl(s), compass & distance to owl(s) from observer's location, misc. owl info., other observations, or change in weather/wind)
21:36	Corporation Yard	8	P	NA	No	Creek
21:55	Willig Gulch	7	P	NA	No	Creek
22:12	East Willig Gulch	12	P	NA	No	Creek
22:32	Holly-leaf intersection	5	P	NA	No	Dogs and jets
23:10	Top of Jenner Gluch	3	P	NA	No	All quiet
23:52	Jenner Gulch washout area	9	P	V	Yes	Male NSO responded from upslope ~ 100 yards NE. Called for about 5 min and then left upslope and north
24:11	Jenner Gulch	10				Skipped for proximity to detected NSO
24:40	Jenner Gulch end landing	11	P	NA	No	Creek very loud
1:24	CL2 Tributary of Sheephouse Creek	15	P	NA	No	Creek very loud, frogs
1:48	NE Landing	14	P	V	BAOW	BAOW responded very rapidly from east. Called for about 5min and left.
2:12	Three-way intersection	13	P	V	BAOW	Dogs, BAOW again.
2:44	Northern Property Line	4	P	NA	No	Wind picking up a bit on top.
3:25	Upper Sawmill Gulch	16	P	NA	No	Frogs, crickets, creek
3:48	Lower Sawmill Gulch	17	P	NA	No	GHOW heard south, screech owl west
4:27	Sawmill Gulch and 116	18	P	NA	No	Cars, dogs

CALIFORNIA DEPARTMENT OF FISH AND GAME

SPOTTED OWL FIELD SURVEY

DFG TERRITORY NO. _____

GENERAL LOCATION Willig Gulch – Jenner, CA **REQUEST NUMBER** _____

PROPERTY NAME Willig Ranch – Berry Family **COUNTY** Sonoma

DATE @ START 4-10-23 **T** 7N **R** 11W **S** 7, 8, & 17 **B&M** MD

OBSERVERS Matt Greene **SUNRISE/SUNSET** 19:54

START TIME (2400 Clock) 19:20 **END TIME** 20:33 **TOTAL TIME** 1 hr 13 min

WEATHER: [clear] cloudy mist/fog light/rain heavy/rain snow (outline one) **WIND :** [calm] breeze mod/wind strong/wind (outline one)

TIME 2400 Clock	LOCATION	PLOT #	CALLING METHOD Leap Frog=LF Point=P Cruise=C	SPECIES/ SEX VOCAL =V OBSV =O	RESPONSE (Yes/No)	COMMENTS (legal location of owl(s), compass & distance to owl(s) from observer's location, misc. owl info., other observations, or change in weather/wind)
7:20	Jenner Gulch	9	P	V/O	Yes	GHOW pair heard calling to the SW of the station.
						7:28 male NSO flew in from E silently. Began calling ~ 7:33. Female began contact calling approximately ~300 feet upslope at 7:47. 7:49 female joined male at my location. I observed them sitting on the same limb until it became too dark to see ~ 8:33. No sign of nesting activities yet.
						Too early in the season to mouse. No need for daytime follow-up as birds were observed during daylight.

CALIFORNIA DEPARTMENT OF FISH AND GAME

SPOTTED OWL FIELD SURVEY

DFG TERRITORY NO. _____

GENERAL LOCATION Willig Gulch – Jenner, CA **REQUEST NUMBER** _____

PROPERTY NAME Willig Ranch – Berry Family **COUNTY** Sonoma

DATE @ START 4-19-23 **T** 7N **R** 11W **S** 7, 8, & 17 **B&M** MD

OBSERVERS Matt Greene, *Mark Ogren*, Cal Fire Rep. **SUNRISE/SUNSET** 19:53

START TIME (2400 Clock) 12:14 **END TIME** 21:17 **TOTAL TIME** 8 hr 28 min

WEATHER: (outline one) clear cloudy **[mist/fog]** light/rain heavy/rain snow **WIND :** (outline one) calm **[breeze]** mod/wind strong/wind

TIME 2400 Clock	LOCATION	PLOT #	CALLING METHOD Leap Frog=LF Point=P Cruise=C	SPECIES/ SEX VOCAL =V OBSV =O	RESPONSE (Yes/No)	COMMENTS (legal location of owl(s), compass & distance to owl(s) from observer's location, misc. owl info., other observations, or change in weather/wind)
12:14	Jenner Gulch washout area	9	C	NA	No	Was onsite to do a preconsultation of the NTMP with Cal Fire Biologist. Decide to go to the location and do another daytime follow-up with Biologist in person.
						We walked a significant area between survey stations 2, 3, 9 and 10. No response from any birds. Ended stand search at 15:40
17:30	Highway 116	18	P	NA	No	Frogs, turkey, cars, Canadian geese, GHOW N ~ 200 feet.
17:50	Corp yard	8	P	V	BAOW	BAOW calling at the station as I got out of vehicle. NNE 300 yards. Called for NSO for 10 minutes to see if they were around, no response.
18:12	Lower Sawmill Gulch	17	P	V	BAOW	BAOW still very vocal and audible at this location. Called 10 min of NSO and moved to 16.
18:33	Upper Sawmill Gulch	16	P	V	BAOW	Ocean, BAOW heard at 8.
18:59	Willig Gulch	7	P			Skipped 7 due to BAOW presence at 8. Still audible from 7.
19:08	Creek Crossing adjacent to old AC Activity Center	6	P	NA	No	Creek, WSOW heard calling NW ~ 300 feet. mosquitoes.
20:22	Jenner Gulch washout area	9	P	V/O	MF/NSO	Male NSO heard calling NE towards station 10 where MO was located. Started walking in that direction. Male and female observed sitting midslope between 9 and 10. Watched for ~ 30 min. Preening and sitting, observed.
		11	P	NA	No	Skipped as that would have been the next station in order.
21:02	Saddle Junction	2	P	NA	No	Ocean, frogs, fog

1721	*Sheephouse Creek*	*15*	*P*	*NA*	*No*	*Light cloud cover. Strong creek flow.*
1742	*Midslope Sheephouse Landing*	*14*	*P*	*NA*	*No*	*Cloud cover clearing up.*
1801	*Sheephouse/East Willig Dividing Ridge*	*13*	*P*	*NA*	*No*	*Light and variable breeze. Highway noise.*
1824	East Willig Gulch	*12*	*P*	*NA*	*No*	*Creek*
1858	*Ridge road/NE Property line*	*4*	*P*	*BAOW V*	*Yes*	*Clear and calm. BAOW pair downslope to S, in vicinity of Station 12. Approximately 0.25mile away.*
1934	*Holly leaf intersection*	*5*	*P*	*NA*	*No*	*Quiet*
1958	*Lower Zigadene Landing*	*1*	*P*	*NA*	*No*	*Quiet*
10:20	*Zigadene Saddle*	*3*	*P*	*BAOW V*	*Yes*	*BAOW calling from ridge to NE, approximately 0.25mile away, calling to second BAOW to east in vicinity of Station 12.*
11:38-2:38	Next day follow-up	10	P	V/O	M/F NSO	Observed this pair for almost 3 hours sitting and preening approximately 200 feet upslope of station 10. No sign of a nest. Will follow-up with them in a few days.

CALIFORNIA DEPARTMENT OF FISH AND GAME

SPOTTED OWL FIELD SURVEY

DFG TERRITORY NO. _____

GENERAL LOCATION Willig Ranch – Jenner, CA **REQUEST NUMBER** _____

PROPERTY NAME Willig Ranch – Berry Family **COUNTY** Sonoma

DATE @ START 5/16-17/23 **T** 7N **R** 11W **S** 7, 8, and 17 **B&M** MD

OBSERVERS Matt Greene **SUNRISE/SUNSET** 20:18

START TIME (2400 Clock) 20:58 **END TIME** 3:26 **TOTAL TIME** 6 hr 42 min

WEATHER: (outline one) clear cloudy **[mist/fog]** light/rain heavy/rain snow **WIND :** (outline one) **[calm]** breeze mod/wind strong/wind

TIME 2400 Clock	LOCATION	PLOT #	CALLING METHOD Leap Frog=LF Point=P Cruise=C	SPECIES/ SEX VOCAL =V OBSV =O	RESPONSE (Yes/No)	COMMENTS (legal location of owl(s), compass & distance to owl(s) from observer's location, misc. owl info., other observations, or change in weather/wind)
20:58	Corp yard	8	P	V	F/NSO	Female NSO heard calling approximately 1,500 feet ENE on neighbors with one contact call at 21:12. Male NSO flew into barn and just sat for 10 min then flew off to the east. Female came to within about 1,000 feet, but no further.
	Willig Gulch	7	P	NA	No	Skipped due to proximity to NSO
21:20	Landing adjacent to 2018 Activity Center	1	P	NA	No	creek
21:42	Saddle Junction	2	P	NA	No	Ocean, frogs, heavy fog
21:58	Top of Jenner Gulch	3	P	V	F/NSO	Female NSO Contact call between 1,500 & 1,800 feet N towards station 10. Also heard BAOW in Jenner Gulch. No male heard.
22:14	Jenner Gulch washout area	9	P	V/O	MF/NSO	Stopped to listen hear and heard them further towards 10, so moved in that direction.
22:18	Jenner Gulch	10	P	V/O	MF/NSO	Female NSO heard upslope ~ 800 feet. Male just above station, BAOW right next to station very agitated. Follow-up tomorrow with mouse when BAOW is not present.
22:39	Jenner Gulch end landing	11	P	NA	No	Skipped
23:17	*Holly leaf intersection*	5	P	NA	No	BAOW heard calling NW in Jenner Gulch
23:35	*Ridge road/NE Property line*	4	P	NA	No	Dogs barking
24:09	East Willig Gulch	12	P	NA	No	Creek, mosquitoes, frogs
24:38	Creek Crossing adjacent to old AC Activity Center	6	P	NA	No	Jet, creek

1:10	*Sheephouse Creek*	15	P	NA	No	
1:42	*Midslope Sheephouse Landing*	14	P	NA	No	dogs
2:03	*Sheephouse/East Willig Dividing Ridge*	13	P	V	BAOW	BAOW calling S across Sheephouse.
2:35	Lower Sawmill Gulch	17	P	NA	No	Cows, frogs.
2:53	Upper Sawmill Gulch	16	P	NA	No	Creek and frogs
3:11	Highway 116	18	P	NA	No	GHOW N 200 feet.
13:12	Corp yard	8	P	V	F/NSO	Daytime Follow-up Male NSO heard calling upslope from roughly same location as night before. Wouldn't come in. BAOW also calling. Proceeded towards the audio detection and found the male sitting by itself. No sign of female. Decided to just watch for 2 hr 3min. No nesting and no sign of male. Inconclusive.
16:36	Jenner Gulch	10	C	V/O	F/NSO	Daytime Follow-up Found Female NSO 16:36 ~200 feet upslope of station 10. Put out first mouse at 16:50. • Mouse 1 consumed at 16:54 • Mouse 2 consumed at 17:11 • Mouse 3 consumed at 17:52 • Mouse 4 consumed at 18:01 • Mouse 5 taken at 18:07 and dropped on the stump below. • Mouse 6 refused. No sign or sound of male.

CALIFORNIA DEPARTMENT OF FISH AND GAME

SPOTTED OWL FIELD SURVEY

DFG TERRITORY NO. _____

GENERAL LOCATION Jenner CA **REQUEST NUMBER**

PROPERTY NAME Willig Ranch **COUNTY** Sonoma

DATE @ START 5-22-23 **T** **R** **S**

OBSERVERS Matt Greene **SUNRISE/SUNSET**

START TIME (2400 Clock) 13:42 **END TIME** 19:30 **TOTAL TIME**

WEATHER: [clear] cloudy mist/fog light/rain heavy/rain snow (outline one) **WIND :** [calm] breeze (outline one)

TIME 2400 Clock	LOCATION	PLOT #	CALLING METHOD Leap Frog=LF Point=P Cruise=C	SPECIES/ SEX VOCAL =V OBSV =O	RESPONSE (Yes/No)	COMMENTS (legal location of owl(s), compass & distance to owl(s) from observer's location, misc. owl info., other observations, or change in weather/wind)
13:42	Corp Yard/Riccolii Ranch	8	C	V/O	Male/female NSO	14:05 found male NSO. 14:12 male NSO came in close enough to mouse. • Mouse 1 taken 14:12 • Mouse 2 taken at 14:30 • Mouse 3 taken at 15:33 • Mouse 4 taken at 16:15 • Mouse 5 refused • Mouse 6 refused Female approached at 15:48. Would not mouse, just sat and watched. After mouse refusals, I observed them sitting in different trees for ~ 3 hours about 20 yards apart. Both stayed in eyesight. No sign of brood pouch and no nesting activities observed.

CALIFORNIA DEPARTMENT OF FISH AND GAME

SPOTTED OWL FIELD SURVEY

DFG TERRITORY NO. _____

GENERAL LOCATION Jenner Ca **REQUEST NUMBER** _____

PROPERTY NAME Willig Ranch **COUNTY** Sonoma

DATE @ START 6-22-23 **T** _____ **R** _____ **S** _____ **B&M** MD

OBSERVERS Matt Greene **SUNRISE/SUNSET** 20:41

START TIME (2400 Clock) 21:20 **END TIME** 3:22 **TOTAL TIME** 6 hr 2 min

WEATHER: (outline one) clear cloudy **mist/fog** light/rain heavy/rain snow **WIND :** (outline one) **calm** breeze mod/wind strong/wind

TIME 2400 Clock	LOCATION	PLOT #	CALLING METHOD Leap Frog=LF Point=P Cruise=C	SPECIES/ SEX VOCAL =V OBSV =O	RESPONSE (Yes/No)	COMMENTS (legal location of owl(s), compass & distance to owl(s) from observer's location, misc. owl info., other observations, or change in weather/wind)
21:20	Corp Yard	8	P	NA	No	Creek, cars, jet, no owls.
21:38	Creek Crossing adjacent to old AC Activity Center	6	P	NA	No	creek
22:13	*Holly leaf intersection*	5	P	V	BAOW	BAOW heard calling NE of station 5 ~ 100 yards
22:51	*Ridge road/NE Property line*	4	P	NA	No	Dogs, cars
	Top of Jenner Gulch	3	P	NA	No	Skipped due to proximity to BAOW.
23:15	Jenner Gulch washout area	9	P	NA	No	Ocean, cars, dogs
23:33	Jenner Gulch	10	P	NA	No	Creek, very quiet!
23:58	Jenner Gulch end landing	11	P	NA	No	Creek
24:25	Saddle Junction	2	P	NA	No	Cars, ocean
24:43	Landing adjacent to 2018 Activity Center	1	P	NA	No	Very quiet
1:05	Willig Gulch	7	P	NA	No	11:05 hear Male NSO SSE towards Station 8, proceeded down to 8 and found male calling above barn and female east approximately 1,000 feet upslope from station.
	Sheephouse Creek	15	P	NA	No	Skipped due to proximity of owls at 8.
1:41	*Midslope Sheephouse Landing*	14	P	V/O	BAOW	BAOW came in from east, very aggressively. Came in and called immediately.
	Sheephouse/East Willig Dividing Ridge	13	P	NA	No	Skipped due to proximity of owls at 8 and BAOW at 14.

2:02	East Willig Gulch	12	P	NA	No	Mosquitoes
2:26	Upper Sawmill Gulch	16	P	NA	No	Cars, crickets
2:43	Lower Sawmill Gulch	17	P	NA	No	Cows
3:07	Highway 116	18	P	NA	No	Car, river
12:28	Corp Yard	8	P	NA	No	Daytime follow-up, called for 25 min at station and got no response. End of follow-up

CALIFORNIA DEPARTMENT OF FISH AND GAME

SPOTTED OWL FIELD SURVEY

DFG TERRITORY NO. _____

GENERAL LOCATION Willig Gulch – Jenner, CA **REQUEST NUMBER** _____

PROPERTY NAME Willig Ranch – Berry Family **COUNTY** Sonoma

DATE @ START July 13, 2022 **T** 7N **R** 11W **S** 7, 8, &17 **B&M** MD

OBSERVERS Mark Ogren Date Error: S/B July 13, 2023 **SUNRISE/SUNSET** 0601/2037

START TIME (2400 Clock) 2036 **END TIME** July 14 - 0232 **TOTAL TIME** 5 hr 55 min

WEATHER: (outline one) [clear] cloudy mist/fog light/rain heavy/rain snow **WIND :** (outline one) [calm] breeze mod/wind strong/wind

TIME 2400 Clock	LOCATION	PLOT #	CALLING METHOD Leap Frog=LF Point=P Cruise=C	SPECIES/ SEX VOCAL =V OBSV =O	RESPONSE (Yes/No)	COMMENTS (legal location of owl(s), compass & distance to owl(s) from observer's location, misc. owl info., other observations, or change in weather/wind)
2036	Sawmill Gulch Landing	17	P	NA	No	Creek flowing
2101	Sawmill Gulch road	16	P	NA	No	Crickets, Ocean
2123	Saddle Junction	2	P	NA	No	Ocean
2151	Jenner Gulch Landing	11	P	NSO (F) V	Yes	Creek. NSO female began whistling within 2 minutes of calling. Calls were steady every 10 seconds or so.
2207	Jenner Gulch 2	10	P	NA	No	Creek.
2227	Jenner Gulch 1	9	P	NA	No	Ocean, Highway, screech owl across the gulch
2249	Zigadene Saddle	3	P	NA	No	Ocean
2308	Holly leaf intersection	5	P	NSO V	No	Crickets. NSO female whistle from the North near Station 11.
2326	Lower Zigadene Landing	1	P	NA	No	Quiet
2346	West/East Willig Gulch Junction	6	P	NA	No	Quiet
0006	Willig Gulch	7	P	NA	No	Creek.
0021	Corporation Yard	8	P	NA	No	Quiet
0041	East Willig Gulch	12	P	NA	No	Quiet
0111	Ridge Road/NE Property Line	4	P	NA	No	Ocean
0132	Sheephouse/East Willig Dividing Ridge	13	P	NA	No	Ocean

0151	Midslope Sheephouse Landing	14	P	NA	No	BAOW whistle from NE after 5 minutes of calling. NSO four-note call at least 0.50mile away to S after 8 minutes of calling, did not come any closer. Two BAOW responded after 9 minutes of calling – NSO continued to respond from far off.
0217	HWY 116	18	P	NA	No	cars on highway
11:56	End of Jenner Gulch	11	P	V/O	F/NSO	Observed female NSO sitting for 2:32 min. No sign of nest or of male.

NORTHERN SPOTTED OWL SURVEY FORM
2024 Breeding Season

Project/General Location: Willig Ranch – Jenner, CA Visit #: 1 Date: 16MAR24
Legal: T7N, R11W, Sec(s): 5, 7, 8, 9, 17, 18 MDB&M (Muniz Rancho) County: Sonoma
NSO Detection: Yes **Barred Owl Detection**: Yes
Surveyor: Pam Town Sunset: 1922
Survey Type: Daytime Access/Station Location & Nocturnal 10-minute Point
Weather Description (cloud/wind): Partly Cloudy with a light breeze – cool air temp
Due to roads – some stations were shifted slightly but as close to original station as possible

Station #	Survey Time	Owl Response	Comments
Daytime:			
Property	1400 – 1600		Worked on checking roads for dirt bike access and location of stations. When stopped, would broadcast NSO calls, particularly around known historic NSO detections. Did detect NSOs at SON0004 (New AC in Jenner Gulch) and SON0109 (Sheephouse Creek). Too early in season to mouse and as detected during daytime – no additional follow-up required. Other species: STJA, TUVU, CORA, RTHA, CAQU, WITU, DEJU, AMRO, UNWO, PSFL, PAWR, and deer
Near STA #9		B – NSO (M)	SON0004 (AC#2) - when stopped to clear road, a male NSO responded and flew to surveyor. Very vocal
North STA #8		V – NSO (?)	SON0109 – when stopped to clear road, an unknown sex NSO responded. Heard lots of mobbing STJAs and then NSO hooted twice before going quiet (STJAs continued to mob).
Point:			
18	2320 - 2330	N/R	Highway 116 & River
8	2345 – 2355	N/R	
17	0014 – 0024	V – GHOW	Pair of Great-Horned Owls
16	0035 – 0045	N/R	Frogs
2	0052 – 0102	N/R	Ocean Waves
1	0107 – 0117	N/R	
3	0130 – 0140	N/R	
5	0150 – 0200	N/R	
9	Skipped		Skipped Station as observed male NSO earlier in day.
10	0215 – 0225	V – NSO Pair	SON004 – AC#2 - Pair of NSOs were vocal. Not far from where male was detected earlier in day.
11	0245 – 0255	V - Barred	Water noise, near end of 10 minutes Barred Owl becomes vocal and flies closer to surveyor
6	0310 – 0320	N/R	
12	0326 – 0336	N/R	Water noise
13	0345 – 0355	N/R	
4	0410 – 0420	N/R	Really Quiet
7	0430 – 0440	N/R	
15	0458 – 0508	N/R	Creek
14	0520 – 0530	N/R	Dog barking, frogs

Owl Response: N/R = No Response from NSO, V = Vocal Response, O = Observed NSO, B = Both Vocal and Observed, BAR = Barred Owl

NORTHERN SPOTTED OWL SURVEY FORM
2024 Breeding Season

Project/General Location: Willig Ranch – Jenner, CA Visit #: 2 Date: 21APR24
T7N, R11W, Sec(s): 5, 7, 8, 9, 17, 18 MDB&M (Muniz Rancho) County: Sonoma
NSO Detection: Yes **Barred Owl Detection**: Yes
Surveyor: Pam Town Sunset: 1957
Survey Type: Activity Center Stand (ACS) Search & Nocturnal 10-minute Point
Weather Description (cloud/wind): Clear and Calm
Due to roads – some stations were shifted slightly but as close to original station as possible

Station #	Survey Time	Owl Response	Comments
ACS SON0109: 8	1530 – 1700	O – Unk Sex NSO	Start near STA #8 broadcasting and walking road following Sheephouse Creek. At 1537 hours, STJAs were heard mobbing something as they moved closer to me. Cross creek and find the NSO the STJAs are mobbing. Positive ID of NSO and not Barred. Tried mousing but STJAs are relentless in their mobbing and NSO ignored mouse. Stayed with NSO for 1 hour - owl appeared to fall asleep once the STJAs finally left. Other Species: RTHA in opening by barn, DEJU, PAWR, CBCH, TRSW, Blackbirds, and lots of STJAs. SON109 – AC#2
ACS SON0004 New AC: 9 & 10	1730 – 1900	B – Pair NSO Probable Non-Nesting	Start near STA #9 and broadcast and walking road toward STA #10. Vocal response from pair up slope. Received visual on male and moused. Mouse #1 = male took and ate Mouse #2 = male watched – mouse escaped Mouse #3 = male took and held Stayed with male for 1 ½ hours and never saw the female. Heard her a few times but was unable to locate her in the canopy before she went quiet. Other Species: CBCH, PSFL, PAWR, and CORA SON004 – AC#2
9	Skip		Moused SON004 – AC#2 (pair)
10	Skip		Moused SON004 – AC#2 (pair)
3	Skip		Moused SON004 – AC#2 (pair)
11	1945 – 2010	N/R	
2	2025 – 2035	N/R	Ocean and frogs
5	2100 – 2110	V – BARRED	Vocal barred owl to the East
1	2130 – 2140	N/R	
16	2154 – 2204	N/R	Frogs, Fox crossed road
17	2215 – 2225	V – GHOW	Single Great Horned Owl
8	Skip		With SON0109 earlier in day

7	2245 – 2255	N/R	Barred Owl heard down near Sheephouse Creek
6	2306 – 2316	N/R	
12	2324 – 2334	N/R	
13	2345 – 2355	N/R	
14	0002 – 0014	B – BARRED	Silent owl flew to surveyor. After 10 minutes, played Barred Owl calls and got an immediate Barred Owl response.
15	0026 – 0036	N/R	
4	0055 – 0105	N/R	
8	While Loading	V – BARRED	While loading for departure, a Barred Owl began vocalizing over by Sheephouse Creek.
18	0135 - 0145	V – GHOW	Great Horned Owl in opening

Owl Response: N/R = No Response from NSO, V = Vocal Response, O = Observed NSO, B = Both Vocal and Observed, BAR = Barred Owl

NORTHERN SPOTTED OWL SURVEY FORM
2024 Breeding Season

Project/General Location: Willig Ranch – Jenner, CA Visit #: 3 Date: 08MAY24
T7N, R11W, Sec(s): 5, 7, 8, 9, 17, 18 MDB&M (Muniz Rancho) County: Sonoma
NSO Detection: Yes **Barred Owl Detection**: Yes
Surveyor: Pam Town Sunset: 2014
Survey Type: Nocturnal 10-minute Point
Weather Description (cloud/wind): Partly cloudy and light breeze
Due to roads – some stations were shifted slightly but as close to original station as possible

Station #	Survey Time	Owl Response	Comments
18	2015 – 2025	N/R	Car
8	2050 – 2100	N/R	Quiet
6	2108 – 2118	N/R	
5	2133 – 2143	N/R	
4	2200 – 2210	N/R	Dogs Barking in distance
9	Skip		Known Pair SON004 – AC#2
10	Skip		Known Pair SON004 – AC#2
3	Skip		Known Pair SON004 – AC#2
11	2236 – 2246	N/R	
2	2310 – 2320	N/R	
1	2330 – 2345	V – Male NSO	At 2340 a male NSO responded. Stayed for 5 more minutes to see if anything else would talk. SON0049?
16	0000 – 0010	N/R	Deer
17	0015 – 0025	N/R	Cars and cows
7	0049 – 0100	V – BARRED	Very vocal barred owl by Sheephouse Creek
12	0115 – 0125	N/R	
13	0136 – 0146	N/R	Crickets
14	0154 – 0204	V – BARRED	Almost immediate vocal from barred owl
15	0213 – 0223	V – BARRED	Barred owl downstream along the creek
8	Loading	V-BARRED	Barred owl along Sheephouse Creek – Vocal without any broadcast calling from surveyor
			Pretty Quiet Evening

Owl Response: N/R = No Response from NSO, V = Vocal Response, O = Observed NSO, B = Both Vocal and Observed, BAR = Barred Owl

NORTHERN SPOTTED OWL SURVEY FORM
2024 Breeding Season

Project/General Location: Willig Ranch – Jenner, CA Visit #: 3A Date: 09MAY24
T7N, R11W, Sec(s): 5, 7, 8, 9, 17, 18 MDB&M (Muniz Rancho) County: Sonoma
NSO Detection: No **Barred Owl Detection**: No
Surveyor: Pam Town Sunset: 2014
Survey Type: Daytime Follow-up
Weather Description (cloud/wind): Clear, breeze, and hot

Station #	Survey Time	Owl Response	Comments
ACS SON0049: 1	1000 - 1200	N/R	Start near STA #1 where obtained NSO response on previous evening. Broadcasting and walking around 2018 core area and toward STA #6 (historic AC). When N/R, went to STA #3 and broadcasted around there. Left as the area getting hotter and winds picking up. Other Species: DEJU, PAWR, STJA, CORA, TUVU, and AMRO. SON0049

NORTHERN SPOTTED OWL SURVEY FORM
2024 Breeding Season

Project/General Location: Willig Ranch – Jenner, CA Visit #: 4 Date: 15MAY24
T7N, R11W, Sec(s): 5, 7, 8, 9, 17, 18 MDB&M (Muniz Rancho) County: Sonoma
NSO Detection: Yes **Barred Owl Detection**: Yes
Surveyor: Pam Town Sunset: 2020
Survey Type: Activity Center Stand (ACS) Search & Nocturnal 10-minute Point
Weather Description (cloud/wind): High fog in some areas, clear in other & light breeze
Due to roads – some stations were shifted slightly but as close to original station as possible

Station #	Survey Time	Owl Response	Comments
Front Gate HWY116			Great Blue Heron close to first house. Heron flew across road into field where it continued to forage.
ACS SON0109: 8 & 15	1100 - 1330	B – Pair NSO Probable Non-Nesting	Start near STA #8 broadcasting and walking road following Sheephouse Creek. At 1145 vocal pair of NSOs within AC#1 (near STA #15). The female NSO didn't sound quite right. She sounded like a NSO, but 4-note hoot always added a 5th hoot to the end. Found both owls. Mouse #1 = was taken by female and she ate. All other mice were dead – so could not use. Stayed with female for 1 hour with no young or nest observed. Other Species: STJA, DEJU, CBCH, CAQU, CORA, AMRO, WREN, PAWR, MODO, and TRSW
ACS SON0004 AC#2: 9 & 10	1400 - 1600	B – Pair NSO Probable Non-Nesting	Start near STA #9 and broadcast and walk road toward STA #10. Vocal response from pair up slope and located both birds. No mice, but stayed with owls for over 1 hour with no young or nest observed. . Other Species: CBCH, PSFL, PAWR, and STJA
ACS SON0049: 1	1630 - 1730	N/R	Start near STA #1 and broadcast and walk around area where NSO was detected on 08MAY24 and toward STA #6. Still N/R. Other Species: STJA, TUVU, DEJU, AMRO, WIWA, WREN, PIWO, and MODO
9	Skip		SON0004 – AC#2 (pair)
10	Skip		SON0004 – AC#2 (pair)
3	Skip		SON0004 – AC#2 (pair)
8	Skip		SON0109 (pair)
15	Skip		SON0109 (pair)
7	Skip		SON0109 (pair)

4	2000 – 2030	N/R	STJA, Distant Dog Barking
5	2039 – 2049	N/R	Crickets
11	2055 – 2105	N/R	
2	2115 – 2125	N/R	
16	2131 – 2141	V – BARRED	Single Barred owl in Sawmill Gulch
17	2144 – 2154	V – BARRED	Probably the same Single Barred Owl in Sawmill Gulch as STA#16.
1	2207 – 2217	N/R	
6	2228 – 2238	N/R	
12	2245 – 2255	N/R	
13	2303 – 2313	N/R	
14	2325 – 2335	V – BARRED	Pair of Barred Owls
18	0015 – 0025	N/R	Car, coyotes

Owl Response: N/R = No Response from NSO, V = Vocal Response, O = Observed NSO, B = Both Vocal and Observed, BAR = Barred Owl

NORTHERN SPOTTED OWL SURVEY FORM
2024 Breeding Season

Project/General Location: Willig Ranch – Jenner, CA Visit #: 5 Date: 24MAY24
T7N, R11W, Sec(s): 5, 7, 8, 9, 17, 18 MDB&M (Muniz Rancho) County: Sonoma
NSO Detection: Yes **Barred Owl Detection**: Yes
Surveyor: Pam Town Sunset: 2028
Survey Type: Nocturnal 10-minute Point
Weather Description (cloud/wind): Fog - in some areas really thick and light in other areas, with a light breeze (stronger on ridges)
Due to roads – some stations were shifted slightly but as close to original station as possible

Station #	Survey Time	Owl Response	Comments
18	2030 – 2040	N/R	Cars & Cows
8	2100 – 2110	N/R	STJA and crickets
15	2117 – 2127	N/R	Creek
14	2140 – 2150	N/R	Breezy
13	2158 – 2208	N/R	
4	2230 – 2240	N/R	Skunk
5	2246 – 2256	N/R	Fox Barking
11	2306 – 2316	N/R	
Between 9 and 10	2325 – 2340	V – NSO Male	Vocal Male (SON0004 – AC#2) responded @ 2332 hours
3	Skip		Known Pair of NSOs
2	2356 – 0006	N/R	
16	0017 – 0027	N/R	Cow Mooing
17	0035 – 0045	N/R	
1	0104 – 0114	N/R	
6	0120 – 0130	N/R	
12	0137 – 0147	N/R	
7	0200 – 0210	V – BARRED	Vocal Barred to the southeast
			Pretty Quiet Evening – bugs most vocal

Owl Response: N/R = No Response from NSO, V = Vocal Response, O = Observed NSO, B = Both Vocal and Observed, BAR = Barred Owl

NORTHERN SPOTTED OWL SURVEY FORM
2024 Breeding Season

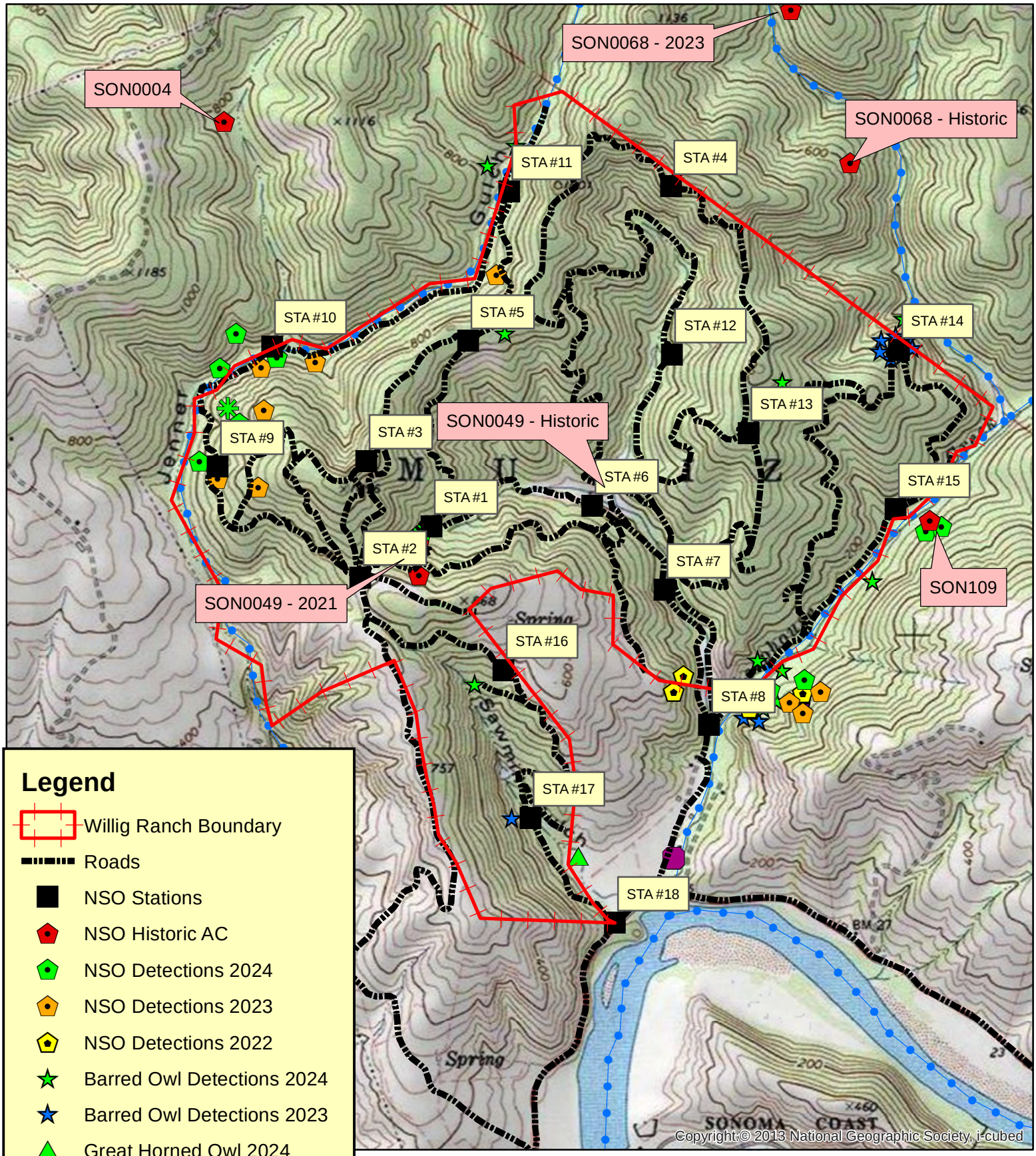
Project/General Location: Willig Ranch – Jenner, CA Visit #: 6 Date: 31MAY24
T7N, R11W, Sec(s): 5, 7, 8, 9, 17, 18 MDB&M (Muniz Rancho) County: Sonoma
NSO Detection: Yes **Barred Owl Detection**: Yes
Surveyor: Sunset: 2033
Survey Type: Nocturnal 10-minute Point
Weather Description (cloud/wind): Partly cloudy with light breeze
Due to roads – some stations were shifted slightly but as close to original station as possible

Station #	Survey Time	Owl Response	Comments
ACS SON0004 (AC#2) 9 & 10	1715 - 1845	N/R	Start near STA #10 broadcasting and walk the road toward STA #9. Walk around in the woods upslope from road. No Response. Other Species: STJA, WREN, PSFL
ACS SON109: 8 &15	1915 - 2025	B – Pair NSO	Start near STA #8 and broadcast and walk toward STA #15. Cross the creek toward where found pair earlier in month. At 2015 hours both NSOs responded and were observed. The NSO still had the 5th note added to the 4-note hoot. Didn't stick around for long as getting dark and needed to get back out to the road. Other Species: CBCH, PSFL, WIWA, WREN, and STJA Found SON109 – AC#1
15	Skip		Found Pair near SON109 – AC#1
14	2045 – 2055	N/R	
13	2107 – 2117	V – BARRED	At 2115 hours a barred owl responded toward STA #14
4	2145 – 2155	N/R	
6	2207 – 2217	V - WSOW	Western Screech owl
7	2225 – 2235	N/R	
17	2245 – 2255	N/R	Car on Hwy 116
16	2303 – 2313	N/R	Coyotes yipping
2	2320 – 2330	N/R	
1	2335 – 2345	N/R	
3	2351 – 0001	N/R	Crickets
5	0010 – 0020	N/R	Bats
11	0040 – 0050	V – BARRED	Barred owl moving along Jenner Gulch
10	0107 – 0117	V – NSO Female	SON0004 – AC#2 – At 0115 female NSO close to surveyor
9	Skip		Known NSOs in the area
12	0140 – 0150	N/R	Crickets
8	0207 – 0217	N/R	
18	0249 – 0300	N/R	Highway 116

Owl Response: N/R = No Response from NSO, V = Vocal Response, O = Observed NSO, B = Both Vocal and Observed, BAR = Barred Owl

Attachment #1 - Map Owl Detections

Willig Ranch NTMP - Owl Detections (2023/2024)



Legend

- Willig Ranch Boundary
- Roads
- NSO Stations
- NSO Historic AC
- NSO Detections 2024
- NSO Detections 2023
- NSO Detections 2022
- Barred Owl Detections 2024
- Barred Owl Detections 2023
- Great Horned Owl 2024
- Great Blue Heron
- SON0004 - AC#2 (Est. 2024)
- SON0109 - AC#2 (Est. 2024)

Portions of Muniz Ranch
Sec(s) 5, 7, 8, 9, 17 & 18 T07N, R11W MDB&M
Sonoma County

Date: 7/9/2024

1 in = 2,000 ft

12/4/2025

NORTHERN SPOTTED OWL SURVEY FORM – 2025 Breeding Season

Project/General Location: Berry's Knotfarm (Willig) Visit #: 1 Date: 06MAR25
Legal: T07N, R11W, Sec(s) 5, 7-9, 17 & 18 MDB&M
County: Sonoma County **NSO Detected**: Yes **Barred Owl Detected**: No
Surveyor: Pam Town Survey Type: ACS & NPS
Weather Description: Clear & Calm Sunset: 1812

Station #	Start Time	End Time	Owl Response	NSO Sex	Owl Location	Comments
ACS SON0004	1630	1745	B (visual and auditory)	Pair	North Side Jenner Gulch	Begin near STA#9 and broadcast walk along road past STA#10 and towards STA#11. On way back, still broadcasting, male NSO responds @ 1715 hrs near STA#10. Shortly after female responds further away (see map). Female moves closer to male and both owls move upslope of STA #10 within 2024 AC.
11	1800	1815	N/R			
5	1819	1829	N/R			
3	1835	1845	N/R			
9	Skip					NSO Detected Earlier
10	Skip					NSO Detected Earlier
2	1900	1910	N/R			
1	1914	1924	N/R			
16	1954	2004	N/R			
17	2008	2018	N/R			Cows Mooing and Cars in Distance
6	2029	2039	N/R			
7	2043	2053	N/R			
12	2100	2110	N/R			
4	2115	2125	N/R			
13	2130	2140	N/R			
14	2156	2206	N/R			
15	2210	2220	V	Male	East of Sheephouse Creek in AC	SON0109 – At 2212 male responded and was vocal. No female heard
8	2230	2250	N/R			
18	2256	2306	N/R			Cows and very light traffic

Survey Type: NPS = Nocturnal Protocol Survey, SCS = Spot Check Survey, DS = Disturbance Survey, ACS = Activity Stand Search, CC = Continuous Calling, SS = Stand Search, AV = Additional Visit, FV = Follow-Up Visit, RV = Reproductive Visit, OPP = Opportunistic Sighting
Owl Response: N/R = No Response from NSO, V = Vocal Response, O = Observed NSO, B = Both Vocal and Observed, BAR = Barred Owl
NSO Sex: M = Male, F = Female, U = Unknown Sex **NSO Age:** A = Adult, S = Subadult, J = Juvenile
Owl Location: Where is owl (bearing & distance) or brief description **Comments:** Other important information or owl species identified

NOTES from 06MAR25 NSO Detections:

- SON004:
    - Was not moused as too early in the breeding season to determine breeding status.
    - Pair of NSOs were located within their “Core Area”
    - NSOs were both observed and heard during the daytime, so no daytime follow-up was required.
- SON109:
    - No daytime follow-up was completed for the following reasons:
        - NSO was detected in 2024 within this AC (has not been an inactive territory)
        - NSO was detected within the known AC and “Core Area”
        - Too early in the breeding season to determine breeding status.
        - This activity center is located further than ½ mile from proposed timber harvest activities (is actually further than 0.7 miles).

Project/General Location: Berry's Knotfarm (Willig) Visit #: 2 Date: 21MAR25
Legal: T07N, R11W, Sec(s) 5, 7-9, 17 & 18 MDB&M
County: Sonoma County **NSO Detected**: No **Barred Owl Detected**: Yes
Surveyor: Pam Town Survey Type: ACS & NPS
Weather Description: Partly Cloudy & Calm Sunset: 1927

Station #	Start Time	End Time	Owl Response	NSO Sex	Owl Location	Comments
ACS SON0049	1630	1820	N/R			Begin near STA#2 and broadcast walk along the road past STA#1 and STA#6. Loop around and head back to STA#2. Walk in the woods in various areas looking for evidence of owls. No owl response or evidence. Other species: CORA, STJA, AMRO, DEJU, CBCH but pretty quiet.
ACS SON0004	1830	1930	N/R			Begin near STA#10 and broadcast walk along road in both directions and travel up into the woods looking for owl evidence. Found 1 pellet. Other species: STJA (not mobbing anyone), AMRO, DEJU, PSFL, PAWR, and tree frogs.
9	1930	1940	V - GHOW		SW – Off Property	STJA, GHOW Far away to SW
10	1944	1954	N/R			
11	2000	2010	N/R			
5	2014	2024	N/R			
4	2030	2040	N/R			WSOW
3	2052	2102	N/R			
2	2107	2117	N/R			
1	2120	2130	N/R			
16	2136	2146	N/R			
17	2140	2200	N/R			
6	2210	2220	N/R			WSOW
7	2224	2235	N/R			
12	2249	2300	N/R			
13	2307	2317	N/R			
4	2320	2330	N/R			
14	2345	2357	BARRED		At Station	Silent Owl flew in. After 10 minutes, played barred owl calls and immediately barred response.
15	0006	0016	N/R			
8	0025	0050	N/R			

18	0125	0135	N/R			

Survey Type: NPS = Nocturnal Protocol Survey, SCS = Spot Check Survey, DS = Disturbance Survey, ACS = Activity Stand Search, CC = Continuous Calling, SS = Stand Search, AV = Additional Visit, FV = Follow-Up Visit, RV = Reproductive Visit, OPP = Opportunistic Sighting
Owl Response: N/R = No Response from NSO, V = Vocal Response, O = Observed NSO, B = Both Vocal and Observed, BAR = Barred Owl
NSO Sex: M = Male, F = Female, U = Unknown Sex **NSO Age:** A = Adult, S = Subadult, J = Juvenile
Owl Location: Where is owl (bearing & distance) or brief description **Comments:** Other important information or owl species identified

NOTE: Quiet Evening – few tree frogs

Project/General Location: Berry's Knotfarm (Willig) Visit #: ACS Date: 10MAY25
Legal: T07N, R11W, Sec(s) 5, 7-9, 17 & 18 MDB&M
County: Sonoma County **NSO Detected**: No **Barred Owl Detected**: No
Surveyor: Chris Town Survey Type: ACS
Weather Description: Clear & Light Breeze Sunset: 2015

Station #	Start Time	End Time	Owl Response	NSO Sex	Owl Location	Comments
ACS SON0004	1500	1700	N/R			Begin near STA#9 and broadcast walk along road past STA#10 and towards STA#11. Move into woods looking for owl sign. N/R
ACS SON0049	1730	1800	N/R			Broadcast calling and walking near STA#2 towards STA#1. Walk into woods near STA#2 and historic AC, but N/R
STA#9	1815	1830	N/R			
STA#10	1835	1850	N/R			

Survey Type: NPS = Nocturnal Protocol Survey, SCS = Spot Check Survey, DS = Disturbance Survey, ACS = Activity Stand Search, CC = Continuous Calling, SS = Stand Search, AV = Additional Visit, FV = Follow-Up Visit, RV = Reproductive Visit, OPP = Opportunistic Sighting
Owl Response: N/R = No Response from NSO, V = Vocal Response, O = Observed NSO, B = Both Vocal and Observed, BAR = Barred Owl
NSO Sex: M = Male, F = Female, U = Unknown Sex **NSO Age:** A = Adult, S = Subadult, J = Juvenile
Owl Location: Where is owl (bearing & distance) or brief description **Comments:** Other important information or owl species identified

Project/General Location: Berry's Knotfarm (Willig) Visit #: 3 Date: 17MAY25
Legal: T07N, R11W, Sec(s) 5, 7-9, 17 & 18 MDB&M
County: Sonoma County **NSO Detected**: Yes **Barred Owl Detected**: Yes
Surveyor: Chris Town Survey Type: ACS & NPS
Weather Description: Clear & periodic breeze Sunset: 2022

Station #	Start Time	End Time	Owl Response	NSO Sex	Owl Location	Comments
ACS SON0109	1700	1745	Vocal	Male	East Sheephouse Creek	Begin near STA#8 and broadcast walk along the road toward STA#15. At 1730 hours a male NSO responded from east side of Creek. Never heard or saw female. Other species: STJA, AMRO, DEJU, HETH, PSFL
ACS SON0049	1815	1900	N/R			Begin near STA#2 and broadcast walk around toward STA#1 and on lower road. Other species: STJA, BTPI, DEJU, PSFL, PAWR, and TUVU.
ACS SON0004	1910	2020	N/R			Begin near STA#10 and walk around area broadcast calling in both directions. Other species: STJA, DEJU, PAWR, UNWO, and TUVU
11	2030	2040	N/R			
10	2045	2100	N/R			
9	2104	2114	N/R			
2	2120	2130	N/R			
16	2140	2150	N/R			
17	2156	2206	N/R			
1	2220	2230	N/R			
5	2237	2247	N/R			
3	2255	2305	N/R			
6	2320	2330	N/R			
7	2334	2345	N/R			
12	2357	0007	N/R			
13	0015	0025	N/R			
4	0035	0045	N/R			
14	0057	0107	N/R			
15	0113	0123	V	Unknown	E. Sheephouse Creek	SON0109 Single NSO response
8	0130	0140	V	BARRED		Moves closer to surveyor
18	0150	0200	N/R			

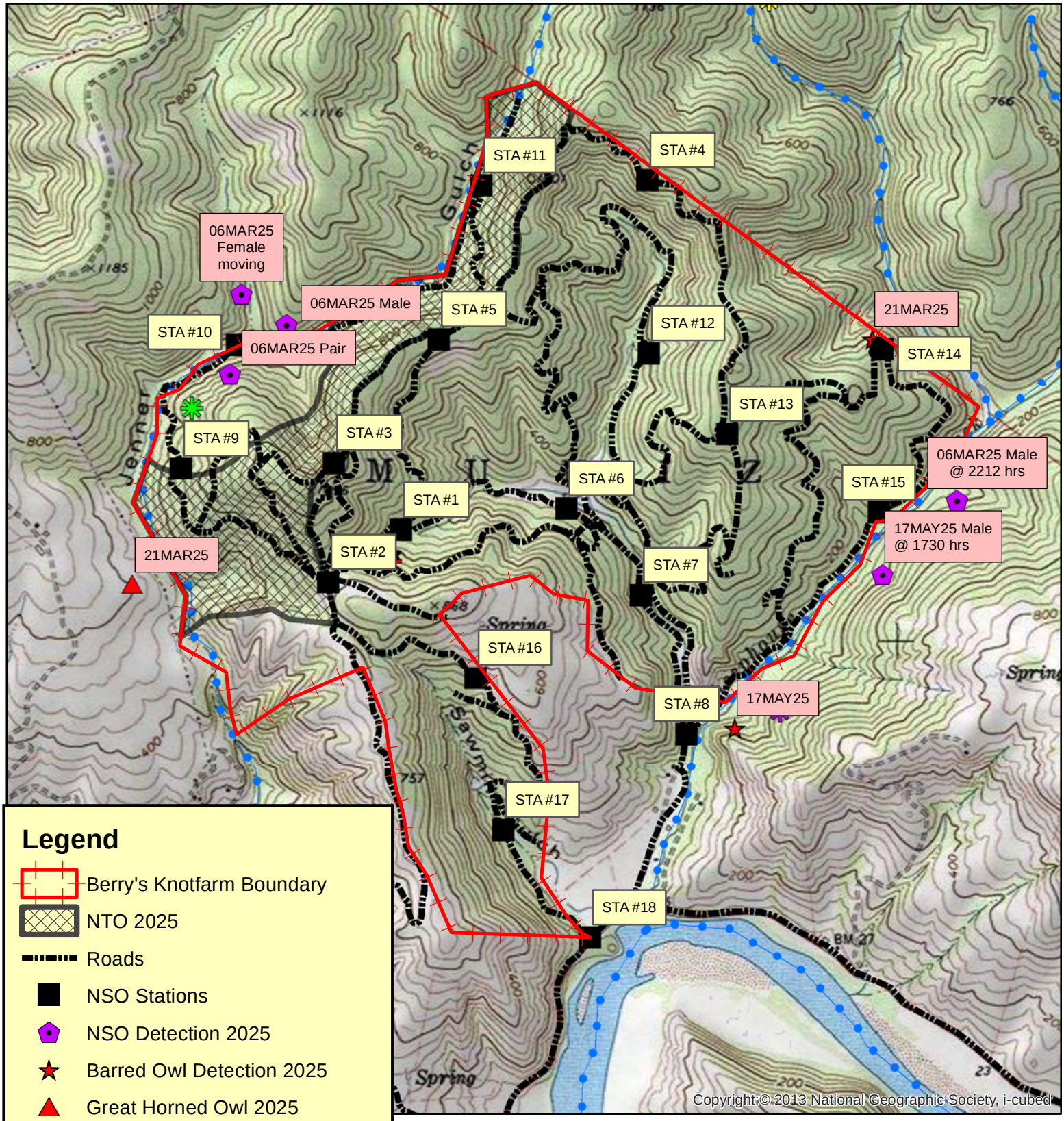
Survey Type: NPS = Nocturnal Protocol Survey, SCS = Spot Check Survey, DS = Disturbance Survey, ACS = Activity Stand Search, CC = Continuous Calling, SS = Stand Search, AV = Additional Visit, FV = Follow-Up Visit, RV = Reproductive Visit, OPP = Opportunistic Sighting
Owl Response: N/R = No Response from NSO, V = Vocal Response, O = Observed NSO, B = Both Vocal and Observed, BAR = Barred Owl
NSO Sex: M = Male, F = Female, U = Unknown Sex **NSO Age:** A = Adult, S = Subadult, J = Juvenile
Owl Location: Where is owl (bearing & distance) or brief description **Comments:** Other important information or owl species identified

NOTES from 17MAY25 NSO Detections:

- SON109:
    - No daytime follow-up was completed for the following reasons:
        - NSO was detected earlier in the day within this AC, stopped to see if could get a pair to respond
        - NSO was detected close to the known AC and within "Core Area"
        - This activity center is located further than ½ mile from proposed timber harvest activities (is actually further than 0.7 miles).

Attachment #1 - 2025 Owl Detections

Owl Detections for 2025 Season
Berry's Knotfarm NTMP



Legend

- Berry's Knotfarm Boundary
- NTO 2025
- Roads
- NSO Stations
- NSO Detection 2025
- Barred Owl Detection 2025
- Great Horned Owl 2025
- SON0049 AC (Est. 2018 - 2019)
- SON0004 - AC#2 (Est. 2024)
- SON0068 - (Est. 2023)
- SON0109 - AC#2 (Est. 2024)

Portions of Muniz Ranch
Sec(s) 5, 7, 8, 9, 17 & 18 T07N, R11W MDB&M
1-25NTMP-0001 SON
Sonoma County

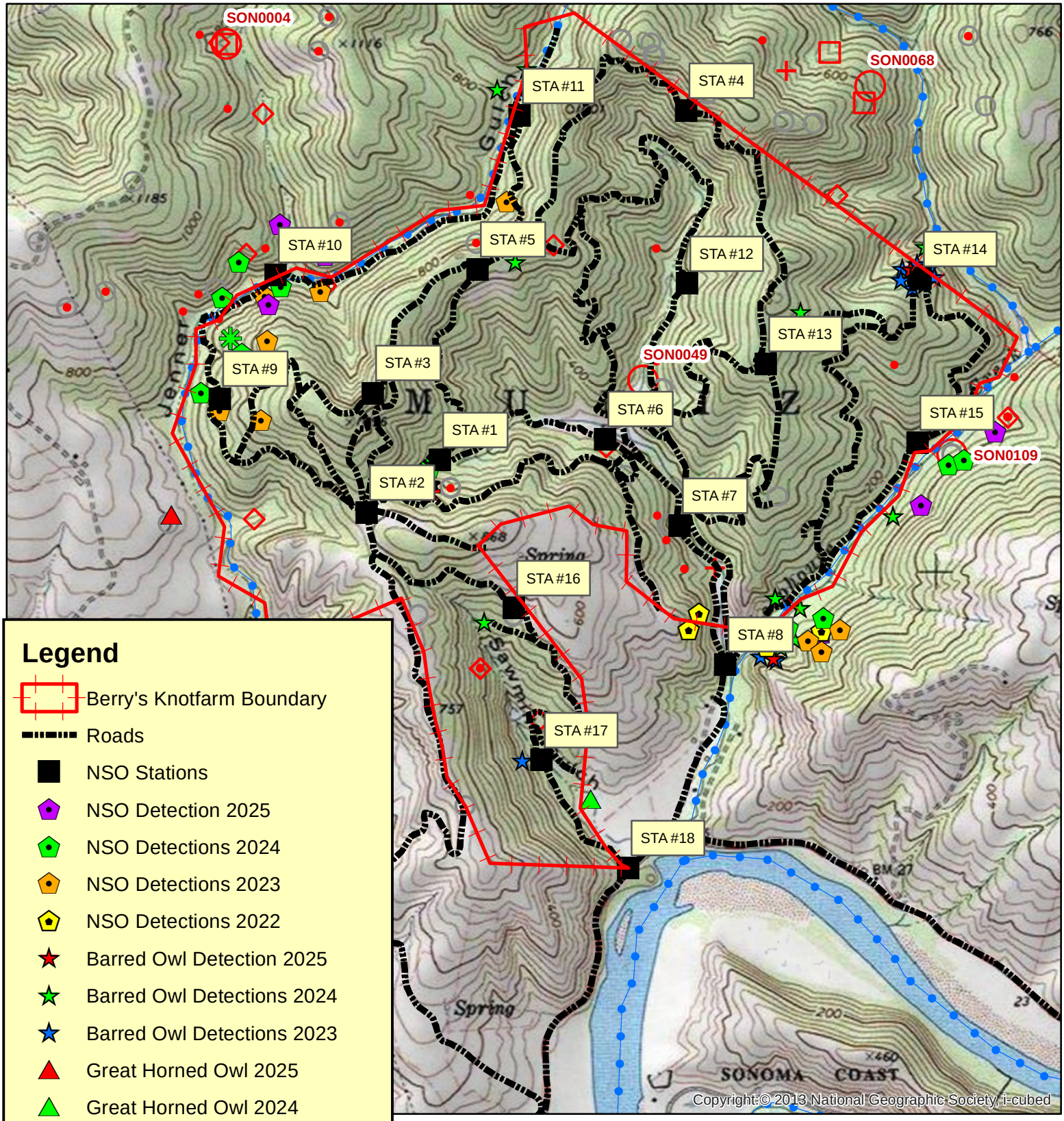
Date: 6/18/2025

1 in = 2,000 ft

12/4/2025

Attachment #1 - Owl Detections '22 - '25

Owl Detections for Berry's Knotfarm NTMP



Legend

- Berry's Knotfarm Boundary
- Roads
- NSO Stations
- NSO Detection 2025
- NSO Detections 2024
- NSO Detections 2023
- NSO Detections 2022
- Barred Owl Detection 2025
- Barred Owl Detections 2024
- Barred Owl Detections 2023
- Great Horned Owl 2025
- Great Horned Owl 2024
- SON0049 AC (Est. 2018 - 2019)
- SON0004 - AC#2 (Est. 2024)
- SON0068 - (Est. 2023)
- SON0109 - AC#2 (Est. 2024)

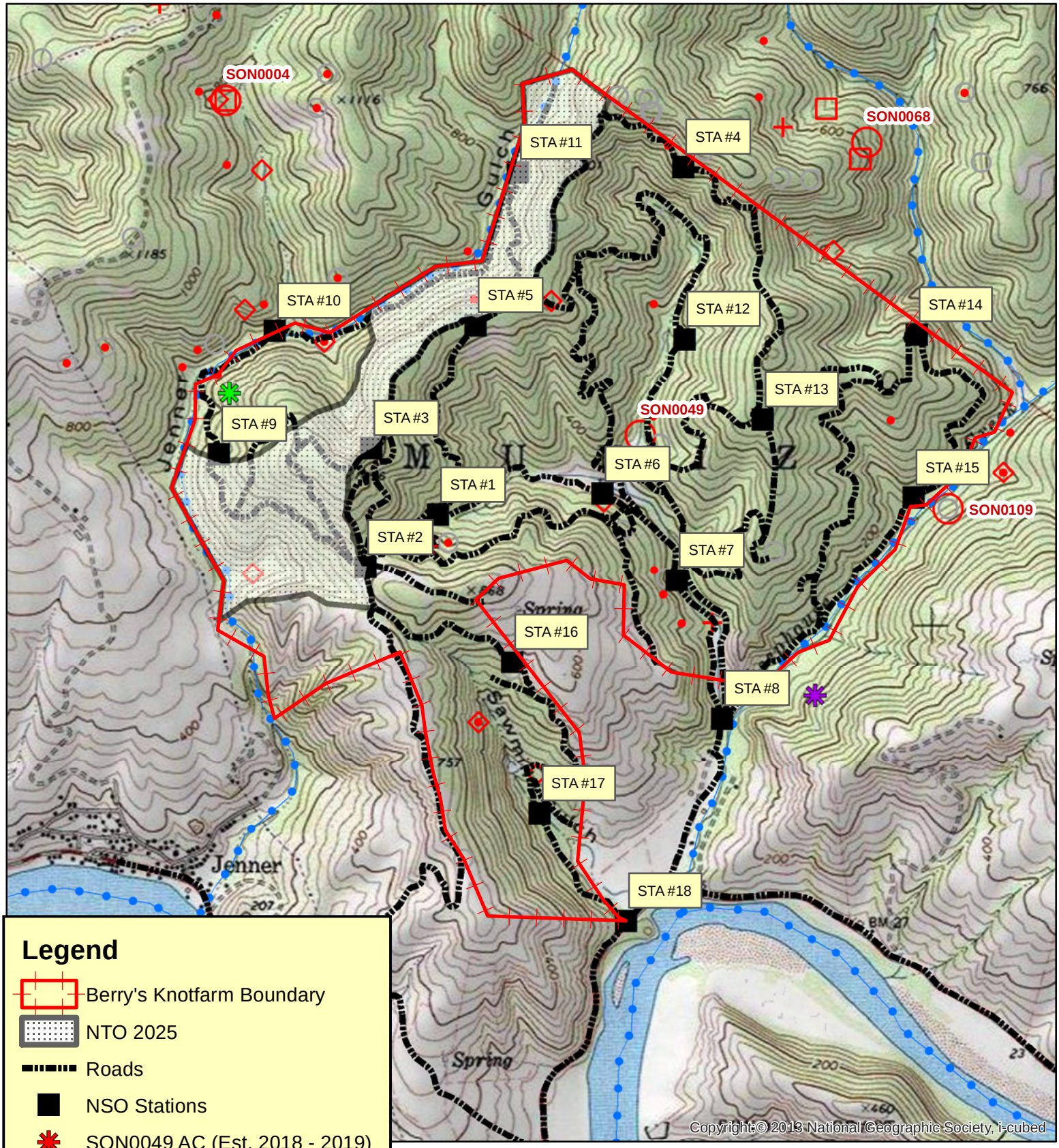
Portions of Muniz Ranch
Sec(s) 5, 7, 8, 9, 17 & 18 T07N, R11W MDB&M
1-25NTMP-0001 SON
Sonoma County
Date: 6/18/2025

1 in = 2,000 ft

12/4/2025

Attachment #2 - NSO Stations

Northern Spotted Owl Survey Stations
Berry's Knotfarm NTMP (2025 NTO)



Legend

- Berry's Knotfarm Boundary
- NTO 2025
- Roads
- NSO Stations
- SON0049 AC (Est. 2018 - 2019)
- SON0004 - AC#2 (Est. 2024)
- SON0068 - (Est. 2023)
- SON0109 - AC#2 (Est. 2024)

Portions of Muniz Ranch
Sec(s) 5, 7, 8, 9, 17 & 18 T07N, R11W MDB&M
1-25NTMP-0001 SON
Sonoma County
Date: 6/16/2025

1 in = 2,000 ft

12/4/2025

Data Version Date:
05/28/2025

Report Generation Date:
6/16/2025

Report #1 - Spotted Owl Sites Found
Known Spotted Owl sites having observations within the search area.

Meridian, Township, Range, Section (MTRS) searched:

M_07N_11W Sections(03,04,05,06,07,08,09,10,15,16,17,18,19,20,21,22);

M_08N_11W Sections(31,32,33,34);

M_07N_12W Sections(01,12,13,24);

M_08N_12W Sections(36);

NOTES:

Berrys Knotfarm

Within 0.7 Miles of NTO 2025

SON004
SON049
SON068

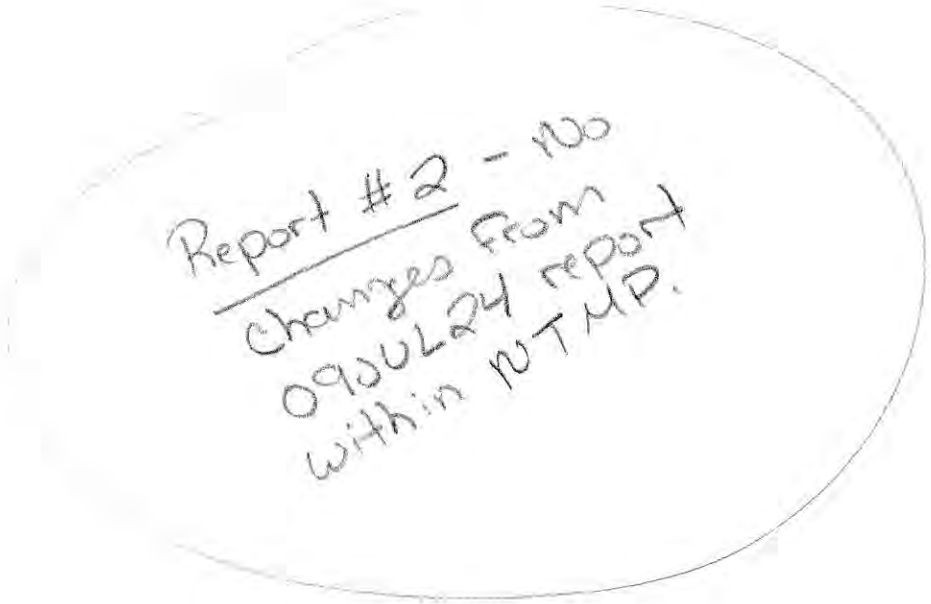
Within 0.7 Miles of NTMP

SON004
SON049
SON068
SON109

3

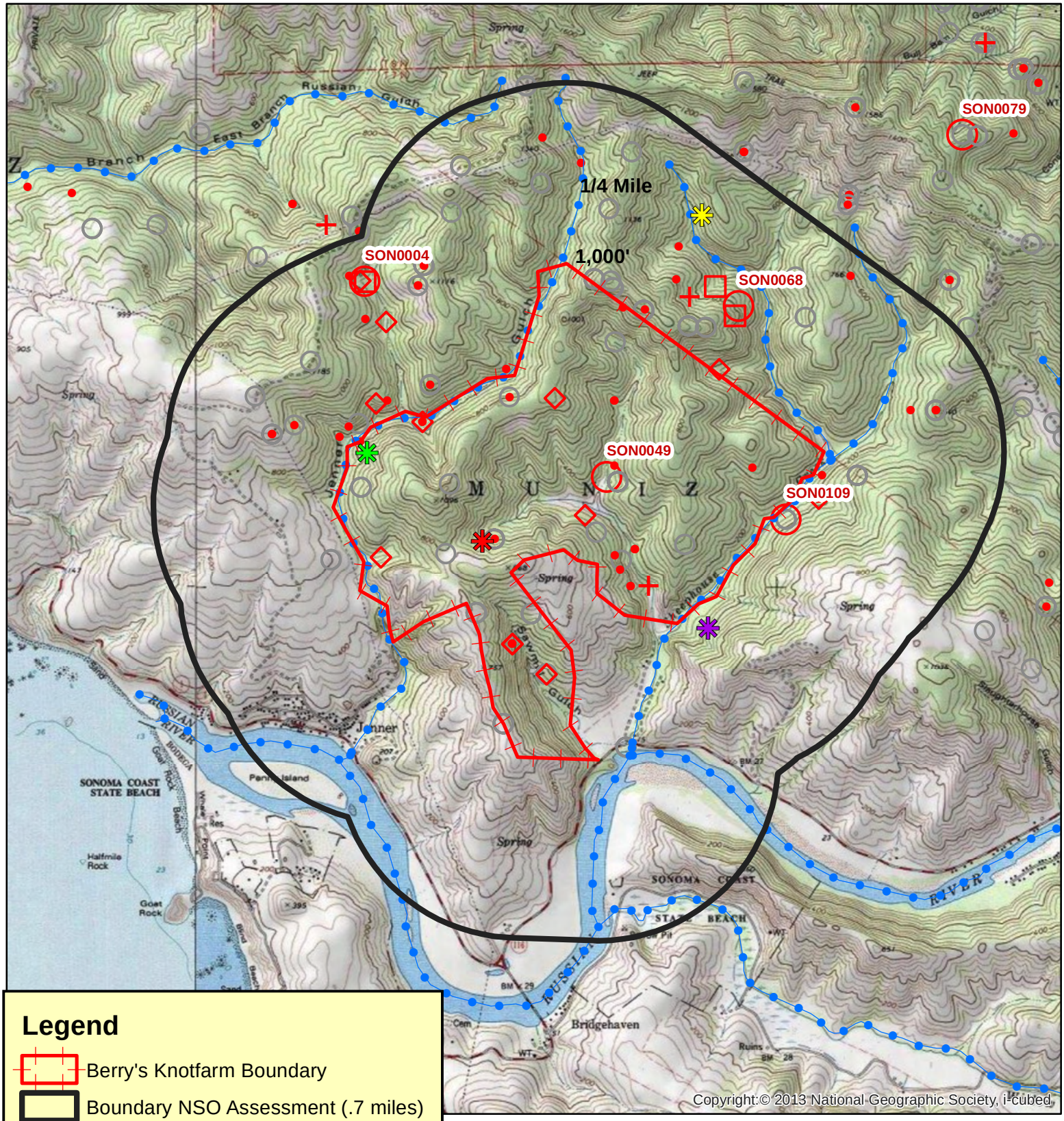
Attachment #3 - NSO Database

Masterowl	Subspecies	LatDD NAD83	LonDD NAD83	MTRS	AC Coordinate Source	
SON0004	NORTHERN	38.475377	-123.113920	M 07N 11W 06	Contributor	
SON0010	NORTHERN	38.496491	-123.082990	M 08N 11W 33	Contributor	1.6+
SON0022	NORTHERN	38.432531	-123.047246	M 07N 11W 23	Contributor	3+
SON0046	NORTHERN	38.460728	-123.057389	M 07N 11W 10	Contributor	2+
SON0047	NORTHERN	38.479940	-123.143736	M 07N 12W 02	Contributor	2+ M
SON0049	NORTHERN	38.464404	-123.096566	M 07N 11W 08	Contributor	
SON0061	NORTHERN	38.513082	-123.069933	M 08N 11W 27	Contributor	2½+
SON0068	NORTHERN	38.474000	-123.087100	M 07N 11W 05	Contributor	
SON0079	NORTHERN	38.483611	-123.071051	M 07N 11W 03	Contributor	1½+
SON0109	NORTHERN	38.462000	-123.083700	M 07N 11W 09	Contributor	1+



Northern Spotted Owl Territories within 0.7 miles
Berry's Knotfarm NTMP

Attachment #3



Legend

- Berry's Knotfarm Boundary
- Boundary NSO Assessment (.7 miles)
- SON0049 AC (Est. 2018 - 2019)
- SON0004 - AC#2 (Est. 2024)
- SON0068 - (Est. 2023)
- SON0109 - AC#2 (Est. 2024)

Portions of Muniz Ranch
Sec(s) 5, 7, 8, 9, 17 & 18 T07N, R11W MDB&M
1-25NTMP-0001 SON
Sonoma County
Date: 6/18/2025

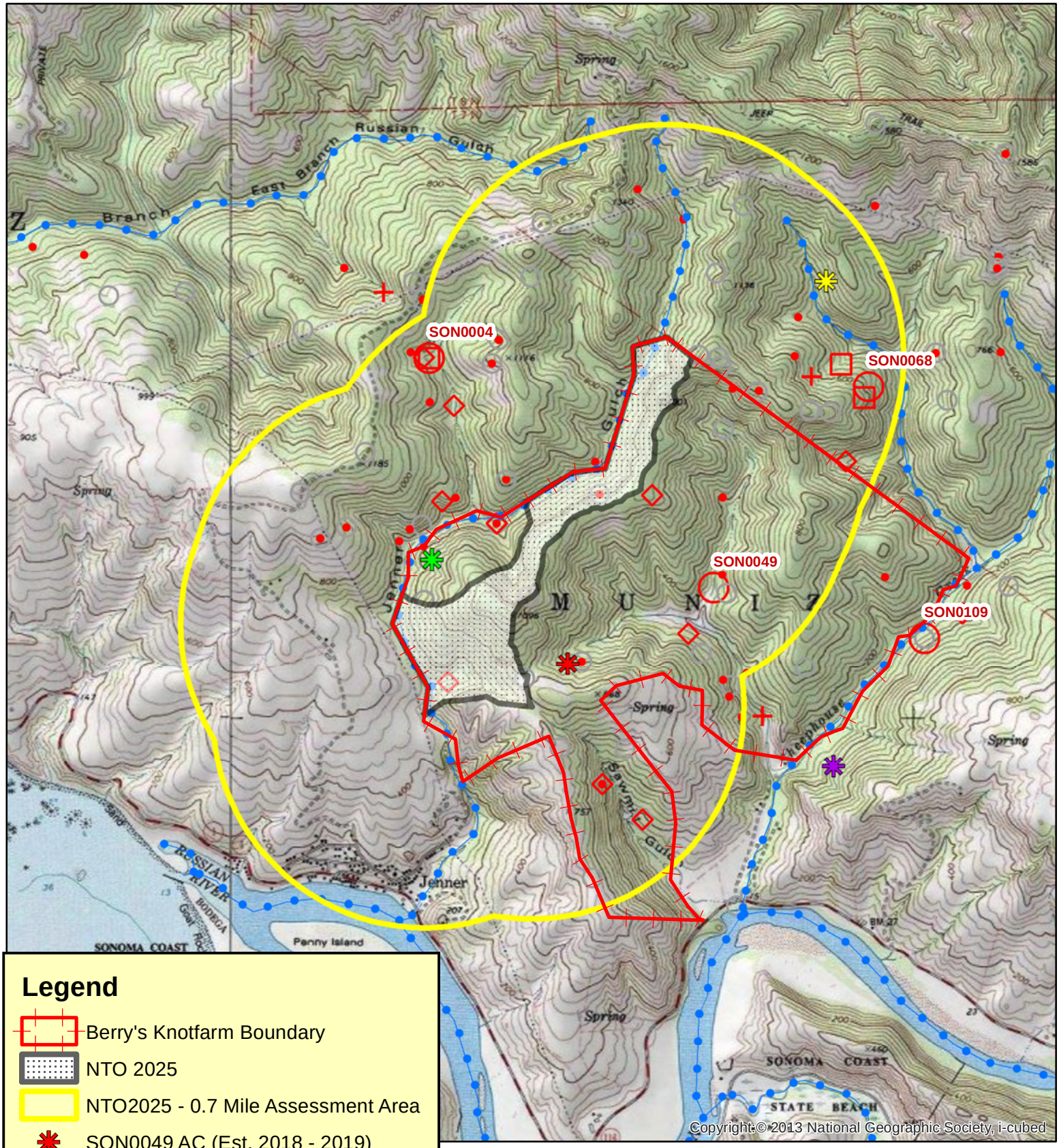
488

1 in = 3,445 ft

12/4/2025

Attachment #4

Owls within 0.7 Miles of NTO - 2025
Berry's Knotfarm NTMP



Legend

- Berry's Knotfarm Boundary
- NTO 2025
- NTO2025 - 0.7 Mile Assessment Area
- SON0049 AC (Est. 2018 - 2019)
- SON0004 - AC#2 (Est. 2024)
- SON0068 - (Est. 2023)
- SON0109 - AC#2 (Est. 2024)

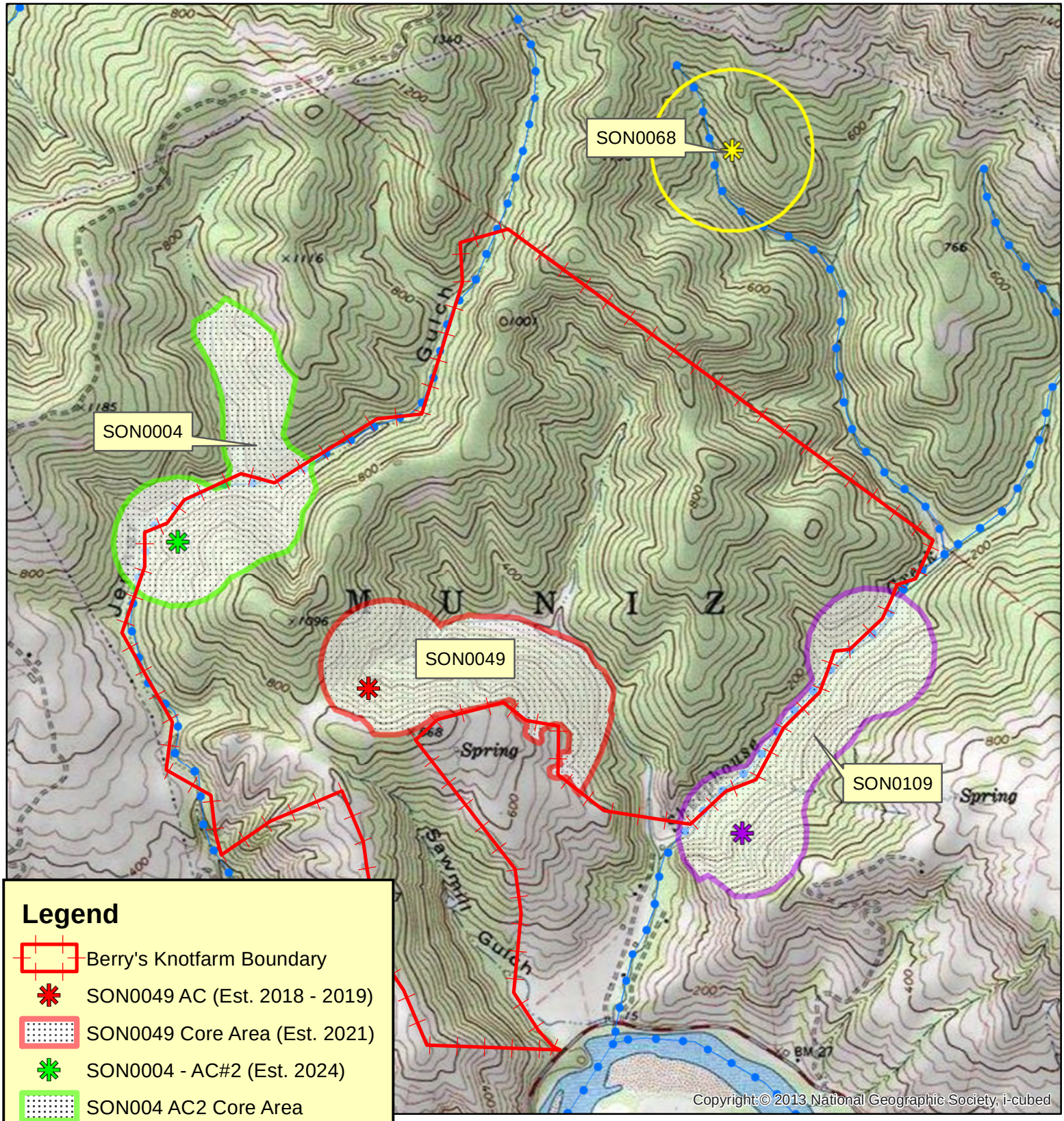
Portions of Muniz Ranch
Sec(s) 5, 7, 8, 9, 17 & 18 T07N, R11W MDB&M
1-25NTMP-0001 SON
Sonoma County
Date: 6/16/2025

1 in = 2,917 ft

12/4/2025

Attachment #5 - All Core Areas for NTMP

Northern Spotted Owl Core Areas
Berry's Knotfarm NTMP



Legend

- Berry's Knotfarm Boundary
- SON0049 AC (Est. 2018 - 2019)
- SON0049 Core Area (Est. 2021)
- SON0004 - AC#2 (Est. 2024)
- SON004 AC2 Core Area
- SON0068 - (Est. 2023)
- SON0068 AC 1000'
- SON0109 - AC#2 (Est. 2024)
- SON0109 Core Area

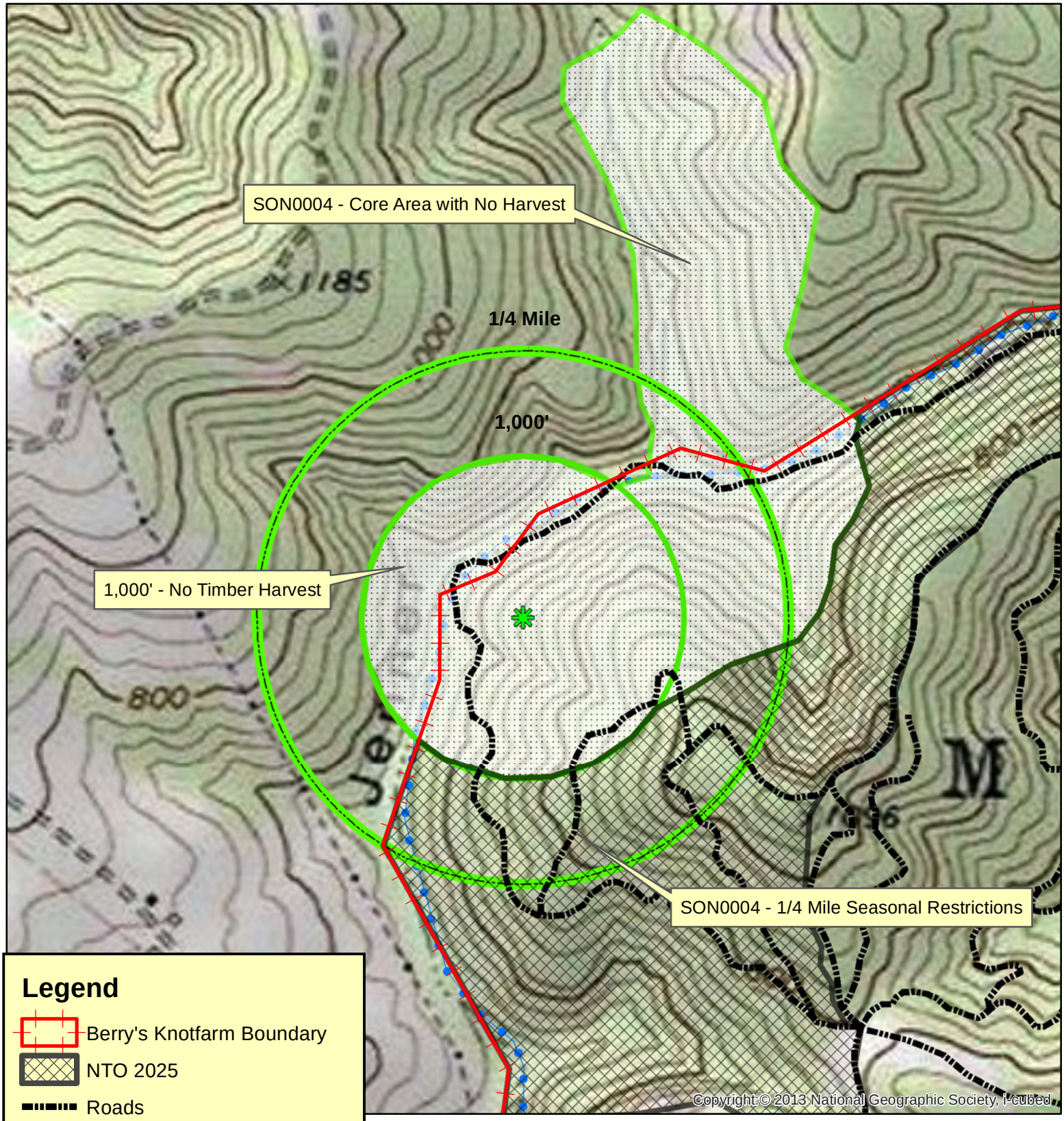
Portions of Muniz Ranch
Sec(s) 5, 7, 8, 9, 17 & 18 T07N, R11W MDB&M
1-25NTMP-0001 SON
Sonoma County
Date: 6/18/2025

1 in = 2,083 ft

12/4/2025

Attachment #6 - SON0004

Northern Spotted Owl Protection Measures
Berry's Knotfarm NTMP (2025 NTO)



Legend

- Berry's Knotfarm Boundary
- NTO 2025
- Roads
- SON0004 - AC#2 (Est. 2024)
- SON0004 AC#2 - 1000'
- SON004 1/4 Mile
- SON004 AC2 Core Area

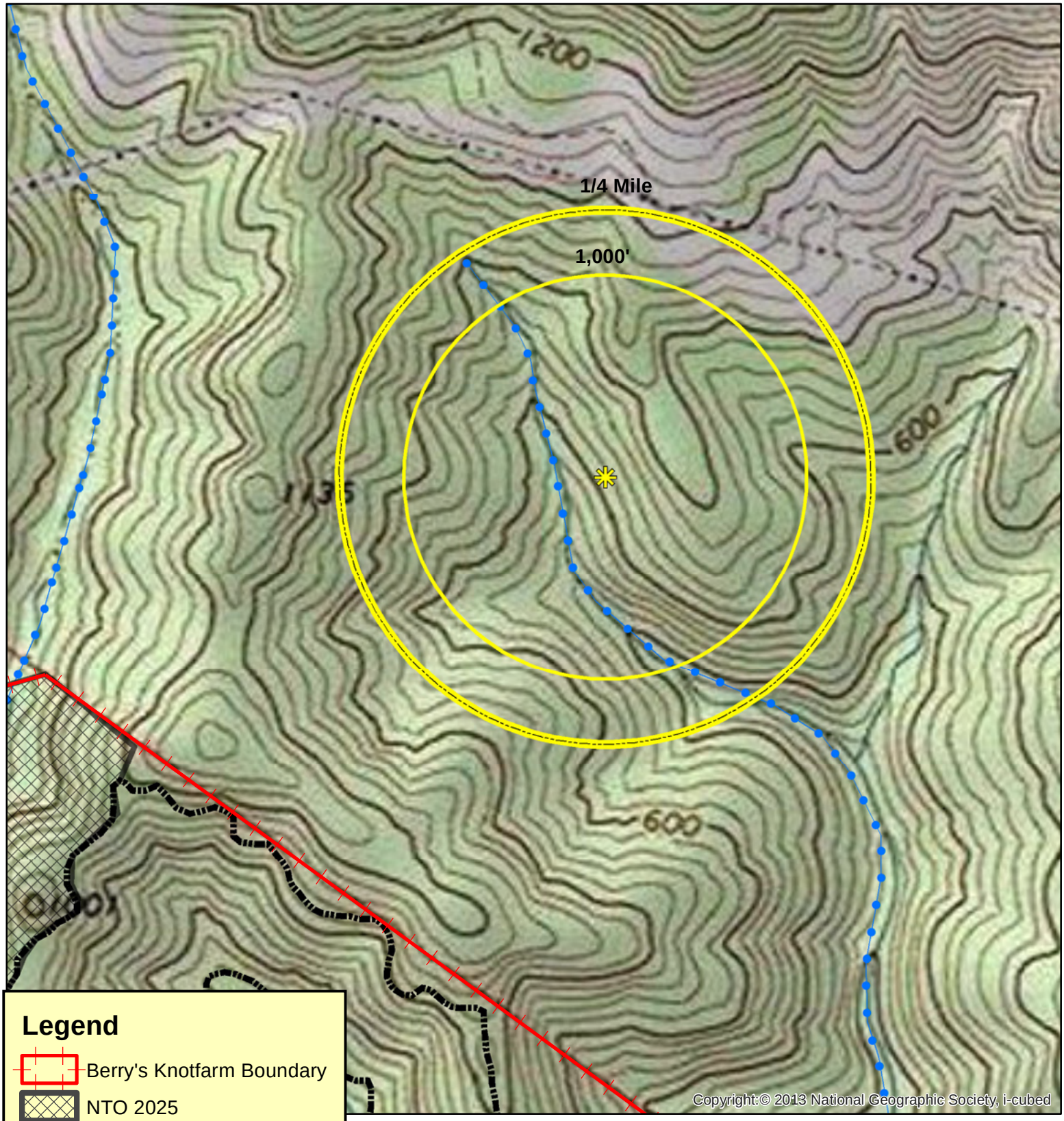
Portions of Muniz Ranch
Sec(s) 5, 7, 8, 9, 17 & 18 T07N, R11W MDB&M
1-25NTMP-0001 SON
Sonoma County
Date: 6/17/2025

1 in = 833 ft

12/4/2025

Attachment #7 - SON0068

Northern Spotted Owl Protection Measures
Berry's Knotfarm NTMP (2025 NTO)



Legend

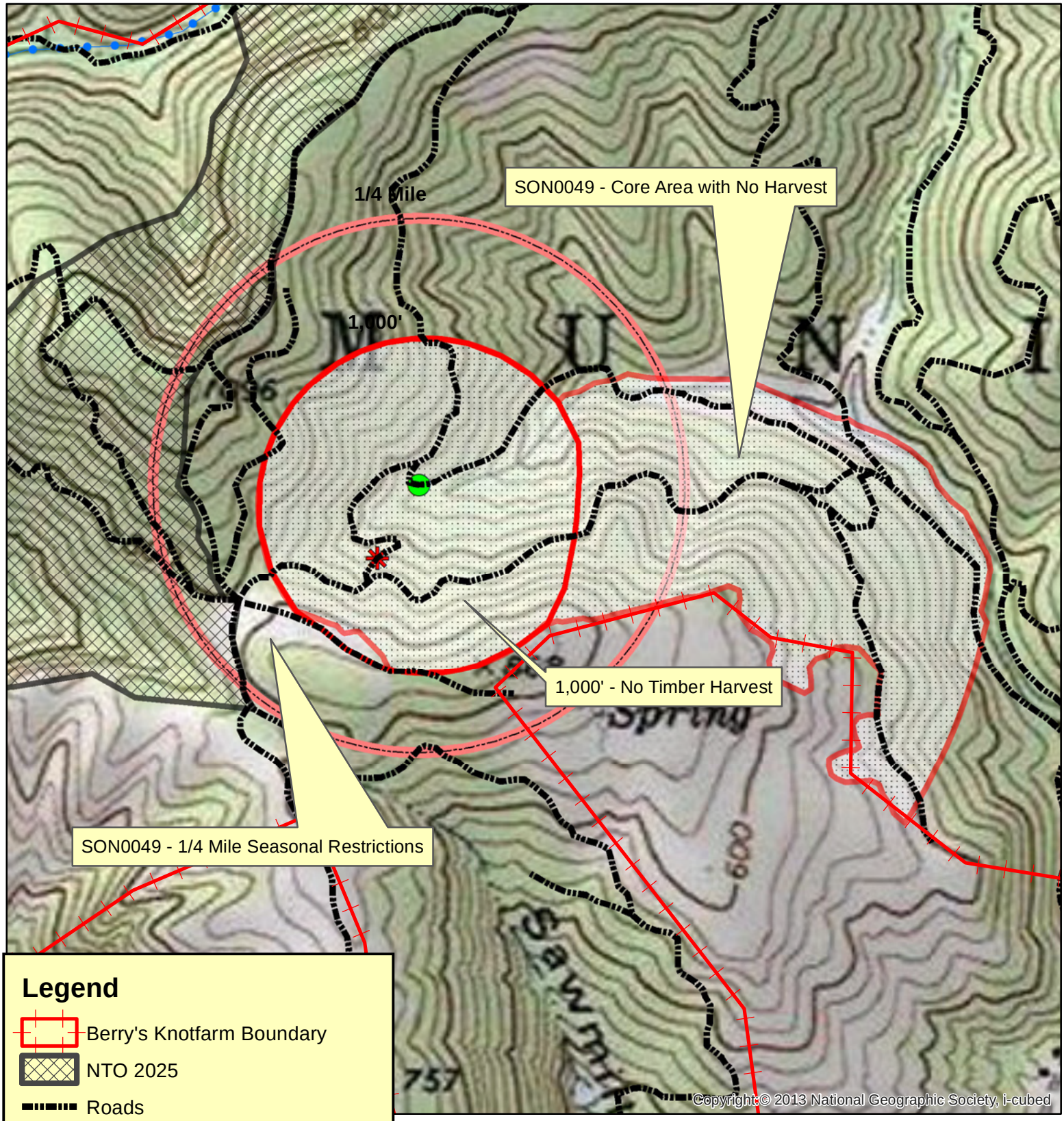
- Berry's Knotfarm Boundary
- NTO 2025
- Roads
- SON0068 - (Est. 2023)
- SON0068 AC 1000'
- SON0068 1/4 Mile

Portions of Muniz Ranch
Sec(s) 5, 7, 8, 9, 17 & 18 T07N, R11W MDB&M
1-25NTMP-0001 SON
Sonoma County
Date: 6/18/2025

1 in = 833 ft
12/4/2025

Attachment # 8 - SON0049

Northern Spotted Owl Protection Measures
Berry's Knotfarm NTMP (2025 NTO)



Legend

- Berry's Knotfarm Boundary
- NTO 2025
- Roads
- SON0049 AC (Est. 2018 - 2019)
- SON049 AC#2 1000'
- SON0049 Core Area (Est. 2021)
- SON0049 1/4 Mile

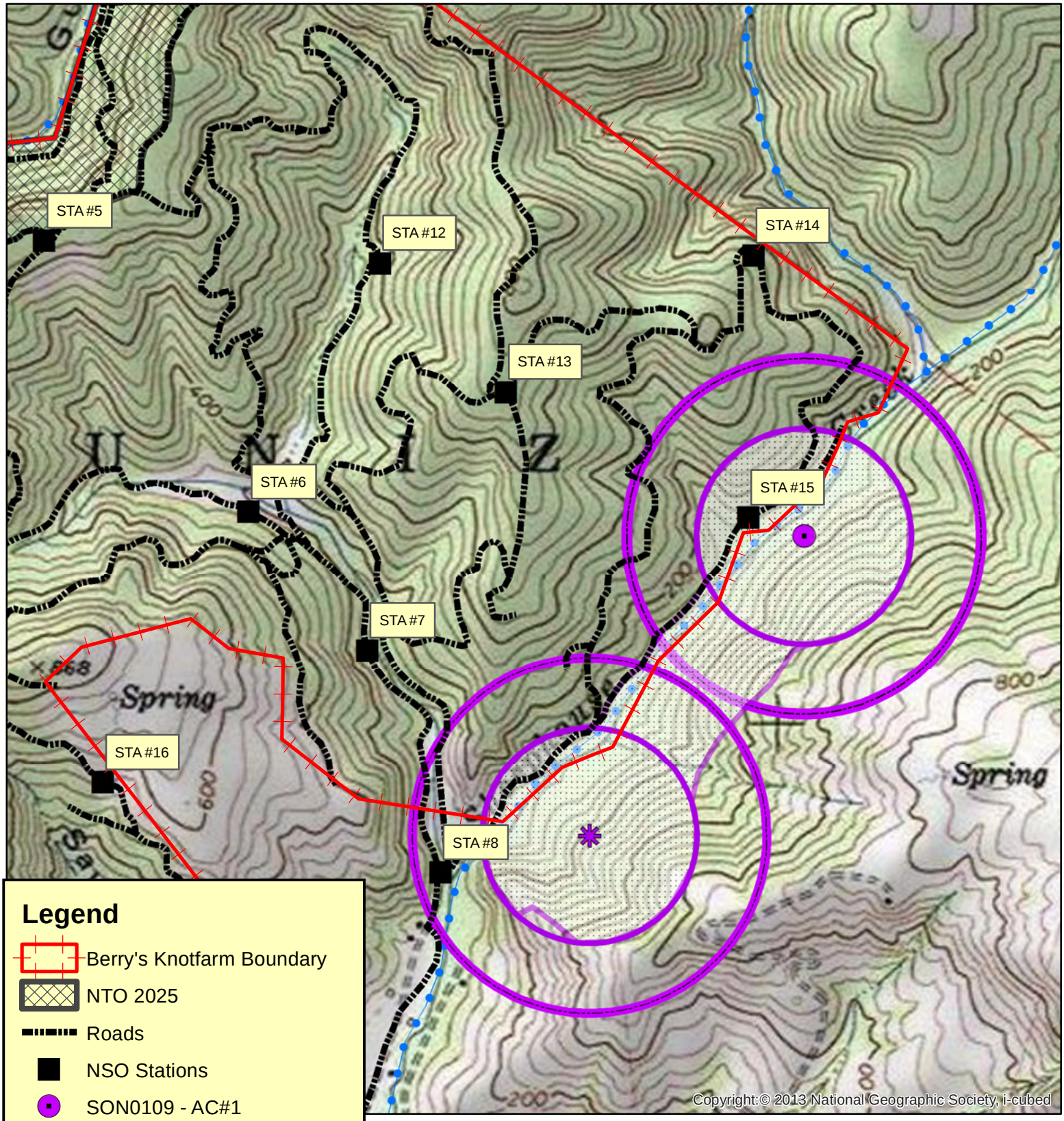
Portions of Muniz Ranch
Sec(s) 5, 7, 8, 9, 17 & 18 T07N, R11W MDB&M
1-25NTMP-0001 SON
Sonoma County
Date: 6/18/2025

1 in = 833 ft

12/4/2025

Attachment #9 - SON109

Northern Spotted Owl Protection Measures
Berry's Knotfarm NTMP (2025 NTO)



Legend

- Berry's Knotfarm Boundary
- NTO 2025
- Roads
- NSO Stations
- SON0109 - AC#1
- SON0109 - AC#2 (Est. 2024)
- SON109 - 1000'
- SON0109 1/4 Mile
- SON0109 Core Area

Portions of Muniz Ranch
Sec(s) 5, 7, 8, 9, 17 & 18 T07N, R11W MDB&M
1-25NTMP-0001 SON
Sonoma County
Date: 6/19/2025

1 in = 1,250 ft

12/4/2025

Botanical Report

Berry's Knot Farm NTO #1

1-25NTMP-00001-SON

March 14, 2025

Prepared for:

Environmental Resource Solutions, Inc.
1221 Gravenstein Highway South
Sebastopol, CA 95472

By:

Heather Morrison
Salix Natural Resource Management, Inc.
P.O. Box 684
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Ukiah, CA 95482

Table of Contents

FIGURES

APPENDICIES

LIST OF ABBREVIATIONS, DEFINITIONS & ACRONYMS

CalFire	California Department of Forestry and Fire Protection
CDFW	California Department of Fish & Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
CRPR	California Rare Plant Rankings
CNPS	California Native Plant Society
MCV	Manual of California Vegetation
NEPA	National Environmental Protection Act
NRCS	Natural Resource Conservation Service
NTMP	Non-industrial Timber Management Plan

A. EXECUTIVE SUMMARY

This study was conducted at the request of Environmental Resource Solutions, Inc, as part of the background studies for Berry's Knot Farm NTMP, 1-25NTMP-0001-SON, NTO #1.

This report details the methods, results, and recommendations for special status plants and sensitive natural communities for the Non-industrial Timber Management Plan, which is located near the community of Jenner in Sonoma County.

A 2018 CDFW protocol-level rare plant survey resulted in the detection of no special status botanical plants, and the detection of one sensitive natural community, the Redwood Forest Alliance (G3, S3.2).

B. PROJECT LOCATION

Berry's Knot Farm NTMP is located approximately 1 mile northeast of the community of Jenner in Sonoma County. The legal description is best described as being located within portions of the Muniz Rancho. Elevation of the proposed NTO area ranges from 121-334 meters (400 to 1,095 feet).

C. PROJECT DESCRIPTION -

While the NTMP is nearly 1,100 acres in size, the assessment area for the first NTO (Unit #1) is 184 acres. The NTO will involve (1) harvesting timber within the NTO area, (2) constructing unpaved roads and (3) potentially upgrading, repairing or installing culverts or other drainage facilities on watercourses or other drainage features. Proposed silviculture is unevenaged (selection). The location of the NTO is shown on Figure 1, General Vicinity Map.

D. BIOLOGICAL SETTING

Watershed: The NTO lies within the Willow Creek CALWATER planning watershed (1114.110401).

The NTO is within the Central Coast Californian (CCo) Floristic province. This region extends along the Pacific Coast from Point Conception to Bodega Bay. It is variable in width and coastal vegetation predominates. In places (e.g., the southern Monterey coast), the CCo is reduced to coastal bluffs. Salt marshes and coastal prairie occur around the San Francisco Bay.

Natural Communities: Vegetative Communities on the NTO were classified using Keeler-Wolf's Manual of California Vegetation (MCV) mapping system through field verification of habitat types and aerial imagery analysis. The following is the sole vegetative community within Unit #1.

- Redwood Forest Alliance (G3, S3). This is dominant forest community within the NTO area. It grows within reach of summer fog, with inland and upper altitudinal ranges possibly limited by this factor. Characteristic species include redwood *Sequoia sempervirens*, Douglas-fir *Pseudotsuga menziesii*, tanoak *Notholithocarpus densiflorus,* bigleaf maple *Acer macrophyllum* and understory species such as sword fern *Polystichum munitum*.

Soils: According to the NRCS Soil Survey, Sonoma County, there are several soil types within the NTO area.

- Hugo very gravelly, 50-75% slopes (HkG)
- Hugo-Josephine complex, 50-75% slopes (HnG)
- Josephine loam, 50-75% slopes (JoG)
- Mendocino sandy clay loam, 30-50% slopes (MmF)

Soils are mapped in Figure 2.

E. SURVEY METHODOLOGY

Surveying methods were based on *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018). A seasonally appropriate and floristic survey was performed as well as a focused-survey for Napa false-indigo (the latter done by botanist technician).

All plant species located during the surveys were identified to the lowest taxonomic level necessary to determine the presence of special status plant species. *The Jepson Manual: Vascular Plants of California* (Baldwin 2012) was used to determine the taxonomic nomenclature. A complete vegetation list of the plant species observed within the NTO area during the site visits is included in Appendix C.

Scoping: Prior to surveys, the following literature and database searches were completed to assess the potential for sensitive natural communities and special-status species*:*

- Aerial photographs (Google Earth, NAIP 2022, ESRI 2024)
- California Natural Diversity Database (CDFW 2024)
- California Native Plant Society Electronic Inventory (CNPS 2024)
- A Manual of California Vegetation Online (CNPS 2024)
- Preliminary Descriptions of the Terrestrial Natural Communities (Holland 1986)

Scoping lists and database searches (i.e. CNDDB, CNPS) were based on Fort Ross, Cazadero, Warm Springs Dam, Tombs Creek, Arched Rock, Duncans Mills, Camp Meeker, Guerneville, Geyserville, Annapolis, and Plantation.

Site visits evaluated the presence of suitable habitat for special-status species as well as observation of specific species. Suitable habitat conditions are based on physical and biological conditions of the site, as well as the professional expertise of the surveyor. The potential for each special-status species to occur in the Survey Area was ranked based on the following criteria:

- None. No habitat components meeting the species requirements are present (such as coastal marsh or coastal dunes).
- Unlikely. Few to none of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.
- Moderate. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.

- High. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.
- Present. Species is observed on the site or has been recorded (database observation) on the site in the recent past.

Survey Area: The survey was conducted by walking the forested areas of the NTO. The grasslands were surveyed only incidentally. Search emphasis was placed on existing, proposed and reconstructed truck roads, tractor roads, landings, and focusing on unique habitat areas such as springs, seeps, and wet areas. During these searches field notes were recorded on the species represented. A map of the area surveyed can be found in Figure 3.

Survey Dates: Site surveys were conducted by botanist Heather Morrison for a total of 21 hours. Survey dates were based on the scoping list blooming periods. Survey efforts focused on identifying special status plant species and plant communities within the project area on the following dates:

- April 3, 2024 – rain
- April 20, 2024 - overcast
- May 6, 2024 - clear

Factors Affecting Surveys: Errors in botanical surveying are a common problem. The presence of a species can easily be overlooked, leading to false absences. It is possible that a false absence can happen due to the impracticality of surveying every portion of the project area or if a plant is missed even though the area was traversed. It is important to design a field survey method, which allows for greater time spent focusing in areas with special habitats (such as wetlands) and which allows for more than one survey time.

Climatic conditions can affect botanical surveys several ways. The most obvious is whether an area can be accessed (i.e. stream banks) and if plants can be seen and identified through inclement weather conditions. Secondly, it is possible for moisture to affect the plants' stature, or its blooms. It is best to choose days to survey when weather conditions are not so bad as to reduce visibility or accessibility of the entire project area.

Reference Populations: To the extent feasible, nearby accessible reference populations of target plant species with a moderate or high potential to occur in the project area were visited to ensure that the surveying botanist had an accurate search image for a species, and/or to determine whether the species was blooming at the expected time. Reference site visits were limited to species that were known to occur in local sites documented in the CNDDB and where access was available.

- North coast semaphore grass (*Pleuropogon hooverianus*) – Ackerman Creek (west of Ukiah). Observed in bloom May 2024.
- Santa Cruz clover (*Trifolium buckwestiorum*)- Garcia River watershed (Mendocino County). Observed in May and June 2024.
- Methuselah's Beard lichen (*Usnea longissima*) – Skaggs Springs Road along the Gualala River. Observed multiple times in 2024.
- Glory bush (*Ceanothus gloriosus* var. *exaltatus*) – Jackson Demonstration State Forest, Mendocino County. Observed multiple times in 2024.

F. RESULTS, IMPACTS AND RECOMMENDATIONS

Natural Communities: Out of the 83 Sensitive Natural Communities included in the scoping list, 5 were determined to have high potential to exist within the Project Area and 1 was present within the Project Area:

- Redwood Forest Alliance (G3, S3): This community is being actively managed and will not be converted through the silviculture prescriptions proposed. Membership rules for the Coast Redwood Forest Alliance state that there must be 50% relative cover in the *Sequoia sempervirens* tree canopy, or more than 30% relative cover with other conifers. No protection measures are recommended.

Special Status and Sensitive Plants: Out of the 102 sensitive and special status plant species documented within the assessment area (within nine USGS 7.5-minute quadrangles queried); 10 species were determined to have a high potential to exist within the NTO area. No special status plants were discovered within the NTO area.

G. REFERENCES

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Plan Author: Heather Morrison received a B.S. in Forestry and Watershed Management from Humboldt State University in 1996. She is a Certified California Botanist (CNPS #31), Registered Professional Forester (#2681) and licensed Pest Control Advisor (PCA #72023) with over 25 years of professional forestry and environmental planning experience. Ms. Morrison provides Botanical Assessments for large and small projects requiring compliance with the California Environmental Quality Act (CEQA). Ms. Morrison's experience includes conducting state and federal protocol Special Status Plant Species Surveys in the counties of Mendocino, Lake, Sonoma and Napa. She is a current member of the California Native Plant Society, the California Botanical Society and California Invasive Plant Council.

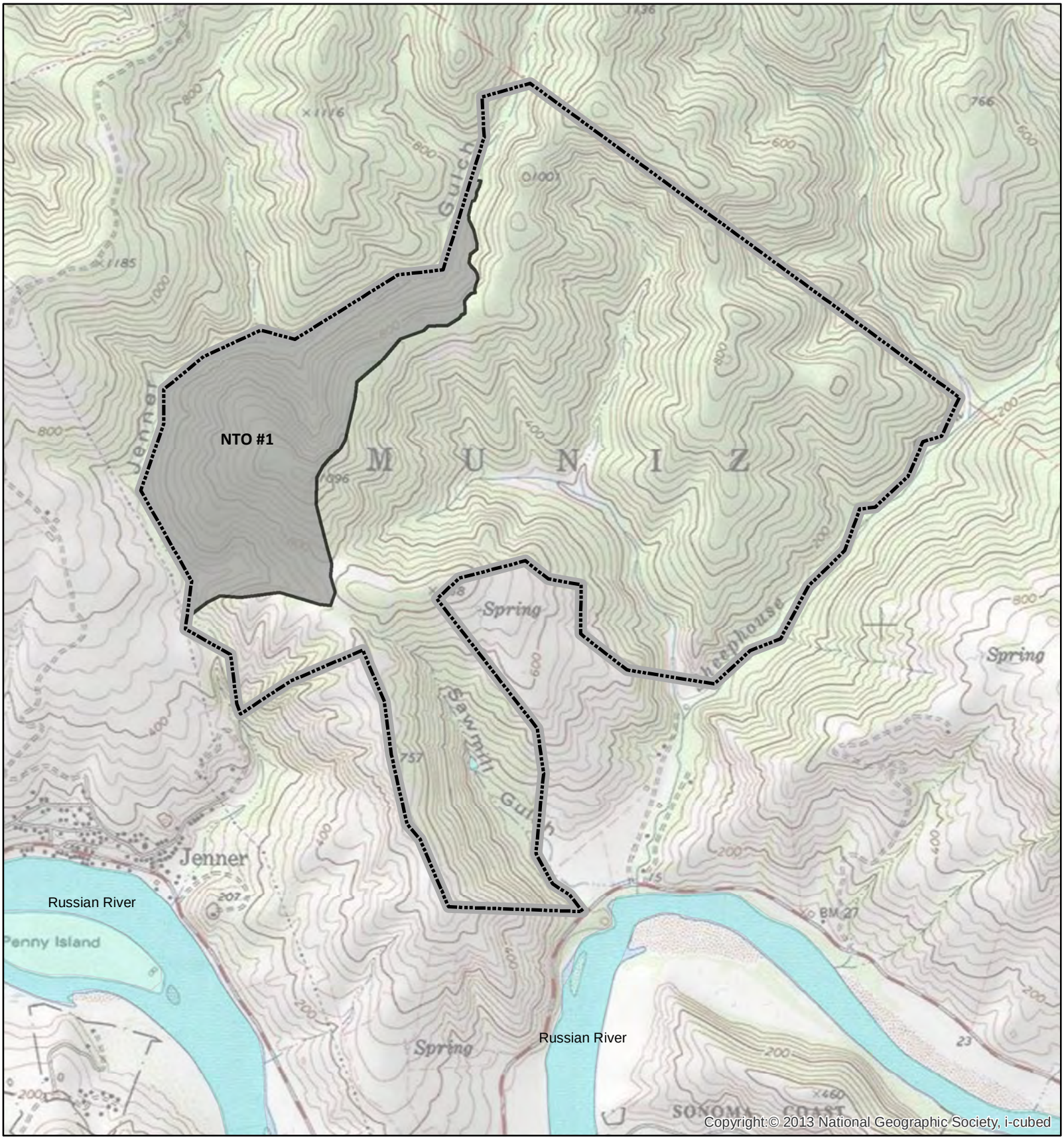

Figure 1

Berry's Knot Farm NTO #1

General Vicinity Map

Portions of Muniz Rancho

Portions of Duncans Mills 7.5' USGS Quadrangle Maps

Sonoma County

NTO #1

Property Boundary

1 inch = 2,000 feet

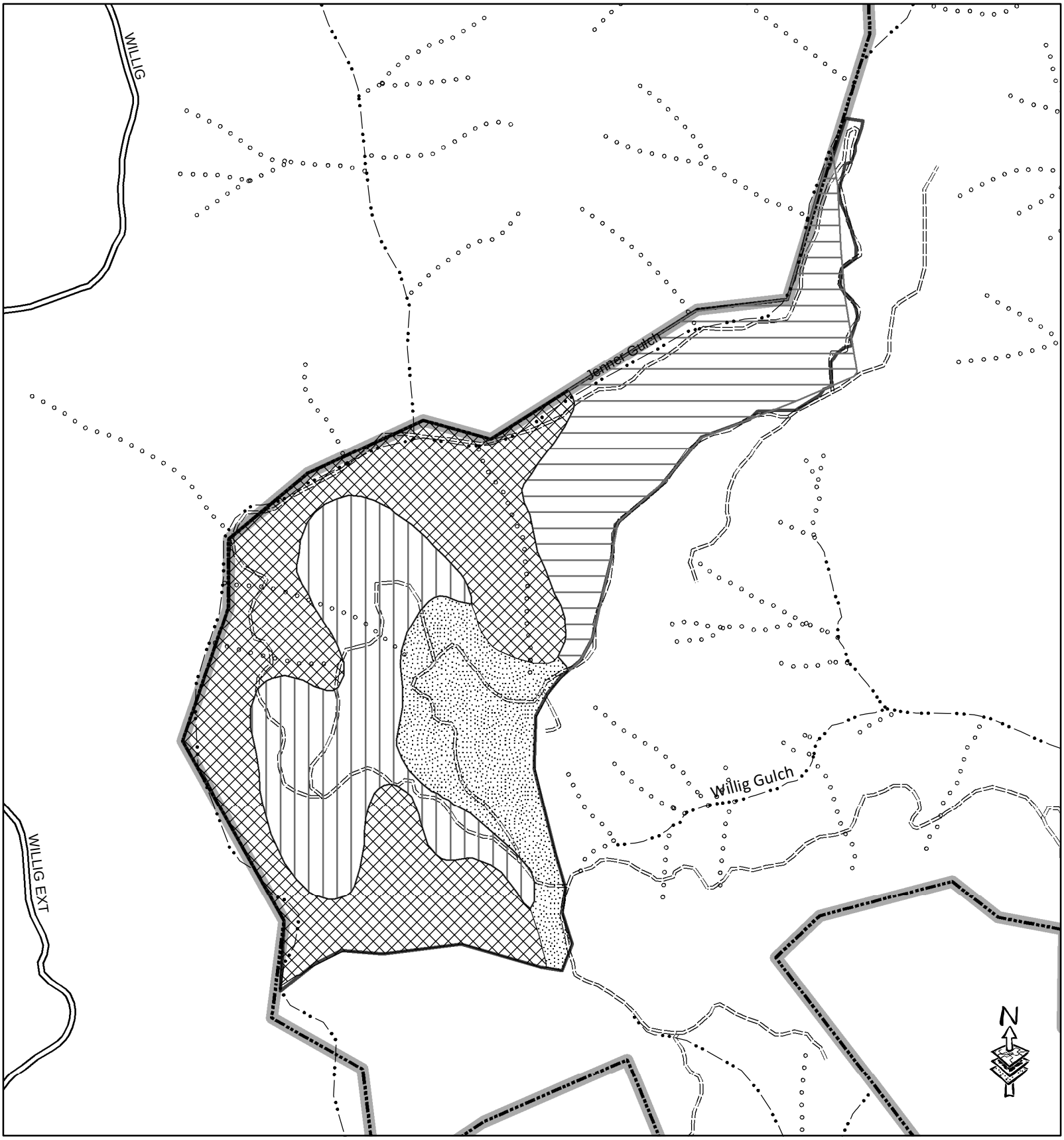

Figure 2

Berry's Knot Farm NTMP - Unit 1

Soil Map

Portions of Muniz Rancho
Portions of Duncans Mills 7.5' USGS Quadrangle Maps
Sonoma County

Unit #1
Property Boundary

HkG
HnG
JoG
MmF

SALIX NATURAL RESOURCE MANAGEMENT

1 inch = 1,000 feet

12/4/2025

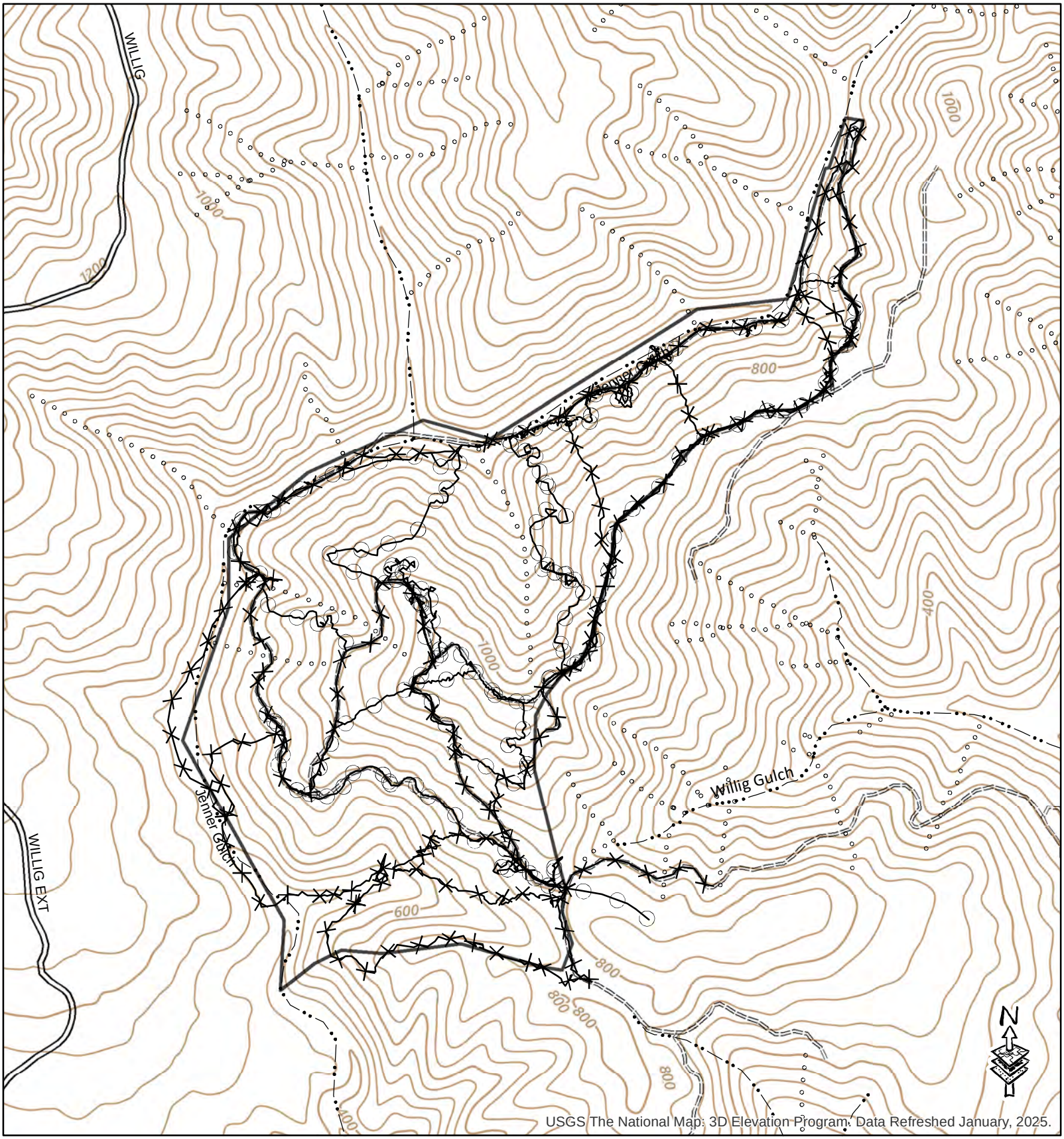

Figure 3

Berry's Knot Farm NTMP - Unit 1

Botanical Survey Map

Portions of Muniz Rancho

Portions of Duncans Mills 7.5' USGS Quadrangle Maps

Sonoma County

Unit #1

Property Boundary

Month

April

May

SALIX NATURAL RESOURCE MANAGEMENT

1 inch = 1,000 feet

Table 1. Special Status Plants with the Potential to Occur, Berry's Knot Farm NTO #1, 121-334 meters.

Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Abronia umbellata var. breviflora	Pink Sand-Verbena	Annual Herb	1B.1	S2	-	-	Jun-Oct	CD	Foredunes and interdunes with sparse cover. *A. umbellata* var. *breviflora* is usually the plant closest to the ocean.	0-10	None
Agrostis blasdalei	Blasdale's Bent Grass	Perennial Rizomatous Herb	1B.2	S2	-	-	May-Jul	CBS, CD, CP	Sandy or gravelly soil close to rocks; often in nutrient-poor soil with sparse vegetation.	0-150	None
Allium peninsulare var. franciscanum	Franciscan Onion	Perennial Bulbiferous Herb	1B.2	S2	-	-	(Apr)May-Jun	CW, VFG	Clay soils; often on serpentine; sometimes on volcanics. Dry hillsides.	52-305	Unlikely
Alopecurus aequalis var. sonomensis	Sonoma Alopecurus	Perennial Herb	1B.1	S1	-	FE	May-Jul	MS, RS	Wet areas, marshes, and riparian banks, with other wetland species.	5-365	Unlikely
Amorpha californica var. napensis	Napa False Indigo	Perennial Deciduous Shrub	1B.2	S2	-	-	Apr-Jul	BUF, Ch, CW	Openings in forest or woodland or in chaparral.	50-2000	High
Amsinckia lunaris	Bent-Flowered Fiddleneck	Annual Herb	1B.2	S3	-	-	Mar-Jun	CW, CBS, VFG	Gravelly slopes, grassland, openings in woodland, often serpentine	3-500	None

Table 1. Special Status Plants with the Potential to Occur, Berry's Knot Farm NTO #1, 121-334 meters.

Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Arabis blepharophylla	Coast Rockcress	Perennial Herb	4.3	S4	-	-	Feb-May	BUF, CBS, CP, CH	Rocky	3-1100	Unlikely
Arctostaphylos bakeri ssp. bakeri	Baker's Manzanita	Perennial Evergreen Shrub	1B.1	S1	CR	-	Feb-Apr	BUF, Ch	Often on serpentine.	75-300	Moderate
Arctostaphylos bakeri ssp. sublaevis	Cedars Manzanita	Perennial Evergreen Shrub	1B.2	S2	CR	-	Feb-May	Ch, CCCF	In serpentine chaparral and Sargent cypress woodland; typically	185-760	None
Arctostaphylos hispidula	Howell's Manzanita	Perennial Evergreen Shrub	4.2	S3	-	-	Mar-Apr	Ch, CCCF	Sandstone, Serpentinite	120-1250	None
Arctostaphylos stanfordiana ssp. decumbens	Rincon Ridge Manzanita	Perennial Evergreen Shrub	1B.1	S1	-	-	Feb-Apr(May)	Ch, CW	Highly restricted endemic to red rhyolites in Sonoma County.	75-370	Unlikely
Asclepias solanoana	Serpentine Milkweed	Perennial Herb	4.2	S3	-	-	May-Jul(Aug)	Ch, CW, LMCF	Serpentine	230-1860	Unlikely
Calamagrostis crassiglumis	Thurber's Reed Grass	Perennial Rhizomatous Herb	2B.1	S2	-	-	May-Aug	CH, MS	Usually in marshy swales surrounded by grassland or coastal scrub.	10-60	None
Calamagrostis ophitidis	Serpentine Reed Grass	Perennial Herb	4.3	S3	-	-	Apr-Jul	Ch, LMCF, MeSe, VFG	Openings, Often North-Facing Slopes, Rocky, Serpentine	90-1065	Unlikely
Calochortus raichei	Cedars Fairy-Lantern	Perennial Bulbiferous Herb	1B.2	S2	-	-	May-Aug	Ch, CCCF	On serpentine. Usually on shaded slopes, but also on barrens and talus.	200-490	Unlikely
Calochortus uniflorus	Pink Star-Tulip	Perennial Bulbiferous Herb	4.2	S4	-	-	Apr-Jun	CP, CH, MeSe, NCCF	Moist meadows	10-1070	Unlikely

Table 1. Special Status Plants with the Potential to Occur, Berry's Knot Farm NTO #1, 121-334 meters.

Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Calystegia collina ssp. oxyphylla	Mt. Saint Helena Morning-Glory	Perennial Rhizomatous Herb	4.2	S3	-	-	Apr-Jun	Ch, LMCF, VFG	On serpentine barrens, slopes, and hillsides.	279-1010	Unlikely
Calystegia purpurata ssp. saxicola	Coastal Bluff Morning-Glory	Perennial Herb	1B.2	S2, S3	-	-	(Mar)Apr-Sep	CBS, CD, CH, NCCF	Rocky coastal scrub	0-105	Unlikely
Carex comosa	Bristly Sedge	Perennial Rhizomatous Herb	2B.1	S2	-	-	May-Sep	CP, MS, VFG	Wet places	0-625	Unlikely
Carex saliniformis	Deceiving Sedge	Perennial Rhizomatous Herb	1B.2	S2	-	-	(May)Jun(Jul)	CP, CH, MS, MeSe	Marshes, pond shores, wet openings	3-230	Unlikely
Castilleja ambigua var. ambigua	Johnny-Nip	Annual Herb (Hemiparasitic)	4.2	S3, S4	-	-	Mar-Aug	CBS, CP, CH, MS, VFG, VP	Coastal bluffs, grassland	0-435	None
Castilleja latifolia	Monterey Coast Paintbrush	Perennial Herb (Hemiparasitic)	4.3	S4	-	-	Feb-Sep	CW, CCCF, CD, CH	Coastal dunes, scrub	0-185	None
Ceanothus confusus	Rincon Ridge Ceanothus	Perennial Evergreen Shrub	1B.1	S1	-	-	Feb-Jun	Ch, CW, CCCF	Known from volcanic or serpentine soils, dry shrubby slopes.	75-1065	Unlikely
Ceanothus foliosus var. vineatus	Vine Hill Ceanothus	Perennial Evergreen Shrub	1B.1	S1	-	-	Mar-May	Ch	Sandy, acidic soil in chaparral.	45-305	Unlikely
Ceanothus gloriosus var. exaltatus	Glory Brush	Perennial Evergreen Shrub	4.3	S4	-	-	Mar-Jun(Aug)	Ch	Sandy or rocky substrates in forest openings	30-610	High
Ceanothus gloriosus var. gloriosus	Point Reyes Ceanothus	Perennial Evergreen Shrub	4.3	S4	-	-	Mar-May	CCCF, CBS, CD, CH	Sandy	5-520	Unlikely

Table 1. Special Status Plants with the Potential to Occur, Berry's Knot Farm NTO #1, 121-334 meters.

Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Ceanothus purpureus	Holly-Leaved Ceanothus	Perennial Evergreen Shrub	1B.2	S2	-	-	Feb-Jun	Ch, CW	Rocky, Volcanic	120-640	Unlikely
Chlorogalum pomeridianum var. minus	Dwarf Soaproot	Perennial Bulbiferous Herb	1B.2	S3	-	-	May-Aug	Ch	Serpentine outcrops in chaparral	305-1000	None
Chloropyron maritimum ssp. palustre	Point Reyes Salty Bird's-Beak	Annual Herb (Hemiparasitic)	1B.2	S2	-	-	Jun-Oct	MS	Usually in coastal salt marsh with *Salicornia, Distichlis, Jaumea, Spartina* , etc.	0-10	None
Chorizanthe cuspidata var. cuspidata	San Francisco Bay Spineflower	Annual Herb	1B.2	S1	-	-	Apr-Jul(Aug)	CBS, CD, CP, CH	Sandy soil on terraces and slopes.	3-215	Unlikely
Chorizanthe cuspidata var. villosa	Woolly-Headed Spineflower	Annual Herb	1B.2	S2	-	-	May-Jul(Aug)	CD, CP, CH	Sandy	3-60	None
Chorizanthe valida	Sonoma Spineflower	Annual Herb	1B.1	S1	CE	FE	Jun-Aug	CP	Sandy	10-305	Unlikely
Cirsium andrewsii	Franciscan Thistle	Perennial Herb	1B.2	S3	-	-	Mar-Jul	BUF, CBS, CP, CH	Bluffs, ravines, seeps, occasionally serpentine	0-150	Unlikely
Collomia diversifolia	Serpentine Collomia	Annual Herb	4.3	S4	-	-	May-Jun	Ch, CW	Rocky to gravelly serpentine areas	200-600	Unlikely
Cordylanthus tenuis ssp. brunneus	Serpentine Bird's-Beak	Annual Herb (Hemiparasitic)	4.3	S3	-	-	Jul-Aug	Ch, CW, CCCF	Serpentine (usually)	305-915	Unlikely
Cordylanthus tenuis ssp. capillaris	Pennell's Bird's-Beak	Annual Herb (Hemiparasitic)	1B.2	S1	CR	FE	Jun-Sep	Ch, CCCF	In open or disturbed areas on serpentine within forest or chaparral.	45-305	Unlikely
Cuscuta pacifica var. papillata	Mendocino Dodder	Annual Vine (Parasitic)	1B.2	S1	-	-	(Jun)Jul-Oct	CD	Interdune Depressions	0-50	None

Table 1. Special Status Plants with the Potential to Occur, Berry's Knot Farm NTO #1, 121-334 meters.

Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Cypripedium californicum	California Lady's-Slipper	Perennial Rhizomatous Herb	4.2	S4	-	-	Apr-Aug(Sep)	BF, LMCF	Seeps, Serpentine (usually), Streambanks	30-2750	Moderate
Cypripedium montanum	Mountain Lady's-Slipper	Perennial Rhizomatous Herb	4.2	S4	-	-	Mar-Aug	BUF, CW, LMCF, NCCF	Moist areas, dry slopes	185-2225	Moderate
Delphinium bakeri	Baker's Larkspur	Perennial Herb	1B.1	S1	CE	FE	Mar-May	BUF, CH, VFG	Decomposed Shale, Mesic (often)	80-305	Moderate
Delphinium luteum	Golden Larkspur	Perennial Herb	1B.1	S1	CR	FE	Mar-May	Ch, CP, CH	Moist sites, cliffs, grassland	0-100	Unlikely
Dirca occidentalis	Western Leatherwood	Perennial Deciduous Shrub	1B.2	S2	-	-	Jan-Mar(Apr)	BUF, Ch, CW, CCCF, NCCF, RF,RP	Generally north or northeast facing slopes, in fog belt	25-425	High
Eastwoodiella californica	Swamp Harebell	Perennial Rhizomatous Herb	1B.2	S3	-	-	Jun-Oct	BF, CCCF, CP, MS, MeSe, NCCF	Bogs and marshes in a variety of habitats; uncommon where it occurs.	1-405	High
Eleocharis parvula	Small Spikerush	Perennial Herb	4.3	S3	-	-	(Apr)Jun-Aug(Sep)	MS	Brackish wet soil	1-3020	None
Elymus californicus	California Bottle-Brush Grass	Perennial Herb	4.3	S4	-	-	May-Aug(Nov)	BUF, CW, NCCF, RW	Shaded banks, wooded areas, redwood forests	15-470	High
Erigeron biolettii	Streamside Daisy	Perennial Herb	3	S3?	-	-	Jun-Oct	BUF, CW, NCCF	Mesic, Rocky	30-1100	High

Table 1. Special Status Plants with the Potential to Occur, Berry's Knot Farm NTO #1, 121-334 meters.

Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Erigeron greenei	Greene's Narrow-Leaved Daisy	Perennial Herb	1B.2	S2?	-	-	May-Sep	Ch	Serpentine and volcanic substrates, generally in shrubby vegetation.	80-1005	Unlikely
Erigeron serpentinus	Serpentine Daisy	Perennial Herb	1B.3	S2	-	-	May-Aug	Ch	Seeps, Serpentinite	60-670	Unlikely
Eriogonum cedrorum	Cedars Buckwheat	Perennial Herb	1B.3	S1	-	-	Jun-Sep	CCCF	Serpentine. Barren rock and talus steep slopes.	365-550	None
Eriogonum ternatum	Ternate Buckwheat	Perennial Herb	4.3	S4	-	-	Jun-Aug	LMCF	Serpentinite	305-2225	None
Erysimum concinnum	Bluff Wallflower	Annual/Perennial Herb	1B.2	S2	-	-	Feb-Jul	CBS, CD, CP	More or less a coastal generalist within coastal habitat types.	0-185	None
Erysimum franciscanum	San Francisco Wallflower	Perennial Herb	4.2	S3	-	-	Mar-Jun	Ch, CD, CH, VFG	Serpentine outcrops, coastal scrub or sand dunes, granitic hillsides	0-550	Unlikely
Erythranthe nudata	Bare Monkeyflower	Annual Herb	4.3	S4	-	-	May-Jun	Ch, CW	Seeps in serpentine outcrops	200-700	None
Fissidens pauperculus	Minute Pocket Moss	Moss	1B.2	S2	-	-	N/A	NCCF	Moss growing on damp soil along the coast. In dry streambeds and on stream banks.	10-1024	High

Table 1. Special Status Plants with the Potential to Occur, Berry's Knot Farm NTO #1, 121-334 meters.

Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Fritillaria liliacea	Fragrant Fritillary	Perennial Bulbiferous Herb	1B.2	S2	-	-	Feb-Apr	CW, CP, CH, VFG	Often on serpentine; various soils reported though usually on clay, in grassland.	3-410	Unlikely
Gilia capitata ssp. chamissonis	Blue Coast Gilia	Annual Herb	1B.1	S2	-	-	Apr-Jul	CD, CH	Coastal sandhills	2-200	None
Gilia capitata ssp. pacifica	Pacific Gilia	Annual Herb	1B.2	S2	-	-	Apr-Aug	Ch, CBS,CP, VFG	Steep slopes, ravines, open flats or coastal bluffs, grassland, dunes.	5-1665	Unlikely
Gilia capitata ssp. tomentosa	Woolly-Headed Gilia	Annual Herb	1B.1	S2	-	-	May-Jul	CBS, VFG	Rocky outcrops, sometimes serpentine.	10-220	Unlikely
Gilia millefoliata	Dark-Eyed Gilia	Annual Herb	1B.2	S2	-	-	Apr-Jul	CD	Stabilized coastal dunes	2-30	None
Hemizonia congesta ssp. congesta	Congested-Headed Hayfield Tarplant	Annual Herb	1B.2	S2	-	-	Apr-Nov	VFG	Grassy valleys and hills, often in fallow fields; sometimes along roadsides.	20-560	Moderate
Hesperevax sparsiflora var. brevifolia	Short-Leaved Evax	Annual Herb	1B.2	S3	-	-	Mar-Jun	CBS, CD, CP	Sandy	0-215	Unlikely
Horkelia marinensis	Point Reyes Horkelia	Perennial Herb	1B.2	S2	-	-	May-Sep	CD, CP,CH	Sandy coastal flats	5-755	Unlikely
Horkelia tenuiloba	Thin-Lobed Horkelia	Perennial Herb	1B.2	S2	-	-	May-Jul(Aug)	BUF, Ch, VFG	Sandy soils, open chaparral	50-500	Unlikely

Table 1. Special Status Plants with the Potential to Occur, Berry's Knot Farm NTO #1, 121-334 meters.

Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Hosackia gracilis	Harlequin Lotus	Perennial Rhizomatous Herb	4.2	S3	-	-	Mar-Jul	BUF, CW, CCCF, CBS, CP, CH, MS, MeSe, NCCF, VFG	In water, springy areas, shores, meadows, roadside ditches	0-700	Moderate
Iris longipetala	Coast Iris	Perennial Rhizomatous Herb	4.2	S3	-	-	Mar-May(Jun)	CP, LMCF, MeSe	Moist, coastal prairie or open coastal forest.	0-600	Unlikely
Kopsiopsis hookeri	Small Groundcone	Perennial Rhizomatous Herb (Parasitic)	2B.3	S1, S2	-	-	Apr-Aug	LMCF, NCCF, UMCF	Open woods, shrubby places, generally on *Gaultheria shallon*.	90-885	High
Lasthenia californica ssp. bakeri	Baker's Goldfields	Perennial Herb	1B.2	S1	-	-	Apr-Oct	CCCF, CH, MS, MeSe	Openings	60-520	None
Lasthenia californica ssp. macrantha	Perennial Goldfields	Perennial Herb	1B.2	S2	-	-	Jan-Nov	CBS, CD, CH	Grasslands, dunes along immediate coast	5-520	None
Lasthenia conjugens	Contra Costa Goldfields	Annual Herb	1B.1	S1	-	FE	Mar-Jun	CW, Pl, VFG, VP	Vernal pools, wet meadows	0-470	None
Lathyrus palustris	Marsh Pea	Perennial Herb	2B.2	S2	-	-	Mar-Aug	BF, CP, CH, LMCF, MS, NCCF	Moist, wet coastal areas	1-100	None
Leptosiphon aureus	Bristly Leptosiphon	Annual Herb	4.2	S4?	-	-	Apr-Jul	Ch, CW, CP, VFG	Grassy areas in woodland and chaparral	55-1500	Unlikely

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Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Leptosiphon grandiflorus	Large-Flowered Leptosiphon	Annual Herb	4.2	S3, S4?	-	-	Apr-Aug	CW, CCCF, CBS, CD, CP, CH, VFG	Open, grassy flats, generally sandy soil	5-1220	Unlikely
Leptosiphon jepsonii	Jepson's Leptosiphon	Annual Herb	1B.2	S2, S3	-	-	Mar-May	Ch, CW, VFG	Open to partially shaded grassy slopes. On volcanics or the periphery of serpentine substrates.	100-500	Unlikely
Leptosiphon rosaceus	Rose Leptosiphon	Annual Herb	1B.1	S1	-	-	Apr-Jul	CBS	Open, grassy slopes	0-100	Unlikely
Lessingia arachnoidea	Crystal Springs Lessingia	Annual Herb	1B.2	S2	-	-	Jul-Oct	CW, CH, VFG	Grassy slopes on serpentine; sometimes on roadsides.	60-200	Unlikely
Lessingia hololeuca	Woolly-Headed Lessingia	Annual Herb	3	S2, S3	-	-	Jun-Oct	BUF, CH, LMCF, VFG	Grasslands, roadsides, occasionally on serpentine or alkali	15-305	Unlikely
Limnanthes vinculans	Sebastopol Meadowfoam	Annual Herb	1B.1	S1	CE	FE	Apr-May	MeSe, VFG, VP	Swales, wet meadows and marshy areas in valley oak savanna; on poorly drained soils of clays and sandy loam.	15-305	None

Table 1. Special Status Plants with the Potential to Occur, Berry's Knot Farm NTO #1, 121-334 meters.

Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Lupinus tidestromii	Tidestrom's Lupine	Perennial Rhizomatous Herb	1B.1	S1	CE	FE	Apr-Jun	CD	Partially stabilized dunes, immediately near the ocean	0-100	None
Microseris paludosa	Marsh Scorzonella	Perennial Herb	1B.2	S2	-	-	Apr-Jun(Jul)	CW, CCCF, CH, VFG	Moist grassland, open woodland	5-355	Unlikely
Monardella viridis	Green Monardella	Perennial Rhizomatous Herb	4.3	S3	-	-	Jun-Sep	BUF, Ch, CW	Chaparral, oak woodland, conifer forest, also serpentine.	100-1010	Moderate
Piperia candida	White-Flowered Rein Orchid	Perennial Herb	1B.2	S3	-	-	(Mar-Apr)May-Sep	BUF, LMCF, NCCF	Open to shady sites, conifer and mixed-evergreen forest	30-1310	High
Piperia leptopetala	Narrow-Petaled Rein Orchid	Perennial Herb	4.3	S4	-	-	May-Jul	CW, LMCF, UMCF	Generally dry sites, scrub, woodland	380-2225	Unlikely
Pleuropogon hooverianus	North Coast Semaphore Grass	Perennial Rhizomatous Herb	1B.1	S2	CT	-	Apr-Jun	BUF, MeSe, NCCF	Wet grassy, usually shady areas, sometimes freshwater marsh; associated with forest environments.	10-671	Moderate
Polemonium carneum	Oregon Polemonium	Perennial Herb	2B.2	S2	-	-	Apr-Sep	CP, CH, LMCF	Moist to dry, open areas.	0-1830	Moderate
Polygonum marinense	Marin Knotweed	Annual Herb	3.1	S2	-	-	(Apr)May-Aug(Oct)	MS	Brackish, Coastal Salt	0-10	None
Ramalina thrausta	Angel's Hair Lichen	Fruticose Lichen (Epiphytic)	2B.1	S2, S3	-	-	N/A	NCCF	On dead twigs and other lichens	75-430	Unlikely

Table 1. Special Status Plants with the Potential to Occur, Berry's Knot Farm NTO #1, 121-334 meters.

Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Ranunculus lobbii	Lobb's Aquatic Buttercup	Annual Herb (Aquatic)	4.2	S3	-	-	Feb-May	CW, NCCF, VFG, VP	Ponds	15-470	None
Sidalcea calycosa ssp. rhizomata	Point Reyes Checkerbloom	Perennial Rhizomatous Herb	1B.2	S2	-	-	Apr-Sep	MS	Freshwater, Near Coast	3-75	None
Sidalcea malviflora ssp. purpurea	Purple-Stemmed Checkerbloom	Perennial Rhizomatous Herb	1B.2	S1	-	-	May-Jun	BUF, CP	Meadows, open coastal forest, prairie.	15-85	None
Silene scouleri ssp. scouleri	Scouler's Catchfly	Perennial Herb	2B.2	S2, S3	-	-	(Mar-May)Juun-Aug(Sep)	CBS, CP, VFG	Rocky slopes	0-600	None
Streptanthus barbiger	Bearded Jewelflower	Annual Herb	4.2	S3	-	-	May-Jul	Ch	Serpentine barrens, chaparral	150-1070	None
Streptanthus glandulosus ssp. hoffmanii	Hoffman's Bristly Jewelflower	Annual Herb	1B.3	S2	-	-	Mar-Jul	Ch, CW, VFG	Moist, steep rocky banks, in serpentine and non-serpentine soil.	120-475	None
Streptanthus morrisonii ssp. hirtiflorus	Dorr's Cabin Jewelflower	Perennial Herb	1B.2	S1	-	-	Jun	Ch, CCCF	On the serpentine barrens at the head of Austin Creek.	185-820	None
Streptanthus morrisonii ssp. morrisonii	Morrison's Jewelflower	Perennial Herb	1B.2	S1?	-	-	May-Sep	Ch	Serpentine outcrops in the Austin Creek area.	120-585	None
Thamnolia vermicularis	Whiteworm Lichen	Fruticose Lichen (Terricolous)	2B.1	S1	-	-	N/A	Ch, VFG	Rocky, Sandstone	90-90	None
Trichostema ovatum	San Joaquin Bluecurls	Annual Herb	4.2	S3	-	-	(Apr-Jun)Jul-Oct	CS, VFG	Grassland, disturbed sites	65-320	None

Table 1. Special Status Plants with the Potential to Occur, Berry's Knot Farm NTO #1, 121-334 meters.

Scientific Name	Common Name	Lifeform	CRPR	SRank	CESA[1]	FESA[2]	Blooming Period	Habitat	Micro Habitat	Elevation Range (m)	Potential Habitat
Trifolium amoenum	Two-Fork Clover	Annual Herb	1B.1	S1	-	FE	Apr-Jun	CBS, VFG	Sometimes on serpentine soil, open sunny sites, swales. Most recently cited on roadside and eroding cliff face.	5-415	Unlikely
Trifolium buckwestiorum	Santa Cruz Clover	Annual Herb	1B.1	S2	-	-	Apr-Oct	BUF, CW, CP	Moist grassland. Gravelly swales in roads.	35-610	High
Trifolium hydrophilum	Saline Clover	Annual Herb	1B.2	S2	-	-	Apr-Jun	MS, VFG, VP	Salt marshes, open areas in alkaline soils.	0-300	None
Triphysaria floribunda	San Francisco Owl's-Clover	Annual Herb	1B.2	S2?	-	-	Apr-Jun	CP, CH, VFG	Serpentine (usually)	10-160	Unlikely
Triquetrella californica	Coastal Triquetrella	Moss	1B.2	S2	-	-	N/A	CBS, CH	On soil	10-100	None
Usnea longissima	Methuselah's Beard Lichen	Fruticose Lichen (Epiphytic)	4.2	S4	-	-	N/A	BUF, NCCF	Grows in the "redwood zone" on tree branches of a variety of trees, including big leaf maple, oaks, ash, Douglas-fir, and bay.	50-1460	High

[1] *CE = California Endangered, CT = California Threatened, CR = California Rare*

[2] *FE = Federally Endangered*

BF= Bogs & Fens
BUF= Broadleafed Upland Forest
CBS= Coastal Bluff Scrub
CCCF= Closed Cone Coniferous Forest
CD= Coastal Dune
Ch= Chaparral
CH= Coastal Scrub
CP= Coastal Prairie
CS- Chenpod Scrub
CW= Cismontane Woodland
GBS= Great Basin Scrub
LMCF= Lower Montane Coniferous Forest
MeSe= Meadows & Seeps
MS- Marshes & Swamps
NCCF= North Coast Coniferous Forest
Pl= Playas
RF= Riparian Forest
RS= Riparian Scrub
RW= Riparian Woodland
SCF= Subalpine Coniferous Forest
UMCF= Upper Montane Coniferous Forest
VFG= Valley & Foothills Grassland
VP= Vernal Pools

Table 2. Special Status Plant Communities with Potential to Occur, Berry's Knot Farm NTO #1, Unit 1

Scientific Name	**Common Name**	**Primary Lifeform**	**Global Rarity**	**State Rarity**	**Likelihood of Occurrence at Project Site?**
Abies grandis	Grand fir forest	Tree	G4	S2.1	None
Abronia latifolia - Ambrosia chamissonis	Dune mat	Herb	G3	S3	None
Acer macrophyllum	Bigleaf maple forest and woodland	Tree	G4	S3	Unlikely
Acer negundo	Box-elder forest and woodland	Tree	G5	S2.2	Unlikely
Aesculus californica	California buckeye groves	Tree	G3	S3	Unlikely
Allium spp. - Streptanthus spp. - Hesperolinon spp. Serpentinite	Onion - twistflower - dwarf-flax serpentinite rock outcrop	Herb	G2G3	S2S3	Unlikely
Alnus viridis	Sitka alder thickets	Shrub	G5	S3?	None
Alopecurus geniculatus	Water foxtail meadows	Herb	G3?	S3?	None
Arctostaphylos glandulosa	Eastwood manzanita chaparral	Shrub	G4	S3	Moderate
Arctostaphylos (bakeri, montana)	Baker's or Mt. Tamalpais manzanita chaparral	Shrub	G3	S3	Unlikely
Arctostaphylos (canescens, manzanita, stanfordiana)	Hoary, common, and Stanford manzanita chaparral	Shrub	G3	S3	Unlikely
Arctostaphylos (nummularia, sensitiva) - Chrysolepis chrysophylla	Glossy leaf manzanita - Golden chinquapin chaparral	Shrub	G2	S2	None
Argentina egedii	Pacific silverweed marshes	Herb	G4	S1	None
Bolboschoenus maritimus	Salt marsh bulrush marshes	Herb	G4	S3	None
Bromus carinatus - Elymus glaucus	California brome - blue wildrye prairie	Herb	G3	S3	High
Bromus rubens - Schismus (arabicus, barbatus)	Red brome or Mediterranean grass grasslands	Herb	None	None	Moderate
Calamagrostis nutkaensis	Pacific reed grass meadows	Herb	G4	S2	None

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Scientific Name	**Common Name**	**Primary Lifeform**	**Global Rarity**	**State Rarity**	**Likelihood of Occurrence at Project Site?**
Calocedrus decurrens	Incense cedar forest and woodland	Tree	G4	S3	None
Carex (aquatilis, lenticularis)	Water sedge and lakeshore sedge meadows	Herb	G5	S3	None
Carex (pansa, praegracilis)	Sand dune sedge swaths	Herb	G4?	S3?	None
Carex barbarae	White-root beds	Herb	G2?	S2?	None
Carex densa	Dense sedge marshes	Herb	G2?	S2?	None
Carex lyngbyei	Lyngbye's sedge swathes	Herb	GNR	S1	None
Carex nudata	Torrent sedge patches	Herb	G3	S3	None
Carex obnupta	Slough sedge swards	Herb	G4	S3	Unlikely
Carex serratodens	Twotooth sedge seeps	Herb	G3	S3?	None
Ceanothus (oliganthus, tomentosus)	Hairy leaf - woolly leaf ceanothus chaparral	Shrub	G3	S3	Unlikely
Chamaecyparis lawsoniana	Port Orford cedar forest and woodland	Tree	G3	S3.1	None
Corylus cornuta var. californica	Hazelnut scrub	Shrub	G3	S2?	Moderate
Darlingtonia californica	California pitcher plant fens	Herb	G4?	S3	None
Deschampsia cespitosa - Hordeum brachyantherum - Danthonia californica	Coastal tufted hair grass - Meadow barley - California oatgrass meadow	Herb	GNR	S3	Unlikely
Eriophyllum staechadifolium - Erigeron glaucus - Eriogonum latifolium	Seaside woolly-sunflower - seaside daisy - buckwheat patches	Herb	G3	S3	None
Festuca idahoensis - Danthonia californica	Idaho fescue - California oatgrass grassland	Herb	GNR	S3	Unlikely
Frangula californica - Rhododendron occidentale - Salix breweri	California coffee berry - western azalea scrub - Brewer's willow	Shrub	G3	S3	Unlikely

Table 2. Special Status Plant Communities with Potential to Occur, Berry's Knot Farm NTO #1, Unit 1

Scientific Name	**Common Name**	**Primary Lifeform**	**Global Rarity**	**State Rarity**	**Likelihood of Occurrence at Project Site?**
Frankenia salina	Alkali heath marsh	Herb	G4	S3	None
Fraxinus latifolia	Oregon ash groves	Tree	G4	S3.2	High
Glyceria Ã—occidentalis	Northwest manna grass marshes	Herb	G3?	S3?	None
Grindelia (camporum, stricta)	Gum plant patches	Herb	G2G3	S2S3	None
Hesperocyparis (sargentii, macnabiana)	Ultramafic cypress woodland	Tree	G3	S3	Unlikely
Hesperocyparis pigmaea	Mendocino pygmy cypress woodland	Tree	G1	S1	None
Heterotheca (oregona, sessiliflora)	Goldenaster patches	Herb	G3	S3	None
Hydrocotyle (ranunculoides, umbellata)	Mats of floating pennywort	Herb	G4	S3?	None
Isoetes (bolanderi, echinospora, howellii, nuttallii, occidentalis)	Quillwort beds	Herb	G3	S3?	None
Juglans hindsii and Hybrids	Hindsâ€™s walnut and related stands	Tree	G1	S1.1	Unlikely
Juncus (oxymeris, xiphioides)	Iris-leaf rush seeps	Herb	G2?	S2?	Unlikely
Juncus lescurii	Salt rush swales	Herb	G3	S2?	None
Lasthenia glaberrima	Smooth goldfields vernal pool bottoms	Herb	G2	S2	None
Leymus cinereus - Leymus triticoides	Ashy ryegrass - Creeping wildrye turfs	Herb	G3	S3	Unlikely
Leymus mollis	Sea lyme grass patches	Herb	G4	S2	None
Lupinus chamissonis - Ericameria ericoides	Silver dune lupine - mock heather scrub	Shrub	G3	S3	None
Mimulus (guttatus)	Common monkey flower seeps	Herb	G4?	S3?	High
Notholithocarpus densiflorus	Tanoak forest	Tree	G4	S3.2	High

Table 2. Special Status Plant Communities with Potential to Occur, Berry's Knot Farm NTO #1, Unit 1

Scientific Name	**Common Name**	**Primary Lifeform**	**Global Rarity**	**State Rarity**	**Likelihood of Occurrence at Project Site?**
Nuphar lutea	Yellow pond-lily mats	Herb	G5	S3?	None
Oenanthe sarmentosa	Water-parsley marsh	Herb	G4	S2?	Moderate
Picea sitchensis	Sitka spruce forest and woodland	Tree	G5	S2	None
Pinus contorta ssp. contorta	Beach pine forest and woodland	Tree	G5	S3	None
Populus fremontii - Fraxinus velutina - Salix gooddingii	Fremont cottonwood forest and woodland	Tree	G4	S3.2	Unlikely
Populus trichocarpa	Black cottonwood forest and woodland	Tree	G5	S3	Unlikely
Pseudotsuga menziesii - Notholithocarpus densiflorus	Douglas fir - tanoak forest and woodland	Tree	G3	S3	High
Quercus garryana (tree)	Oregon white oak woodland and forest	Tree	G4	S3	High
Quercus lobata	Valley oak woodland and forest	Tree	G3	S3	None
Quercus lobata Riparian	Valley oak riparian forest and woodland	Tree	G3	S3	Unlikely
Rhododendron columbianum	Western Labrador-tea thickets	Shrub	G4	S2?	Unlikely
Rubus spectabilis - Morella californica	Salmonberry - Wax myrtle scrub	Shrub	G4	S3	None
Ruppia (cirrhosa, maritima)	Ditch-grass or widgeon-grass mats	Herb	G4?	S2	Unlikely
Salix gooddingii - Salix laevigata	Goodding's willow - red willow riparian woodland and forest	Tree	G4	S3	None
Salix hookeriana	Coastal dune willow thickets	Shrub	G4	S3	Unlikely
Salix lucida ssp. lasiandra	Shining willow groves	Tree	G4	S3.2	High
Salix sitchensis	Sitka willow thickets	Shrub	G4	S3?	None
Sarcocornia pacifica (Salicornia depressa)	Pickleweed mats	Herb	G4	S3	None

Table 2. Special Status Plant Communities with Potential to Occur, Berry's Knot Farm NTO #1, Unit 1

Scientific Name	**Common Name**	**Primary Lifeform**	**Global Rarity**	**State Rarity**	**Likelihood of Occurrence at Project Site?**
Schoenoplectus americanus	Common Three-square marsh	Herb	G5	S3.2	Unlikely
Scirpus microcarpus	Small-fruited bulrush marsh	Herb	G4	S2	Unlikely
Selaginella (bigelovii, wallacei)	Bushy spikemoss mats	Herb	G4	S3	Unlikely
Sequoia sempervirens	**Redwood forest and woodland**	**Tree**	**G3**	**S3.2**	**Present. See body of of report for details.**
Sparganium (angustifolium)	Mats of bur-reed leaves	Herb	G4	S3?	None
Spartina foliosa	California cordgrass marsh	Herb	G3	S3.2	None
Stuckenia (pectinata) - Potamogeton spp.	Pondweed mats	Herb	G3G5	S3?	None
Trifolium variegatum	White-tip clover swales	Herb	G3?	S3?	Unlikely
Tsuga heterophylla	Western hemlock forest	Tree	G5	S2	None
Umbellularia californica	California bay forest and woodland	Tree	G4	S3	High
Vaccinium uliginosum	Bog blueberry wet meadows	Shrub	G4	S3	None
Vitis arizonica - Vitis girdiana	Wild grape shrubland	Shrub	G3	S3	None
Zostera (marina, pacifica) Pacific Aquatic	Eelgrass beds	Herb	GNR	S3	None

January 2022 CNPS, Northern California Coast Alliance Map

Table 3. Plants Observed During 2024 Boanical Surveys, Berry's Knot Farm NTO #1

Scientific Name	Common Name	Family	Cal IPC	Origin
Sambucus racemosa var. racemosa	red elderberry	ADOXACEAE		Native
Chlorogalum angustifolium	narrow-leaved soap plant	AGAVACEAE		Native
Allium triquetrum	three corner leek	ALLIACEAE		Non-Native
Toxicodendron diversilobum	poisonoak	ANACARDIACEAE		Native
Conium maculatum	poison-hemlock	APIACEAE	Moderate	Non-Native
Heracelum maximum	cow parsnip	APIACEAE		Native
Osmorhiza berteroi	mountain sweet-cicely	APIACEAE		Native
Sanicula crassicaulis	pacific snakeroot	APIACEAE		Native
Sanicula laciniata	coast sanicle	APIACEAE		Native
Torilis arvensis	tall sock destroyer	APIACEAE	Moderate	Non-Native
Aristolochia californica	pipe vine	ARISTOLOCHIACEAE		Native
Asarum caudatum	wild ginger	ARISTOLOCHIACEAE		Native
Achillea millefolium	common yarrow	ASTERACEAE		Native
Adenocaulon bicolor	trail plant	ASTERACEAE		Native
Agoseris retrorsa	spear-leaved dandelion	ASTERACEAE		Native
Anaphalis margaritaceae	pearly everlasting	ASTERACEAE		Native
Anisocarpus madiodes	woodland madia	ASTERACEAE		Native
Arnica discoidea	rayless arnica	ASTERACEAE		Native
Artemisia douglasiana	mugwort	ASTERACEAE		Native
Baccharis pilularis ssp. consanguinea	coyote brush	ASTERACEAE		Native
Cirsium arvense	Canada thistle	ASTERACEAE		Native
Cirsium vulgare	bull thistle	ASTERACEAE	Moderate	Non-Native
Erigeron canadensis	horseweed	ASTERACEAE		Native
Eriophyllum lanatum var. arachnoideum	woolly sunflower	ASTERACEAE		Native
Euchiton gymnocephalus	creeping cudweed	ASTERACEAE		Non-Native
Eurybia radulina	roughleaf aster	ASTERACEAE		Native
Gamochaeta ustulata	purple cudweed	ASTERACEAE		Native
Helminthotheca echioides	Bristly ox-tongue	ASTERACEAE	Limited	Non-Native
Hieracium albiflorum	white hawkweed	ASTERACEAE		Native
Hypochaeris glabra	smooth cats ear	ASTERACEAE	Limited	Non-Native
Hypochaeris sp.	cats ear	ASTERACEAE	Moderate	Non-Native
Lactuca serriola	prickly lettuce	ASTERACEAE		Non-Native
Leontodon saxatilis	hawkbit	ASTERACEAE		Non-Native
Leucanthemum vulgare	ox-eyed daisy	ASTERACEAE	Moderate	Non-Native
Madia exigua	small tarweed	ASTERACEAE		Native
Madia sp.	tarweed	ASTERACEAE		Native
Plagiobothrys bracteatus	bracted popcornflower	ASTERACEAE		Native
Pseudognaphalium beneolens	cudweed	ASTERACEAE		Native

Table 3. Plants Observed During 2024 Boanical Surveys, Berry's Knot Farm NTO #1

Scientific Name	Common Name	Family	Cal IPC	Origin
Pseudognaphalium californicum	ladies tobacco	ASTERACEAE		Native
Pseudognaphalium luteoalbum	Jersey cudweed	ASTERACEAE		Non-Native
Senecio glomeratus	cut-leaved coast fireweed	ASTERACEAE		Non-Native
Senecio minimus	fireweed	ASTERACEAE		Non-Native
Silybum marianum	milkthistle	ASTERACEAE	Limited	Non-Native
Soliva sessilis	solvia	ASTERACEAE		Non-Native
Sonchus oleraceus	common sow thistle	ASTERACEAE		Non-Native
Berberis nervosa	dwarf Oregon-grape	BERBERIDACEAE		Native
Vancouveria planipetala	redwood inside-out-flower	BERBERIDACEAE		Native
Alnus rubra	red alder	BETULACEAE		Native
Corylus cornuta var. californica	California hazelnut	BETULACEAE		Native
Struthiopteris spicant	deer fern	BLECHNACEAE		Native
Woodwardia fimbriata	giant chain fern	BLECHNACEAE		Native
Adelinia grandis	hound's tongue	BORAGINACEAE		Native
Myosotis latifolia	forget-me-not	BORAGINACEAE	Limited	Non-Native
Myosotis laxa	forget-me-not	BORAGINACEAE		Native
Cardamine californica	California milkmaids	BRASSICACEAE		Native
Cardamine hirsuta	hairy bittercress	BRASSICACEAE		Non-Native
Cardamine pensylvanica	Pennsylvania bittercress	BRASSICACEAE		Native
Lonicera hispidula	hairy honeysuckle	CAPRIFOLIACEAE		Native
Symphoricarpos albus var. laevigatus	common snowberry	CAPRIFOLIACEAE		Native
Cerastium glomeratum	mouse ear chickweed	CARYOPHYLLACEAE		Non-Native
Stellaria sp.	chickweed	CARYOPHYLLACEAE		Non-Native
Marah oregana	Oregon man-root	CUCURBITACEAE		Native
Sequoia sempervirens	coast redwood	CUPRESSACEAE		Native
Carex brevicaulis	short stem sedge	CYPERACEAE		Native
Carex densa	dense sedge	CYPERACEAE		Native
Carex globosa	round-footed sedge	CYPERACEAE		Native
Carex gyndodynama	Wonder woman sedge	CYPERACEAE		Native
Carex hendersonii	Henderson's sedge	CYPERACEAE		Native
Carex leptopoda	slender footed sedge	CYPERACEAE		Native
Carex praegracilis	clustered field sedge	CYPERACEAE		Native
Carex obnupta	slough sedge	CYPERACEAE		Native
Carex sp.	sedge	CYPERACEAE		Native
Cyperus eragrostis	nutsedge	CYPERACEAE		Native
Pteridium aquilinum var. pubescens	western bracken fern	DENNSTAEDTIACEAE		Native
Dryopteris arguta	coastal wood fern	DRYOPTERIDACEAE		Native
Polystichum munitum	sword fern	DRYOPTERIDACEAE		Native

Table 3. Plants Observed During 2024 Boanical Surveys, Berry's Knot Farm NTO #1

Scientific Name	Common Name	Family	Cal IPC	Origin
Equisetum arvense	horsetail	EQUISETACEAE		Native
Arbutus menziesii	Pacific madrone	ERICACEAE		Native
Arctostaphylos columbiana	redwood manzanita	ERICACEAE		Native
Arctostaphylos manzanita ssp. manzanita	common manzanita	ERICACEAE		Native
Chimaphila menziesii	little prince's pine	ERICACEAE		Native
Gaultheria shallon	salal	ERICACEAE		Native
Pyrola aphylla	leafless wintergreen	ERICACEAE		Native
Vaccinium ovatum	evergreen huckleberry	ERICACEAE		Native
Acmispon parviflorus	rose-flowered lotus	FABACEAE		Native
Acmispon wrangelianus	Chilean trefoil	FABACEAE		Native
Genista monspessulana	French broom	FABACEAE	High	Non-Native
Lathyrus sulphureus var. sulphureus	Brewer's pea	FABACEAE		Native
Lathyrus torreyi	Redwood pea	FABACEAE		Native
Lathyrus vestitus	common pacific pea	FABACEAE		Native
Lupinus albifrons var. albifrons	silver lupine	FABACEAE		Native
Medicago polymorpha	bur clover	FABACEAE	Limited	Non-Native
Trifolium benghalensis	purple vetch	FABACEAE		Non-Native
Trifolium ciliolatum	tree clover	FABACEAE		Native
Trifolium depauperatum	dwarf sack clover	FABACEAE		Native
Trifolium dubium	shamrock clover	FABACEAE		Non-Native
Trifolium oliganthum	few-flowered clover	FABACEAE		Native
Trifolium repens	white clover	FABACEAE		Non-Native
Trifolium sp.	clover	FABACEAE		Native
Trifolium subterraneum	subterraneum clover	FABACEAE		Non-Native
Vicia gigantea	giant vetch	FABACEAE		Native
Vicia hassei	Hasse's vetch	FABACEAE		Native
Vicia sativa	spring vetch	FABACEAE		Non-Native
Vicia sativa ssp. nigra	smaller common vetch	FABACEAE		Non-Native
Vicia sp.	vetch	FABACEAE		Native
Notholithocarpus densiflorus var. densiflorus	tanoak	FAGACEAE		Native
Erodium botrys	big heron bill	GERANIACEAE		Non-Native
Erodium cicutarium	coastal heron's bill	GERANIACEAE	Limited	Non-Native
Geranium core-core	Alderney crane-bill	GERANIACEAE		Non-Native
Geranium dissectum	cut-leaved geranium	GERANIACEAE	Limited	Non-Native
Geranium molle	dovefoot geranium	GERANIACEAE		Non-Native
Geranium sp.	Geranium	GERANIACEAE		Non-Native
Ribes californicum var. californicum	California gooseberry	GROSSULARIACEAE		Native

Table 3. Plants Observed During 2024 Boanical Surveys, Berry's Knot Farm NTO #1

Scientific Name	Common Name	Family	Cal IPC	Origin
Ribes sanguineum var. glutinosum	pink-flowering currant	GROSSULARIACEAE		Native
Whipplea modesta	modesty	HYDRANGEACEAE		Native
Iris douglasiana	Douglas iris	IRIDACEAE		Native
Sisyrinchium bellum	blue-eyed grass	IRIDACEAE		Native
Juncus balticus ssp. ater	Baltic rush	JUNCACEAE		Native
Juncus bufonius	common toad rush	JUNCACEAE		Native
Juncus effusus ssp. pacificus	common rush	JUNCACEAE		Native
Juncus patens	common rush	JUNCACEAE		Native
Luzula comosa var. comosa	hairy wood rush	JUNCACEAE		Native
Luzula sp.	wood rush	JUNCACEAE		Native
Clinopodium douglasii	yerba santa	LAMIACEAE		Native
Lepichinia calycina	pitcher sage	LAMIACEAE		Native
Mentha pulegium	pennyroyal	LAMIACEAE	Moderate	Non-Native
Prunella vulgaris var. vulgaris	self-heal	LAMIACEAE		Non-Native
Stachys ajugoides var. rigida	hedge nettle	LAMIACEAE		Native
Umbellularia californica	laurel	LAURACEAE		Native
Clintonia andrewsiana	bead lily	LILIACEAE		Native
Prosartes hookeri	drops of gold	LILIACEAE		Native
Scoliopis bigelovii	fetid adder's tongue	LILIACEAE		Native
Linum bienne	western blue flax	LINACEAE		Non-Native
Toxicoscordion fremontii	Fremont's death camas	MELANTHIACEAE		Native
Trillium ovatum var. ovatum	western trillium	MELANTHIACEAE		Native
Calandrinia menziesii	red maids	MONTIACEAE		Native
Claytonia sp.	miner's lettuce	MONTIACEAE		Native
Morella californica	wax myrtle	MYRICACEAE		Native
Lysimachia arvensis	scarlet pimpernel	MYRSINACEAE		Native
Lysimachia latifolia	Pacific star flower	MYRSINACEAE		Native
Epilobium ciliatum	willowherb	ONAGRACEAE		Native
Calypso bulbosa	fairy slipper orchid	ORCHIDACEAE		Native
Corallorhiza maculata	spotted coralroot	ORCHIDACEAE		Native
Goodyera oblongifolia	rattlesnake plantain	ORCHIDACEAE		Native
Oxalis smalliana	redwood sorrel	OXALIDACEAE		Native
Diplacus aurantiacus	orange monkey bush	PHRYMACEAE		Native
Pseudotsuga menziesii	Douglas-fir	PINACEAE		Native
Plantago lanceolata	English plantain	PLANTAGINACEAE	Limited	Non-Native
Veronica sp.	speedwell	PLANTAGINACEAE		Native
Agrostis hallii	Hall's bent grass	POACEAE		Native
Agrostis pallens	Diego bent grass	POACEAE		Native
Aira caryophyllea	silver European hairgrass	POACEAE		Non-Native
Anthoxanthum occidentalis	California sweet grass	POACEAE		Native
Anthoxanthum odoratum	vanilla grass	POACEAE	Moderate	Non-Native
Bromus diandrus	ripgut grass	POACEAE	Moderate	Non-Native

Table 3. Plants Observed During 2024 Boanical Surveys, Berry's Knot Farm NTO #1

Scientific Name	Common Name	Family	Cal IPC	Origin
Bromus hordeaceus	soft chess	POACEAE	Limited	Non-Native
Bromus sitchensis var. maritumus	maritime brome	POACEAE		Native
Bromus vulgaris	common brome	POACEAE		Native
Cortaderia jubata	jubata grass	POACEAE	High	Non-Native
Cynosurus echinatus	hedgehog grass	POACEAE	Moderate	Non-Native
Dactylis glomerata	orchard grass	POACEAE	Limited	Non-Native
Festuca californica	California fescue	POACEAE		Native
Festuca microstachys	small fescue	POACEAE		Native
Festuca myuros	rattail grass	POACEAE	Moderate	Non-Native
Festuca occidentalis	western fescue	POACEAE		Native
Festuca perennis	Italian rye grass	POACEAE	Moderate	Non-Native
Festuca subuliflora	crinkle-awn fescue	POACEAE		Native
Holcus lanatus	velvet grass	POACEAE	Moderate	Non-Native
Melica imperfecta	coast melic	POACEAE		Native
Melica subulata	Alaska melic	POACEAE		Native
Phalaris sp.	harding grass	POACEAE		Native
Poa annua	annual bluegrass	POACEAE		Non-Native
Rhinotropis californica	California milkwort	POLYGALACEAE		Native
Rumex acetosella	sheep sorrel	POLYGONACEAE	Moderate	Non-Native
Rumex crispus	curly dock	POLYGONACEAE	Limited	Non-Native
Adiantum aleuticum	five-fingered fern	PTERIDACEAE		Native
Pentagramma triangularis ssp. triangularis	gold-backed fern	PTERIDACEAE		Native
Actaea rubra	baneberry	RANUNCULACEAE		Native
Aquilegia formosa	crimson columbine	RANUNCULACEAE		Native
Ranunculus muricatus	prickly-fruit buttercup	RANUNCULACEAE		Non-Native
Ranunculus occidentalis var. occidentalis	western buttercup	RANUNCULACEAE		Native
Ceanothus thrysiflorus var. thrysiflorus	blue blossum	RHAMNACEAE		Native
Frangula californica ssp. californica	California coffeeberry	RHAMNACEAE		Native
Aphanes occidentalis	ladie's mantle	ROSACEAE		Native
Drymocallis sp.		ROSACEAE		Native
Fragaria vesca	strawberry	ROSACEAE		Native
Heteromeles arbutifolia	toyon	ROSACEAE		Native
Oemleria cerasiformis	oso berry	ROSACEAE		Native
Rosa gymnocarpa	wood rose	ROSACEAE		Native
Rubus armeniacus	Himalaya berry	ROSACEAE	High	Non-Native
Rubus parviflorus	thimbleberry	ROSACEAE		Native
Rubus spectablis	salmon berry	ROSACEAE		Native
Rubus ursinus	trailing blackberry	ROSACEAE		Native

Table 3. Plants Observed During 2024 Boanical Surveys, Berry's Knot Farm NTO #1

Scientific Name	Common Name	Family	Cal IPC	Origin
Galium aparine	cleavers	RUBIACEAE		Non-Native
Galium triflorum	sweet-scented bedstraw	RUBIACEAE		Native
Sherardia arvensis	field madder	RUBIACEAE		Native
Maianthemum stellatum	star Solomon's seal	RUSCACEAE		Native
Salix scouleriana	Scouler's willow	SALICACEAE		Native
Salix sitchensis	Sitka willow	SALICACEAE		Native
Salix spp.	willow	SALICACEAE		Native
Tellima grandiflora	fringe cups	SAXIFRAGACEAE		Native
Scrophularia californica	bee plant	SCROPHULARIACEAE		Native
Solanum sp.	nightshade	SOLANACEAE		Native
Torreya californica	California nutmeg	TAXACEAE		Native
Typha sp.	cattail	TYPHACEAE		Non-Native
Urtica dioica ssp. gracilis	stinging nettle	URTICACEAE		Native
Viola sempervirens	redwood violet	VIOLACEAE		Native
Athyrium filix-femina var. cyclosorum	lady fern	WOODSIACEAE		Native

Berry's Knotfarm NTMP Project Carbon Accounting: Inventory, Growth, and Harvest

This worksheet addresses the sequestation and emissions associated with the project area's balance of harvest, inventory, and growth plus any emissions associated with site preparation. Complete the input for Steps 0- 8 on this worksheet.

Forest Type				Harvest Periods	Inventory		Growth Rates		Harvest Volume	
Multipliers to Estimate Carbon Tonnes per MBF (Sampson, 2002)				Time of Harvest (years from project approval)	Conifer Live Tree Volume (MBF/Acre) - Prior to Harvest	Hardwood Live Tree Volume (BA square feet/Acre) - Prior to Harvest	Conifer Growth Rate BF/Acre/Year	Hardwood Growth Rate BA/Acre/Year	Conifer Harvest Volume (MBF/acre)	Hardwood Harvested / Treated Basal Area (BA/Acre)
Forest Type	**Step 0.** Identify the approximate percentage of conifers by volume within the harvest plan. Must sum to 100%	Multiplier from Cubic Feet (merchantable) to Total Biomass	Pounds Carbon per Cubic Foot	**Step 1.** Enter the anticipated future harvest entries. The re-entry cycles should be supported by management plan, if available.	**Step 2.** Enter the estimated conifer inventory (mbf/acre) present in project area prior to harvest.	**Step 3.** Enter the estimated hardwood inventory (basal area per acre) present in project area prior to harvest.	**Step 4.** Enter the average annual periodic growth of conifers between harvests based on estimated growth in management plan, if available. Must be entered for each harvest cycle identified in Step 1.	**Step 5.** Insert average annual periodic growth of hardwoods between harvests based on estimated growth in management plan, if available.	**Step 6.** Enter the estimated conifer harvested per acre at current and future entries. The estimate should be based on projections from the management plan if available.	**Step 7.** Enter estimated hardwood basal area harvested/treated per acre
Douglas-fir	20%	1.675	14.38		31.6	23.3	257	0.79	22	3.05
Redwood	80%	1.675	13.42		12.2	27.27	378	0.77	1.7	3.54
Pines	0%	2.254	12.14		14.2	31.43	415	0.72	2.6	4.03
True firs	0%	2.254	11.18		15.7	34.56	422	0.66	2.8	4.39
Hardwoods		2.214	11.76		17.1	36.76	452	0.58	2.9	4.63
		Pounds per Metric Tonne			18.7	37.95	459	0.51	3	4.75
Conversion of Board Feet to Cubic Feet	0.165		2,204		20.3	38.28	461	0.43	3.4	4.73
Multipliers to Estimate Total Carbon Tonnes per MBF	Conifer	**1.71**			21.6	37.86	435	0.36	3.3	4.61
	Hardwoods	**1.95**			22.7	36.87	440	0.3	3.4	4.42
Multipliers to Estimate Merchantable Carbon Tonnes per MBF	Conifer	**1.02**			23.7	35.43	428	0.24	3	4.16
	Hardwoods	**0.88**			24.8	33.71	430	0.2	2.8	3.8

User must enter harvest cycles to 100 years and/or at least three entry cycles.

Harvest Periods	Inventory Conversion to Carbon (prior to harvest)		Inventory Conversion to Carbon Dioxide Equivalent (prior to harvest)		Site Preparation	
	Conifer Live Tree Tonnes (C/acre)	Hardwood Live Trees Tonnes (C/acre)	Conifer Live Tree Tonnes (CO_2 equivalent/acre)	Hardwood Live Tree Tonnes (CO_2 equivalent/acre)	**Step 8**. Enter the value (in bold) for each harvest cycel that best reflects the site preparation activities, as averaged across the project area:	
from above (Time of Harvest as years from project approval)	**Computed:** MBF * Conifer Multiplier from Step 0.	**Computed:** BA*Volume/Basal Area Ration (to convert to MBF) * Hardwood Multiplier from Step 0.	**Computed:** Conversion of carbon to CO_2 (3.67 tonnes CO2 per 1 tonne Carbon)	**Computed:** Conversion of carbon to CO_2 (3.67 tonnes CO2 per 1 tonne Carbon)	**Heavy**- 50% or more of the project area is covered with brush and removed as part of site preparation or stumps are removed (mobile emissions estimated at .429 metric tonnes CO2e per acre, biological emissions estimated at 2 metric tonnes CO2e per acre) **Medium** - >25% <50% of the project area is covered with brush and removed as part of site preparation (mobile emissions estimated at .202 metric tonnes CO2e per acre, biological emissions estimated at 1 metric tonne per acre). **Light** - 25% or less of the project area is covered with brush and is removed as part of site preparation (mobile emissions estimated at .09 metric tonnes CO2e per acre, biological emissions estimated at .5 metric tonnes per acre). **None** - No site preparation is conducted.	
0	54	3	198	13	None	0
10	21	4	76	15	None	0
20	24	5	89	17	None	0
30	27	5	98	19	None	0
40	29	5	107	20	None	0
50	32	6	117	20	None	0
60	35	6	127	21	None	0
70	37	6	135	20	None	0
80	39	5	142	20	None	0
	Difference between ending stocks and beginning stocks		-56	7.28	Sum of emissions (Metric Tonnes CO2e) per acre	0

Berry's Knotfarm NTMP Project Carbon Accounting: Harvesting Emissions

This worksheet addresses the non-biological emissions associated with the project area's harvesting activities. Complete the input for Steps 9- 14 on this worksheet.

Harvest Periods	Falling Operations	Production per Day	Emissions Associated with Yarders and Loaders			Emissions Associated with Tractors and Skidders			Emissions Associated with Helicopters			Landing Saws	Trucking Emissions		
from Inventory, Growth, and Harvest Page (Time of Harvest as years from project approval)	**Assumption:** ((.25 gallons gasoline per MBF harvested * 5.33 (pounds carbon per gallon))/2205(conversion to metric tonnes)* mbf per acre harvested	MBF (all species) Yarded Delivered to Landing	**Assumption**:(((35 gallons diesel per day per piece of equipment * 6.12 pounds carbon / gallon)/2205 to convert to metric tonnes carbon)* 3.67 to convert to metric tonnes CO2 equivalent)/Production per Day			**Assumption:** (((55 gallons diesel per day per piece of equipment * 6.12 pounds carbon / gallon)/2205 to convert to metric tonnes carbon)* 3.67 to convert to metric tonnes CO2 equivalent)/Production per Day			**Assumption:** (((200 gallons jet fuel per day per piece of equipment * 5 pounds carbon / gallon)/2205 to convert to metric tonnes carbon)* 3.67 to convert to metric tonnes CO2 equivalent)/Production per Day			**Assumption**: (((.16 gallons gasoline per MBF * 5.33 (pounds carbon per gallon))/2205(conversion to metric tonnes)* 3.67 to convert to metric tonnes CO2 equivalent)/mbf per acre harvested. Applies to all species whether harvested or not.	**Assumption:** Round Trip Hours/Load average (from below, to compute the mbf/hour) (((6 gallons diesel/hour * 6.12 pounds carbon/gallon)/2205 (conversion to metric tonnes carbon))*3.67 (conversion to metric tonnes carbon dioxide equivalent)		
	Computed. Metric Tonnes CO2 equivalent per mbf harvested Applies to all species whether harvested or treated	**Step 9.** Enter the estimated volume delivered to the landing in a day.	**Step 10.** Enter number of pieces of equipment in use per day for each harvest entry	**Computed.** Yarders and Loaders CO2 equivalent/mbf (metric tonnes)	**Computed.** Yarders and Loaders CO2 equivalent per Acre Harvested (metric tonnes)	**Step 11.** Enter number of pieces of equipment in use per day for each harvest entry	**Computed.** Tractor and skidder CO2 equivalent/mbf (metric tonnes)	**Computed.** Tractors and Skidders CO2 equivalent per Acre Harvested (metric tonnes)	**Step 12.** Enter number of pieces of equipment in use per day for each harvest entry	**Computed.** Helicopter CO2 equivalent/mbf (metric tonnes)	**Computed.** Helicopters CO2 equivalent per Acre Harvested (metric tonnes)	**Computed.** Landing Saws CO2 equivalent per Acre Harvested (metric tonnes)	**Steps 13 and 14 below**		**Computed.** Estimated Metric Tonnes CO2e per harvested acre for each harvesting period.
0	(0.05)	30	1.5	-0.02	-0.39	1.5	-0.03	-0.62	0	0.00	0.00	-0.03			-0.207377744
10	(0.00)	15	1.5	-0.04	-0.06	1.5	-0.06	-0.10	0	0.00	0.00	0.00	**Step 13.** Enter Estimated Load Average: MBF/Truck	**5.3**	-0.016024644
20	(0.01)	15	1.5	-0.04	-0.09	1.5	-0.06	-0.15	0	0.00	0.00	0.00			-0.024508279
30	(0.01)	15	1.5	-0.04	-0.10	1.5	-0.06	-0.16	0	0.00	0.00	0.00	**Step 14.** Enter Estimated Round Trip Haul in Hours	**3**	-0.026393531
40	(0.01)	15	1.5	-0.04	-0.10	1.5	-0.06	-0.16	0	0.00	0.00	0.00			-0.027336157
50	(0.01)	5	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00			0
60	(0.01)	5	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	-0.01			0
70	(0.01)	5	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	-0.01			0
80	(0.01)	5	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	-0.01			0
90	(0.01)	5	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0.00			0
Sum Emissions	**-0.11**				**-0.75**			**-1.18**			**0.00**	**-0.07**			**-0.30**

Berry's Knotfarm NTMP Project Carbon Accounting: Harvested Wood Products and Processing Emissions

This worksheet addresses the non-biological emissions associated with the project area's harvesting activities. Complete the input for Steps 15- 16 on this worksheet.

Harvest Periods	Quantity of Forest Carbon Delivered to Mills				Non-Biological Emissions Associated with Mills	Quantity of Forest Carbon Remaining Immediately After Milling (Mill Efficiency)		Long-Term Sequestration in Wood Products	
	Conifer Percentage Delivered to Mills	Hardwood Percentage Delivered to Mills	Conifer CO2e Delivered to Mills / Acre	Hardwood CO2 equivalent Delivered to Mills / Acre	**Assumption.** 20 kw/hour (mill energy use) /(40mbf lumber processed/hour) *(.05 metric tonnes/kw hour) * mbf processed	**Computed.** Remaining CO2 equivalent after Milling Efficiency for Conifers	**Computed.** Remaining CO2 equivalent after Milling Efficiency for Hardwoods	**Computed.** CO2 Equivalent Tonnes in Conifer Wood Products in Use- 100 Year Weighted Average / Acre and Landfill	**Computed.** CO2 Equivalent Tonnes in Hardwood Wood Products in Use- 100 Year Weighted Average / Acre
from Inventory, Growth, and Harvest Page (Time of Harvest as years from project approval)	**Step 15.** Insert the percentage of conifer trees harvested that are subsequently delivered to sawmills	**Step 16.** Insert the percentage of hardwoods harvested or treated that are subsequently delivered to sawmills	**Computed:** The merchantable portion determined by the conversion factors (Sampson, 2002) on the Inventory, Growth, and Harvest worksheet. This is multiplied by the percent delivered to mills to reflect the carbon delivered to mills.	**Computed:** The merchantable portion determined by the conversion factors (Sampson, 2002) on the Inventory, Growth, and Harvest worksheet. This is multiplied by the percent delivered to mills to reflect the carbon delivered to mills.	**Calculated. The CO2e associated with processing the logs at the mill**	The difference between carbon delivered to mills and carbon remaining after milling is assumed to be emitted immediately		**Estimate.** The weighted average carbon remaining in use at year 100 is 46.3%	**Estimate.** The weighted average carbon remaining in use at year 100 is 23.0%
						The efficiency rating from mills in California is 0.67 (DOE 1605b) for conifers	The efficiency rating from mills in California is .5 (DOE 1605b) for hardwoods	**Estimate.** The carbon in landfills at year 100 is 29.8% of the initial carbon produced in wood products.	**Estimate.** The carbon in landfills at year 100 is 29.8% of the initial carbon produced in wood products.
0	100%	0%	82.28	0.00	-0.55	55.13	0.00	41.95	0.00
10	100%	0%	6.36	0.00	-0.04	4.26	0.00	3.24	0.00
20	100%	0%	9.72	0.00	-0.07	6.51	0.00	4.96	0.00
30	100%	0%	10.47	0.00	-0.07	7.02	0.00	5.34	0.00
40	100%	0%	10.85	0.00	-0.07	7.27	0.00	5.53	0.00
50	0%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	0%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	0%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0%	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Sum of emissions associate with processing of lumber			-0.80	Sum of CO2 equivalent in wood products		61.02	0.00

Berry's Knotfarm NTMP Carbon Accounting Summary			Years until Carbon Stocks are Recouped from Initial Harvest (Includes Carbon in Live Trees, Harvested Wood Products, and Landfill)
	Beginning Stocks	Ending Stocks	
Emissions Source/Sink/Reservoir	Metric Tonnes CO2 Equivalent Per Acre Basis		88 Years
Live Trees (Conifers and Hardwoods)	210.45	161.98	
Wood Products		61.02	
Site Preparation Emissions		0.00	
Non-biological emissions associated with harvesting		-2.41	
Non-biological emissions associated with milling		-0.80	
Sum of Net Emissions/Sequestration over Identified Harvest Cycles (CO2 metric tonnes)		9.33	
Project Summary			
Project Acres	Step 17- Insert the acres that are part of the harvest area.	1070.31	
Total Project Sequestration over defined Harvesting Periods (CO2 metric tonnes)		9,991	

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NONINDUSTRIAL TIMBER MANAGEMENT PLAN NUMBER 1-25NTMP-00001-SON

NOTE

Information concerning timber stand and growth data has been removed from this Nonindustrial Timber Management Plan. This information is considered confidential by the plan submitter as a “Trade Secret”. The original copy of this material is maintained in a confidential file at CAL FIRE’s Northern Region Headquarters, 135 Ridgway Avenue, Santa Rosa, CA 95401.

Pages 404-428 (Submitted 07/24/2025)
Pages 404-428 (Resubmitted 09/30/2025)
Pages 533-557 (Resubmitted 12/08/2025)