
HARNEY BASIN
OREGON
Medford
SISKIYOU MOUNTAINS
BLACK ROCK DESERT
SIERRA NEVADA
Redding
Chico
Reno
Carson City
SHOSHONE MOUNTAINS
SACRAMENTO VALLEY
Sacramento
Santa Rosa
Napa
Vacaville
Fairfield
Antioch
Concord
Stockton
San Francisco
Modesto
Livermore
Fremont
San Jose
Pioneer Seamount
Guide Seamount
Salinas
DIABLO RANGE
SAN JOAQUIN VALLEY
Fresno
Visalia
Whitney
PANAMINT RANGE
Lancaster
2010 California Department of Fish and Wildlife Fisher Occupied Range
CWHR Fisher Historic Range (California Department of Fish and Wildlife 2010)
(43% unoccupied historic range in California)
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.


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Visalia
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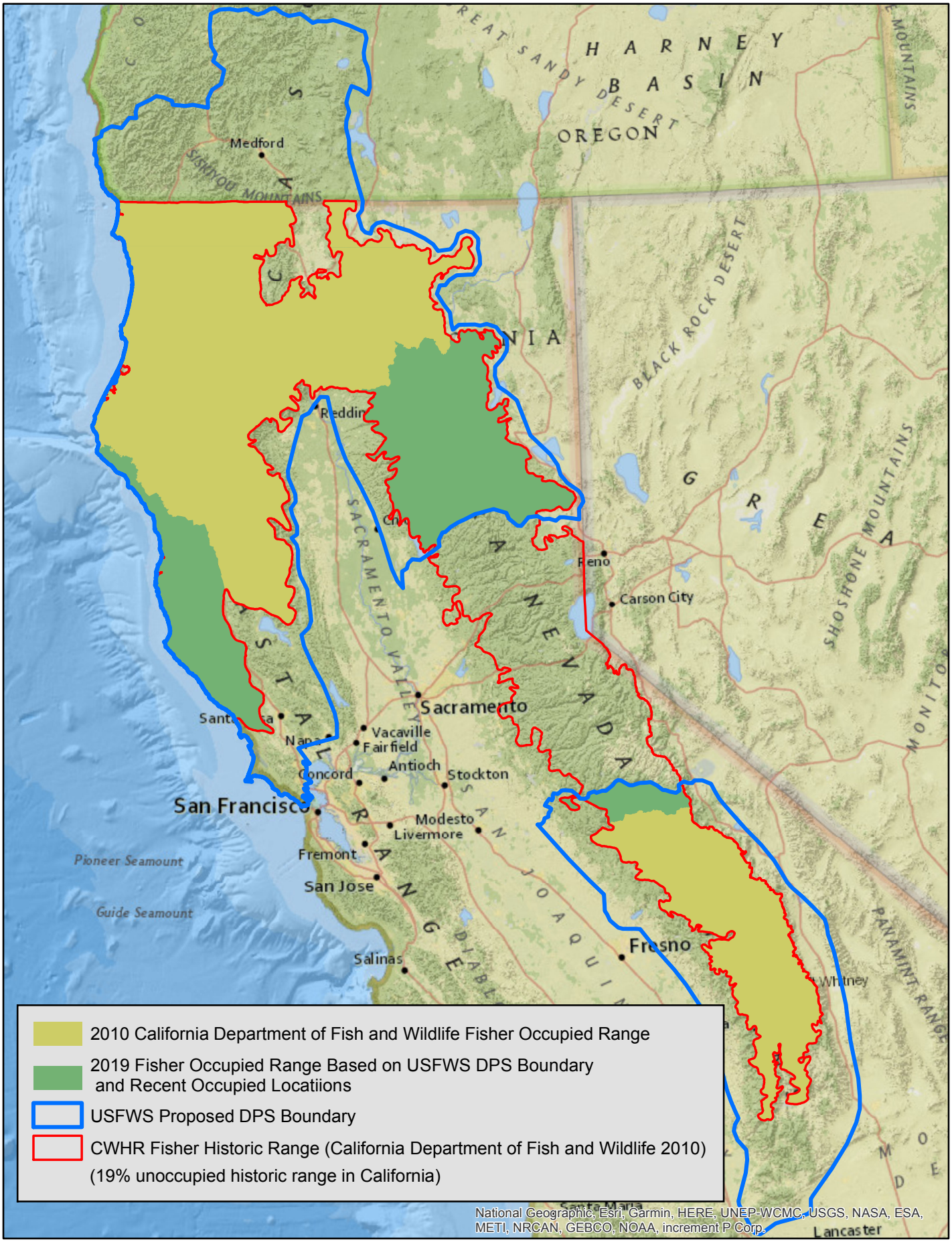
Pioneer Seamount
Guide Seamount
2010 California Department of Fish and Wildlife Fisher Occupied Range
2019 California Department of Fish and Wildlife Fisher Occupied Range
CWHR Fisher Historic Range (California Department of Fish and Wildlife 2010)
(19% unoccupied historic range in California)
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.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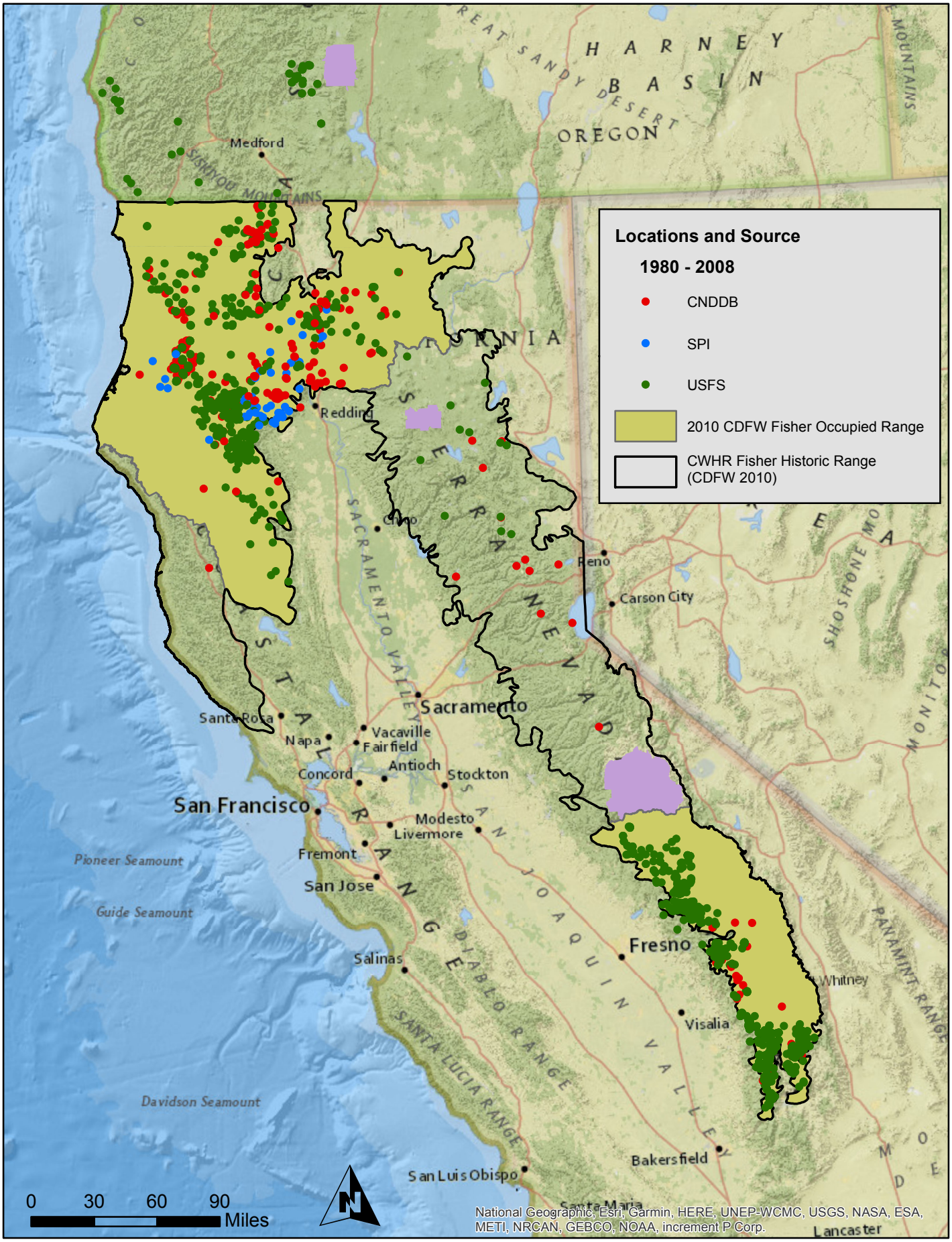
BLACK ROCK DESERT
PANAMINT RANGE
2010 California Department of Fish and Wildlife Fisher Occupied Range
2019 Fisher Occupied Range Based on USFWS DPS Boundary and Recent Occupied Locatiions
USFWS Proposed DPS Boundary
CWHR Fisher Historic Range (California Department of Fish and Wildlife 2010)
(19% unoccupied historic range in California)
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.


Locations and Source
1980 - 2008
CNDDB
SPI
USFS
2010 CDFW Fisher Occupied Range
CWHR Fisher Historic Range (CDFW 2010)
HARNEY BASIN
OREGON
Medford
Redding
Reno
Carson City
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Santa Rosa
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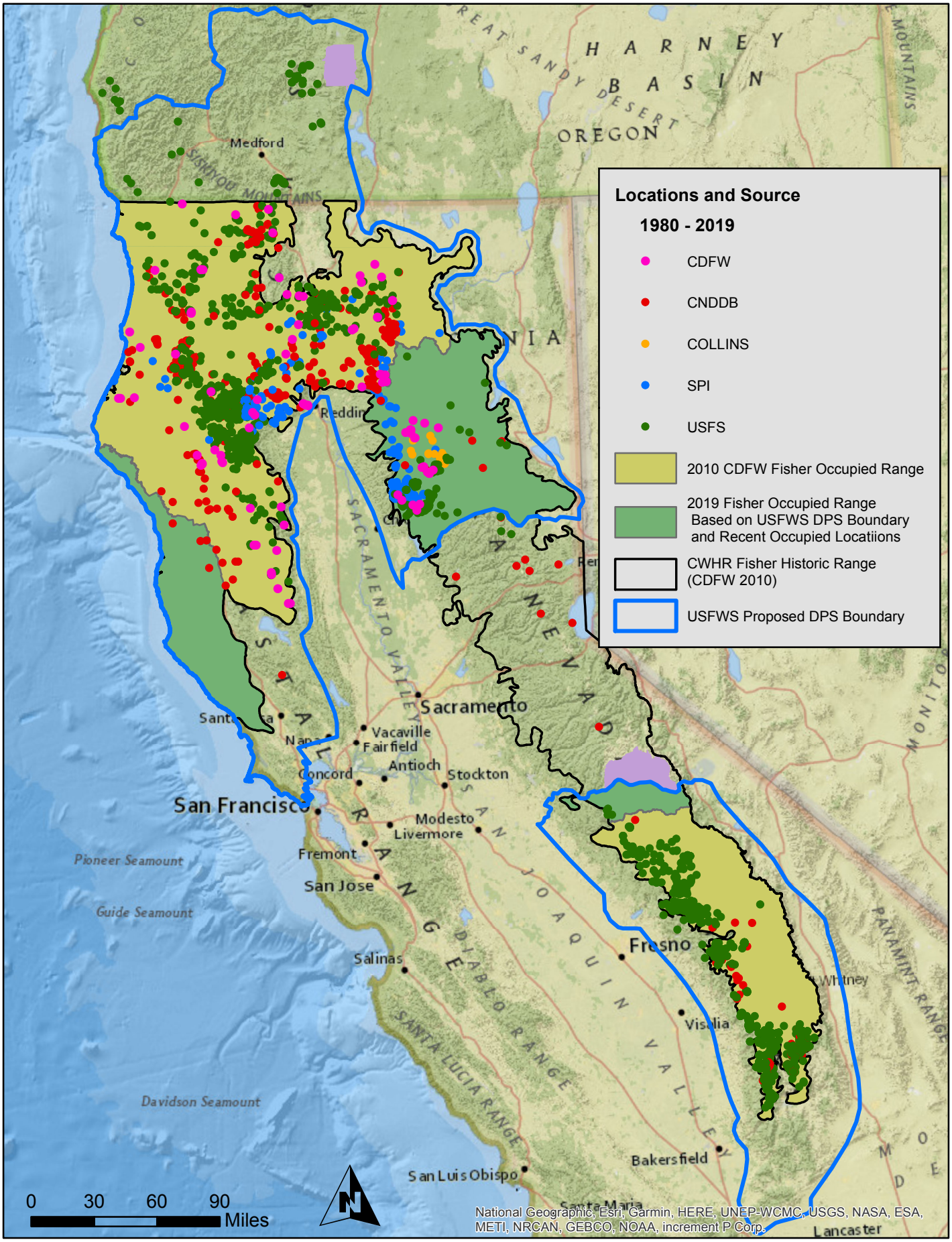
Davidson Seamount
SACRAMENTO VALLEY
SAN JOAQUIN VALLEY
SANTA LUCIA RANGE
DIABLO RANGE
SHOSHONE MOUNTAINS
PANAMINT RANGE
0 30 60 90 Miles
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.


Locations and Source
1980 - 2019
CDFW
CNDDB
COLLINS
SPI
USFS
2010 CDFW Fisher Occupied Range
2019 Fisher Occupied Range Based on USFWS DPS Boundary and Recent Occupied Locatiions
CWHR Fisher Historic Range (CDFW 2010)
USFWS Proposed DPS Boundary
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Redding
Sacramento
Vacaville
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Antioch
Concord
Stockton
San Francisco
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HARNEY BASIN
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SACRAMENTO VALLEY
SAN JOAQUIN VALLEY
DIABLO RANGE
SANTA LUCIA RANGE
PANAMINT RANGE
0 30 60 90
Miles
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Exhibit A Fisher Detection Point Data Sources

SPI gathered information from the California Department of Fish and Wildlife (CDFW), California Natural Diversity Data Base (CNDDB), Collins Pine Company (Collins), USFS NRIS Data Base (USFS) and SPI's Wildlife Sighting Database (SPI). These records contain 3,799 detections of fishers. SPI will provide all this data to the U.S. Fish and Wildlife Service (Service) upon request, after it has confirmed from all the data sources they will release them (or the Service already has access to them like the CNDDB dataset).

Project: A Comparison of Fisher (*Pekania pennanti*) Hair and Blood Samples Collected by Sierra Pacific Industries

Date Issued: August 13, 2015

Recipient: **Brian Dotters**
Sierra Pacific Industries
P.O. Box 478
Weaverville CA 96093

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We analyzed DNA from fisher hair samples collected in 2015 and compared it to DNA from blood samples collected in 2006, 2007 and 2008 from Sierra Pacific Industry lands. The 16 blood samples were sent to us on March 5, 2015 by Mourad Gabriel (Integral Ecology Research Center). Nine of these blood samples are associated with the SPI study area (Table 1). Note there was no sample #5, 0D7E28. On March 6, 2015 we received 19 liquid blood samples sent directly by you (Table 2); unfortunately, these samples were delayed in transit and were compromised. We received additional blood from 16 of these samples sent on blood cards on May 11, 2015 for analysis (Table 2). Fisher 1F0858 was represented in blood samples sent both by Dr. Gabriel and you.

Table 1. Blood samples sent by Dr. Gabriel. The samples highlighted are not from the SPI study area and were not analyzed.

Count	Accession #	Species	Animal ID	Date Processed	Lab Notes
1	1	MAPE	689248A		not part of SPI study
2	2	MAPE	IFO858		
3	3	MAPE	01F006D	1/20/2006	not part of SPI study
4	4	MAPE	6891293	3/6/2006	
5	5	MAPE	0D7E28	1/19/2006	not received
6	6	MAPE	144D3C		
7	7	MAPE	DECCA		
8	8	MAPE	4D083C		
9	9	MAPE	68922 E3		
10	10	MAPE	67B8A5A		not part of SPI study
11	12	MAPE	6893B24		
12	13	MAPE	1F0ADF		not part of SPI study
13	14	MAPE	689373		not part of SPI study
14	15	MAPE	1F03F2		
15	16	MAPE	6893F09		not part of SPI study
16	18	MAPE	689206D	3/6/2006	
17	19	MAPE	1F0253	1/22/2006	not part of SPI study

Table 2. Blood samples sent by B. Dotters. The 3 highlighted samples did not have an additional blood sample available.

Trap Name	Sample I.D.	Fisher I.D.	Sex	Latitude (NAD 27)	Longitude (NAD 27)	Year Trapped	NOTES
BRNS04	SPI B-1	6891A1B	M	40.540078	-122.927717	2007	no additional blood available
BRNS07	SPI B-2	68940A5	F	40.54782	-122.92072	2007	
BRNS08	SPI B-3	6890CC0	F	40.540703	-122.932946	2007	
	SPI B-4	689196E	M			2007	
	SPI B-5	6CBAD59	M			2008	
	SPI B-6	67B7BF1	M			2008	no additional blood available
BRNS09	SPI B-7	6C662A5	M	40.58932	-122.98527	2008	
BRNS13	SPI B-8	4D083C	F	40.60957	-122.9906	2008	

EFB05	SPI B-10	689448D	M	40.61906	-122.997476	2007	
EFH02	SPI B-11	68928CE	M	40.64233	-123.02636	2007	
EFH06	SPI B-12	67B7BF1	M	40.641557	-123.015721	2007	
LTL01	SPI B-13	688F451	F	40.52188	-122.96107	2008	
MAX03	SPI B-14	6C68F29	M	40.65226	-122.86463	2008	
MAX05	SPI B-15	6893327	M	40.56063	-122.97221	2007	
MDLT01	SPI B-16	6891128	F	40.5723	-122.9975	2008	no additional blood available
MDLT04	SPI B-17	1F0858	M	40.56554	-123.00282	2007	Translocated to Stirling in 2009
MDLT07	SPI B-18	6CBBB4F	M	40.633453	-123.016318	2008	
MDLT09	SPI B-19	689305A	F	40.631416	-123.023709	2007	
MDLT13	SPI B-20	1596E2	M	40.627514	-123.032756	2008	Translocated to Stirling in 2010

We analyzed 24 fishers from blood samples using our fisher microsatellite marker panel. Individuals 1F0858 and 1596E2 are already in the fisher DNA database as these animals were translocated to Stirling, CA. A successful genotype was obtained from each of the 24 individuals (Table 3).

Table 3. Fisher blood samples from the SPI study area

Trap Name	Sample I.D.	Fisher I.D.	Sex	Latitude (NAD 27)	Longitude (NAD 27)	Year Trapped	NOTES	Genotype Obtained
BRNS07	SPI B-2	68940A5	F	40.54782	-122.92072	2007		Yes
BRNS08	SPI B-3	6890CC0	F	40.540703	-122.932946	2007		Yes
	SPI B-4	689196E	M			2007		Yes
	SPI B-5	6CBAD59	M			2008		Yes
BRNS09	SPI B-7	6C662A5	M	40.58932	-122.98527	2008		Yes
BRNS13	SPI B-8	4D083C	F	40.60957	-122.9906	2008		Yes
EFB05	SPI B-10	689448D	M	40.61906	-122.997476	2007		Yes
EFH02	SPI B-11	68928CE	M	40.64233	-123.02636	2007		Yes
EFH06	SPI B-12	67B7BF1	M	40.641557	-123.015721	2007		Yes
LTL01	SPI B-13	688F451	F	40.52188	-122.96107	2008		Yes
MAX03	SPI B-14	6C68F29	M	40.65226	-122.86463	2008		Yes
MAX05	SPI B-15	6893327	M	40.56063	-122.97221	2007		Yes
MDLT04	SPI B-17	1F0858	M	40.56554	-123.00282	2007	Translocated to Stirling in 2009	already in database
MDLT07	SPI B-18	6CBBB4F	M	40.633453	-123.016318	2008		Yes
MDLT09	SPI B-19	689305A	F	40.631416	-123.023709	2007		Yes
MDLT13	SPI B-20	1596E2	M	40.627514	-123.032756	2008	Translocated to Stirling in 2010	already in database
	2	IFO858	IFO858				blood sent by M. Gabriel	already in database
	4	6891293	6891293			3/6/2006	blood sent by M. Gabriel	Yes
	6	144D3C	144D3C				blood sent by M. Gabriel	Yes
	7	DECCA	DECCA				blood sent by M. Gabriel	Yes
	8	4D083C	4D083C				blood sent by M. Gabriel	Yes
	9	68922 E3	68922 E3				blood sent by M. Gabriel	Yes

	12	6893B24	6893B24				blood sent by M. Gabriel	Yes
	15	1F03F2	1F03F2				blood sent by M. Gabriel	Yes
	18	689206D	689206D			3/6/2006	blood sent by M. Gabriel	Yes

We compared the 8 individuals identified from non-invasive hair samples collected in 2015 to the DNA of the fishers sampled in 2006-2008. All 8 contemporary fishers are unique individuals and are not recaptures of previously identified fisher (Table 4).

Table 4. Fishers from the SPI study 2006-2015. Individuals identified from hair samples are in blue; duplicate samples are in gray.

Trap Name	Sample I.D.	Fisher I.D.	Sex	Latitude (NAD 27)	Longitude (NAD 27)	Year/ Date Collected	NOTES
BRNS07	SPI B-2	68940A5	F	40.54782	-122.92072	2007	
BRNS08	SPI B-3	6890CC0	F	40.540703	-122.932946	2007	
	SPI B-4	689196E	M			2007	
	SPI B-5	6CBAD59	M			2008	
BRNS09	SPI B-7	6C662A5	M	40.58932	-122.98527	2008	
BRNS13	SPI B-8	4D083C	F	40.60957	-122.9906	2008	
EFB05	SPI B-10	689448D	M	40.61906	-122.997476	2007	
EFH02	SPI B-11	68928CE	M	40.64233	-123.02636	2007	
EFH06	SPI B-12	67B7BF1	M	40.641557	-123.015721	2007	
LTL01	SPI B-13	688F451	F	40.52188	-122.96107	2008	
MAX03	SPI B-14	6C68F29	M	40.65226	-122.86463	2008	
MAX05	SPI B-15	6893327	M	40.56063	-122.97221	2007	
MDLT04	SPI B-17	1F0858	M	40.56554	-123.00282	2007	Translocated to Stirling in 2009
MDLT07	SPI B-18	6CBBB4F	M	40.633453	-123.016318	2008	
MDLT09	SPI B-19	689305A	F	40.631416	-123.023709	2007	
MDLT13	SPI B-20	1596E2	M	40.627514	-123.032756	2008	Translocated to Stirling in 2010
	2	IFO858					blood sent by M. Gabriel
	4	6891293				3/6/2006	blood sent by M. Gabriel
	6	144D3C					blood sent by M. Gabriel
	7	DECCA					blood sent by M. Gabriel
	8	4D083C					blood sent by M. Gabriel
	9	68922 E3					blood sent by M. Gabriel
	12	6893B24					blood sent by M. Gabriel
	15	1F03F2					blood sent by M. Gabriel
	18	689206D				3/6/2006	blood sent by M. Gabriel
69.1, 69.2	SPI-H-6, SPI-H-10	SPI_15_M1	M	40.561644	-123.000654	2/10/2015	Hair Samples 2015
71.1	SPI-H-12, SPI-H-16	SPI_15_F2	F	40.573732	-122.937806	1/22/2015	Hair Samples 2015

80.1, 80.2, 84.1	SPI-H-17, SPI-H-21, SPI-H-22, SPI-H-63, SPI-H-65, SPI-H-75	SPI_15_M3	M	40.547094	-122.942168	1/22/2015	Hair Samples 2015
81.1	SPI-H-24, SPI-H-25, SPI-H-26, SPI-H-28	SPI_15_F4	F	40.556557	-122.976966	1/15/2015	Hair Samples 2015
81.1	SPI-H-29	SPI_15_M5	M	40.556557	-122.976966	2/4/2015	Hair Samples 2015
81.2, 82.2, 84.2	SPI-H-31, SPI-H-32, SPI-H-47, SPI-H-69, SPI-H-70	SPI_15_M6	M	40.539287	-122.99099	1/15/2015	Hair Samples 2015
81.2, 83.1, 83.2, 84.2	SPI-H-40, SPI-H-50, SPI-H-51, SPI-H-52, SPI-H-53, SPI-H-56, SPI-H-74	SPI_15_M7	M	40.518868	-123.019973	1/15/2015	Hair Samples 2015
84.1	SPI-H-62, SPI-H-64	SPI_15_M8	M	40.518067	-122.959755	1/15/2015	Hair Samples 2015

Exploring potential parent offspring relationships

Per your request, we investigated potential parent/offspring relationships of the individuals identified from the 2015 hair samples. Specifically, we looked at whether any of the males were offspring of either of the two females identified. In these comparisons, Male 7 was the only male consistent with having a parent/offspring relationship, and his genotype is consistent with being offspring of Female 2 as well as Female 4. This does not necessarily mean that either of these females is the parent of Male 7, but that this relationship is genetically possible. We encourage you to bring your knowledge of field data to bear on these possible relationships. The females are not consistent with having a parent/offspring relationship with each other.

Please contact us if you have any questions.

FS Agreement No. _____

Cooperator Agreement No. _____

MEMORANDUM OF UNDERSTANDING
Between
SIERRA PACIFIC INDUSTRIES,
AND
CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION,
AND
NATIONAL FISH AND WILDLIFE FOUNDATION,
AND THE
USDA, FOREST SERVICE
PACIFIC SOUTHWEST REGION

This MEMORANDUM OF UNDERSTANDING (MOU) is hereby made and entered into by and between Sierra Pacific Industries, hereinafter referred to as "SPI," California Department of Forestry and Fire Protection referred to as "CAL FIRE," the National Fish and Wildlife Foundation referred to as "NFWF," and the United States Department of Agriculture (USDA), Forest Service, Pacific Southwest Region, hereinafter referred to as the "U.S. Forest Service." This MOU supersedes and replaces the MOU dated August 30, 2017 (CSO MOU), and April 19, 2019 (NSO MOU) between the parties relating to this subject matter.

Background: Large scale, high-severity fire poses a risk to Northern Spotted Owls (NSO), California Spotted Owls (CSO), West Coast Distinct Population Segment Fishers (fishers) and their habitat. Increased habitat resilience and resistance to multiple disturbances is needed to promote NSO, CSO, and fisher persistence.

The U.S. Forest Service, SPI, a private corporation, and CAL FIRE manage forest lands in California that are frequently adjacent to each other, and have ongoing programs to protect and enhance habitat for fish and wildlife and also manage forest fuels to reduce fire risk and its potential impacts on wildlife species. Under State law, SPI has the authority to participate in fire suppression on its own lands while CAL FIRE, contract counties, the U.S. Forest Service, and other government agencies have primary fire suppression responsibility for all federal, State, and private wildlands in California. The parties also have responsibilities and interests in the inventory of their respective lands for federally- and State-recognized threatened, endangered, proposed, candidate, and sensitive species and in the development of appropriate protection measures for these species.

Due to these natural resource challenges, we believe it is important to establish a coordinated, multi-stakeholder agreement to help protect and enhance our forest resources. This will involve establishing a strategic conservation framework to help restore and protect areas where sensitive species – particularly the (NSO), (CSO), and fisher – are threatened by habitat degradation due to uncharacteristically extensive and severe adverse fire effects.

Roles: The U.S. Forest Service, under the laws of the United States and regulations of the Secretary of Agriculture, is responsible for the protection of fish, wildlife, and plant habitats on National Forest lands and for providing special attention to Federally-recognized threatened, endangered, proposed, and candidate species and U.S. Forest Service sensitive species and species of conservation concern, including the NSO, CSO, and fisher.

The U.S. Forest Service is also a cooperating agency under the National Environmental Policy Act (NEPA) in the development of an Environmental Impact Statement by the U.S. Fish and Wildlife Service's concerning SPI's application for an Endangered Species Act (ESA) Section 10 permit for California Spotted Owl that may occur on SPI lands.

SPI is responsible under the laws of the United States and the State of California for the assessment of wildlife and plant resources on its lands when developing timber harvest plans. SPI is developing an application for an ESA Section 10 permit for California Spotted Owl that may occur on SPI lands and currently has a Candidate Conservation Agreement with Assurances (CCAA) for fisher.

Under the laws of the State of California, CAL FIRE must consider the public need for watershed protection, consider fish, wildlife, and plant habitats on nonfederal lands, and provide special attention to federal and State- recognized threatened and endangered species.

NFWF is an independent 501(c) (3) nonprofit organization that is governed by a Board of Directors appointed by the Secretary of the Interior. NFWF works with public and private sectors to protect and restore fish, wildlife, plants and habitats. NFWF has invested tens of millions of dollars in conservation projects throughout California. This includes a California-wide fuels management program to protect valuable natural resources, post-fire restoration programs in Southern California, wet meadow restoration in the Sierra Nevada, Klamath Basin watershed restoration, in-stream flow, and watershed habitat improvement in Northern California, and efforts to recover select declining, threatened, and endangered species.

Many of NFWF's existing programs and projects are threatened by the deteriorating conditions resulting from forest fires and untreated post-fire sites. As a result, NFWF has a vested interest in working with the U.S. Forest Service, CAL FIRE and SPI to maximize the health of California's forests. NFWF also has extensive experience serving as a grant maker or fiduciary to assist federal agencies in identifying, awarding, and managing projects that achieve mutually beneficial outcomes. This includes the

development of, or update to, implementation documents that guide investments to achieve targeted outcomes.

Title: Forest Fuels Reduction and Species Conservation in California.

I. PURPOSE: The purpose of this MOU is to document the agreement between the parties to coordinate on certain actions that may contribute to Forest Fuels Reduction and species conservation in accordance with the provisions of the MOU.

II. STATEMENT OF MUTUAL BENEFIT AND INTERESTS:

U.S. Forest Service benefits and interests: The U.S. Forest Service will have more information and be able to make better decisions regarding the management of forest fuels on lands adjacent to SPI in California, and conservation, with a focused priority on NSO, CSO, and fisher, in these areas.

SPI benefits and interests: SPI will have more information regarding the management of forest resources and fuels on its lands, and important to the conservation of NSO, CSO, and fisher when meeting its responsibilities with respect to developing and implementing its timber harvest plans and land management objectives.

CAL FIRE benefits and interests: CAL FIRE will be able to make better decisions regarding the management of forest resources and fuels on lands adjacent to SPI in California that may contain habitat important to the conservation of NSO, CSO, and fisher.

NFWF benefits and interests: As a grant maker that leverages public and private resources to implement conservation projects, NFWF will have more information regarding the management of forest resources and fuels important to the conservation of NSO, CSO, and fisher.

Mutual benefits and interests: The U.S. Forest Service, SPI, CAL FIRE, and NFWF will be better able to fulfill their respective obligations and goals to manage resources and increase effectiveness of management to contribute to the conservation of NSO, CSO, and fisher. and its habitat by considering data and information applicable to whole landscapes, regardless of ownership.

In consideration of the above premises, the parties agree as follows:

III. SPI SHALL:

A. Provide the U.S. Forest Service, CAL FIRE, and NFWF with:

a. Information concerning SPI's forest fuels management plans near U.S. Forest Service timber lands and CAL FIRE Demonstration State Forests.

b. Information that may contribute to the conservation of NSO, CSO, fisher, and other sensitive species.
c. Other data and information requested by the U.S. Forest Service, CAL FIRE, and NFWF, if agreeable to SPI.

B. Meet and coordinate regularly with the U.S. Forest Service and CAL FIRE, or as otherwise mutually agreed by the parties, regarding forest fuels management actions on the parties' respective lands.

C. Upon the request of the U.S. Forest Service, CAL FIRE, or NFWF, meet with the requesting party and the U.S. Fish and Wildlife Service to discuss NSO, CSO, and fisher conservation strategies and conservation measures on SPI lands identified through the implementation of this MOU.

IV. CAL FIRE SHALL:

A. Provide the U.S. Forest Service, SPI, and NFWF with:

a. Information concerning CAL FIRE's forest fuels management plans near SPI timber lands and U.S. Forest Service timber lands.
b. Information that may contribute to the conservation of NSO, CSO, and fisher and other sensitive species.
c. Other data and information requested by the U.S. Forest Service, SPI, and NFWF that is not exempt pursuant to the California Public Records Act.

B. Meet and coordinate regularly with the U.S. Forest Service and SPI, or as otherwise mutually agreed by the parties, regarding forest fuels management actions.

C. Upon the request of the U.S. Forest Service, SPI, or NFWF, meet with the requesting party and the U.S. Fish and Wildlife Service to discuss California NSO, CSO, and fisher conservation strategies identified through the implementation of this MOU.

V. NFWF SHALL:

A. Provide the U.S. Forest Service, CAL FIRE, and SPI with:

a. Information concerning NFWF's conservation programs and grant funding opportunities that may support conservation opportunities for the NSO, CSO, fisher and other sensitive species.
b. Information that may contribute to the conservation of these three species and other sensitive species.
c. Other data and information requested by the U.S. Forest Service, CAL FIRE, and SPI, if agreeable to NFWF.

B. Meet and coordinate regularly with the U.S. Forest Service, CAL FIRE, and SPI, or as otherwise mutually agreed by the parties, regarding conservation

programs and grant funding opportunities for NSO, CSO, fisher, and other sensitive species.

C. Upon the request of the U.S. Forest Service, CAL FIRE, or SPI, meet with the requesting party and the U.S. Fish and Wildlife Service to discuss NSO, CSO, and fisher conservation strategies on lands identified through the implementation of this MOU.

VI. U.S. FOREST SERVICE SHALL:

A. Provide SPI, CAL FIRE, and NFWF with:

a. Information concerning the U.S. Forest Service's forest fuels management plans near SPI timber lands and CAL FIRE Demonstration State Forests.
b. Information that may contribute to the conservation of NSO, CSO, fisher, l and other sensitive species.
c. Other data and information requested by SPI relating to these subjects if agreeable to the U.S. Forest Service.

B. Meet and coordinate regularly with SPI and CAL FIRE, or as mutually agreed by the parties, regarding forest fuels management actions on U.S. Forest Service lands.

C. Implement applicable conservation measures as identified in the applicable Forest Plans and/or finalized California Spotted Owl Conservation Strategy, as well as NSO and fisher management strategies on National Forest System lands identified through the implementation of this MOU.

D. Coordinate with SPI and the U.S. Fish and Wildlife Service to discuss conservation strategies and conservation measures for these three species, as well as other sensitive species on National Forest System lands identified through the implementation of this MOU.

E. Encourage direct coordination between the National Forests of Pacific Southwest Region with the parties to this MOU regarding its implementation.

VII. IT IS MUTUALLY UNDERSTOOD AND AGREED BY AND BETWEEN THE PARTIES THAT:

A. Nothing in this MOU shall modify any other agreements between the parties.

B. PRINCIPAL CONTACTS. Individuals listed below are authorized to act in their respective areas for matters related to this agreement.

Principal Cooperator Contacts:

Cooperator Program Contact	Cooperator Administrative Contact
Name: Dan Tomascheski, SPI Address: P.O. Box 496028 City, State, Zip: Redding, CA 96049-6028 Telephone: (530) 378-8000 FAX: (530) 378-8109 Email: DTomascheski@spi-ind.com	Name: Ed Murphy, SPI Address: P.O. Box 496028 City, State, Zip: Redding, CA 96049-6028 Telephone: (530) 378-8000 FAX: (530) 378-8109 Email: EMurphy@spi-ind.com

Cooperator Program Contact	Cooperator Administrative Contact
Name: Jonathan Birdsong, NFWF Address: 90 New Montgomery Street, Suite 1010 City, State, Zip: San Francisco, CA 94105 Telephone: 415-778-0999 FAX: 415-778-0998 Email: Jonathan.Birdsong@nfwf.org	Name: Grants Department, NFWF Address: 1133 Fifteenth St. NW, Suite 1000 City, State, Zip: Washington, D.C. 20005 Telephone: 202-857-0166 FAX: 202-857-0162 Email: info@nfwf.org

Cooperator Program Contact	Cooperator Administrative Contact
Name: Helge Eng, CALFIRE Address: 1416 9th Street, PO Box 944246 City, State, Zip: Sacramento, CA 94244 Telephone: 916-653-5000 FAX: 916-651-1435 Email: Helge.Eng@fire.ca.gov	Name: Director, CALFIRE Address: 1416 9th Street, PO Box 944246 City, State, Zip: Sacramento, CA 94244 Telephone: 916-653-5000 FAX: 916-651-1435

Principal U.S. Forest Service Contacts:

U.S. Forest Service Program Manager Contact	U.S. Forest Service Administrative Contact
Name: John Exline Address: 1323 Club Drive City, State, Zip: Vallejo, CA 94590 Telephone: 707-562-8689 FAX: 707-562-9229 Email: jexline@fs.fed.us	Name: Constance Zipperer Address: 1323 Club Drive City, State, Zip: Vallejo, CA 94590 Telephone: 707-562-9120 FAX: 707-562-9144 Email: czipperer@fs.fed.us

C. ASSURANCE REGARDING FELONY CONVICTION OR TAX DELINQUENT STATUS FOR CORPORATE ENTITIES. This agreement is subject to the provisions contained in the Department of Interior, Environment, and Related Agencies Appropriations Act, 2012, P.L. No. 112-74, Division E, Section 433 and 434 regarding corporate felony convictions and corporate federal tax delinquencies. Accordingly, by entering into this agreement, the signatory

acknowledges that it: (1) does not have a tax delinquency, meaning that it is not subject to any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability, and (2) has not been convicted (or had an officer or agent acting on its behalf convicted) of a felony criminal violation under any Federal law within 24 months preceding the agreement, unless a suspending and debarring official of the USDA has considered suspension or debarment is not necessary to protect the interests of the Government. If SPI, CAL FIRE, or NFWF fails to comply with these provisions, the U.S. Forest Service will annul this agreement as to the violating party, and may recover any funds expended in violation of sections 433 and 434.

D. NOTICES. Any communications affecting the operations covered by this agreement given by the U.S. Forest Service or SPI is sufficient only if in writing and delivered in person, mailed, or transmitted electronically by e-mail or fax, as follows:

To the U.S. Forest Service Program Manager, at the address specified in the MOU.

To SPI, at SPI's address shown in the MOU or such other address designated within the MOU.

To CAL FIRE, at CAL FIRE's address shown in the MOU or such other address designated within the MOU.

To NFWF, at NFWF's address shown in the MOU or such other address designated within the MOU.

Notices are effective when delivered in accordance with this provision, or on the effective date of the notice, whichever is later.

E. PARTICIPATION IN SIMILAR ACTIVITIES. This MOU in no way restricts the U.S. Forest Service, SPI, CAL FIRE, or NFWF from participating in similar activities with other public or private agencies, organizations, and individuals.

F. ENDORSEMENT. Any of SPI's contributions made under this MOU do not by direct reference or implication convey U.S. Forest Service, CAL FIRE, or NFWF endorsement of SPI's products or activities.

G. NONBINDING AGREEMENT. This MOU creates no right, benefit, or trust responsibility, substantive or procedural, enforceable by law or equity. The parties shall manage their respective resources and activities in a separate, coordinated and mutually beneficial manner to meet the purpose(s) of this MOU.

Nothing in this MOU authorizes any of the parties to obligate or transfer anything of value.

Specific, prospective projects or activities that involve the transfer of funds, services, property, and/or anything of value to a party requires the execution of separate agreements and are contingent upon numerous factors, including, as applicable, but not limited to: agency availability of appropriated funds and other resources; cooperator availability of funds and other resources; agency and cooperator administrative and legal requirements (including agency authorization by statute); etc. This MOU neither provides, nor meets these criteria. If the parties elect to enter into an obligation agreement that involves the transfer of funds, services, property, and/or anything of value to a party, then the applicable criteria must be met. Additionally, under a prospective agreement, each party operates under its own laws, regulations, and/or policies, and any Forest Service obligation is subject to the availability of appropriated funds and other resources. The negotiation, execution, and administration of these prospective agreements must comply with all applicable law.

Nothing in this MOU is intended to alter, limit, or expand the agencies' statutory and regulatory authority.

H. USE OF A PARTY'S INSIGNIA. In order for any party to use another party's insignia on any published media, such as a Web page, printed publication, or audiovisual production, permission must be granted in writing, and in the case of the U.S. Forest Service or CAL FIRE, from the U.S. Forest Service's or CAL FIRE's Office of Communications. In the case of the U.S. Forest Service, a written request must be submitted and approval granted in writing by the Office of Communications (Washington Office) prior to use of the insignia.

I. MEMBERS OF U.S. CONGRESS. Pursuant to 41 U.S.C. 22, no U.S. member of, or U.S. delegate to, Congress shall be admitted to any share or part of this agreement, or benefits that may arise therefrom, either directly or indirectly.

J. FREEDOM OF INFORMATION ACT (FOIA). Public access to this MOU or agreement records must not be limited, except when such records must be kept confidential and would have been exempted from disclosure pursuant to Freedom of Information regulations (5 U.S.C. 552) or the California Public Records Act (California Government Code Section 6250, et seq).

K. TEXT MESSAGING WHILE DRIVING. In accordance with Executive Order (EO) 13513, "Federal Leadership on Reducing Text Messaging While Driving," any and all text messaging by Federal employees is banned: a) while driving a Government owned vehicle (GOV) or driving a privately owned vehicle (POV) while on official Government business; or b) using any electronic equipment supplied by the Government when driving any vehicle at any time. All

cooperators, their employees, volunteers, and contractors are encouraged to adopt and enforce policies that ban text messaging when driving company owned, leased or rented vehicles, POVs or GOVs when driving while on official Government business or when performing any work for or on behalf of the Government.

L. TRIBAL EMPLOYMENT RIGHTS ORDINANCE (TERO). The U.S. Forest Service recognizes and honors the applicability of the Tribal laws and ordinances developed under the authority of the Indian Self-Determination and Educational Assistance Act of 1975 (PL 93-638).

M. PUBLIC NOTICES. It is the U.S. Forest Service's policy to inform the public as fully as possible of its programs and activities. SPI, CAL FIRE, and NFWF are encouraged to give public notice of the receipt of this agreement and, from time to time, to announce progress and accomplishments. Press releases or other public notices should include a statement substantially as follows:

"Pacific Southwest Region of the U.S. Forest Service, Department of Agriculture, "

SPI, CAL FIRE, and NFWF may call on the U.S. Forest Service's or CAL FIRE's Office of Communication for advice regarding public notices. SPI, CAL FIRE, and NFWF are requested to provide copies of notices or announcements to the U.S. Forest Service and CAL FIRE Program Manager and to The U.S. Forest Service's and CAL FIRE's Office of Communications as far in advance of release as possible.

N. U.S. FOREST SERVICE ACKNOWLEDGED IN PUBLICATIONS, AUDIOVISUALS AND ELECTRONIC MEDIA. SPI, CAL FIRE, and NFWF shall acknowledge U.S. Forest Service support in any publications, audiovisuals, and electronic media developed as a result of this MOU.

O. NONDISCRIMINATION STATEMENT – PRINTED, ELECTRONIC, OR AUDIOVISUAL MATERIAL. SPI, CAL FIRE, and NFWF shall include the following statement, in full, in any printed, audiovisual material, or electronic media for public distribution developed or printed with any Federal funding.

In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, or disability.

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

If the material is too small to permit the full statement to be included, the material must, at minimum, include the following statement, in print size no smaller than the text:

"This institution is an equal opportunity provider."

P. TERMINATION. Any of the parties, in writing, may terminate this MOU in whole, or in part, at any time before the date of expiration.

Q. DEBARMENT AND SUSPENSION.SPI, CAL FIRE, and NFWF shall immediately inform the U.S. Forest Service if they or any of their principals are presently excluded, debarred, or suspended from entering into covered transactions with the federal government according to the terms of 2 CFR Part 180. Additionally, should SPI, CAL FIRE, or NFWF, or any of their principals, receive a transmittal letter or other official Federal notice of debarment or suspension, then they shall notify the U.S. Forest Service without undue delay. This applies whether the exclusion, debarment, or suspension is voluntary or involuntary.

R. MODIFICATIONS. Modifications within the scope of this MOU must be made by mutual consent of the parties, by the issuance of a written modification signed and dated by all properly authorized, signatory officials, prior to any changes being performed. Requests for modification should be made, in writing, at least 30 days prior to implementation of the requested change.

S. COMMENCEMENT/EXPIRATION DATE. This MOU is executed as of the date of the last signature and is effective through **December 31, 2024,** at which time it will expire.

T. AUTHORIZED REPRESENTATIVES. By signature below, each party certifies that the individuals listed in this document as representatives of the individual parties are authorized to act in their respective areas for matters related to this MOU.

In witness whereof, the parties hereto have executed this MOU as of the last date written below.

1/20/2020

MARK EMMERSON, Chairman and CFO — Date
Sierra Pacific Industries

1/27/20

RANDY MOORE, Regional Forester — Date
USDA Forest Service, Pacific Southwest Region

2/7/2020

THOM PORTER, Director — Date
California Department of Forestry and Fire Protection

3/8/20

JEFF TRANDAHL, Executive Director — Date
National Fish and Wildlife Foundation

The authority and format of this agreement have been reviewed and approved for signature.

25 January 2020

CONSTANCE ZIPPERER
Grants Management Specialist
USDA Forest Service, Pacific Southwest Region

Burden Statement

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0217. The time required to complete this information collection is estimated to average 3 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call toll free (866) 632-9992 (voice). TDD users can contact USDA through local relay or the Federal relay at (800) 877-8339 (TDD) or (866) 377-8642 (relay voice). USDA is an equal opportunity provider and employer.

FS Agreement No. Addendum to 20-MU-11052007-022
Cooperator Agreement No.

MEMORANDUM OF UNDERSTANDING
Between
SIERRA PACIFIC INDUSTRIES,
AND THE
CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION,
AND THE
NATIONAL FISH AND WILDLIFE FOUNDATION,
AND THE
USDA, FOREST SERVICE
PACIFIC SOUTHWEST REGION

COMMERCIAL FOREST LANDOWNERS ADDENDUM TO THE ABOVE MOU
Including
GREEN DIAMOND RESOURCE COMPANY,
HUMBOLDT REDWOOD COMPANY, LLC,
MENDOCINO REDWOOD COMPANY, LLC,
FRUITGROWERS SUPPLY COMPANY,
TC&I-SHASTA,
BASCOM PACIFIC, LLC,
W. M. BEATY AND ASSOCIATES,
HEARST FORESTS, LLC,
WYNTOON TIMBERLANDS, LLC
MICHIGAN-CALIFORNIA TIMBER COMPANY,
SHASTA-CASCADES TIMBERLAND, LLC,
CALIFORNIA TIMBERLAND INVESTMENTS
SOPER COMPANY,
COLLINS ALMANOR FOREST

This ADDENDUM MEMORANDUM OF UNDERSTANDING (MOU) is hereby made and entered into by and between Green Diamond Resource Company, Humboldt Redwood Company, LLC, Mendocino Redwood Company, LLC, Fruit Growers Supply Company, TC&I-Shasta, Bascom Pacific LLC, W. M. Beatty and Associates, Hearst Forests, LLC, Wyntoon Timberlands, LLC, Michigan-California Timber Company, Shasta-Cascades Timberland Company, California Timberlands Investment, Soper Company, Collins Almanor Forest, and Sierra Pacific Industries (these entities collectively referred to as "Commercial Forest Landowners" or "CFLs"); joining with California Department of Forestry and Fire Protection referred to as "CAL FIRE;" the National Fish and Wildlife Foundation, referred to as "NFWF;" and the United States Department of Agriculture (USDA), Forest Service, Pacific Southwest Region, hereinafter referred to as the "U.S. Forest Service." This MOU supersedes and replaces 17-MU-11052007-096 and

Amendment 1; and 19-MU-11052007-028 between the parties relating to this subject matter.

Background: Large scale, high-severity fire poses a risk to Northern Spotted Owls (NSO), California Spotted Owls (CSO), West Coast Distinct Population Segment Fisher (fisher) and their habitat. Increased habitat resilience and resistance to multiple disturbances is needed to promote NSO, CSO, and fisher persistence.

The U.S. Forest Service, CFLs, and CAL FIRE manage forest lands in California that are frequently adjacent, and have ongoing programs to protect and enhance habitat for fish and wildlife; and also manage forest fuels to reduce fire risk and its potential impacts on wildlife species. Under State law, CFLs are authorized to participate in fire suppression on their lands, while CAL FIRE, contract counties, the U.S. Forest Service, and other government agencies have primary fire suppression responsibility for all federal, state, and private wildlands in California. The parties also have responsibilities and interests in the inventory of their respective lands for federally- and state-recognized threatened, endangered, proposed, candidate, and sensitive species; and development of appropriate protection measures for these species.

Due to these natural resource challenges, we believe it is important to establish a coordinated, multi-stakeholder agreement to help protect and enhance our forest resources. This involves establishing a strategic conservation framework to help restore and protect areas where sensitive species – particularly the NSO, CSO, and fisher – are threatened by habitat degradation due to uncharacteristically extensive and severe adverse fire effects.

Roles: The U.S. Forest Service, under the laws of the United States and regulations of the Secretary of Agriculture, is responsible for the protection of fish, wildlife, and plant habitats on National Forest lands and for providing special attention to federally-recognized threatened, endangered, proposed, and candidate species; and U.S. Forest Service sensitive species and species of conservation concern, including the NSO, CSO, and fisher. The U.S. Forest Service is also a cooperating agency under the National Environmental Policy Act (NEPA) in the development of an Environmental Impact Statement by the U.S. Fish and Wildlife Service concerning SPI's application for an Endangered Species Act (ESA) Section 10 permit for NSO and CSO potentially occurring on SPI lands.

The CFLs are responsible under the laws of the United States and the State of California for the assessment of wildlife and plant resources on their lands when developing timber harvest plans.

Under the laws of the State of California, CAL FIRE must consider the public need for watershed protection, and fish, wildlife, and plant habitats on nonfederal lands, while providing special attention to federal- and state- recognized threatened and endangered species.

The NFWF is an independent 501(c) (3) nonprofit organization governed by a Board of Directors appointed by the Secretary of the Interior. The NFWF works with public and private sectors to protect and restore fish, wildlife, plants, and habitats. The NFWF has invested tens of millions of dollars in conservation projects throughout California. This includes a California-wide fuels management program to protect valuable natural resources, post-fire restoration programs in Southern California, wet meadow restoration in the Sierra Nevada, Klamath Basin watershed restoration, in-stream flow, and watershed habitat improvement in Northern California, and efforts to recover select declining, threatened, and endangered species.

Many of NFWF's existing programs and projects are threatened by the deteriorating conditions resulting from extensive and severe forest fires and untreated post-fire sites. As a result, NFWF has a vested interest in working with the U.S. Forest Service, CAL FIRE and CFLs to maximize the health of California's forests. The NFWF also has extensive experience serving as a grant maker or fiduciary to assist federal agencies in identifying, awarding, and managing projects that achieve mutually beneficial outcomes. This includes the development of, or update to, implementation documents guiding investments to achieve targeted outcomes.

Title: Forest Fuels Reduction and Species Conservation in California.

I. PURPOSE: The purpose of this MOU is to document the agreement between the parties to coordinate on certain actions contributing to Forest Fuels Reduction and species conservation in accordance with the provisions of the MOU.

II. STATEMENT OF MUTUAL BENEFIT AND INTERESTS:

U.S. Forest Service benefits and interests: The U.S. Forest Service will have more information and ability to make better decisions regarding the management of forest fuels on lands adjacent to CFLs in California, with a focused priority on NSO, CSO, and fisher, in these areas.

CFLs benefits and interests: The CFLs will have more information regarding the management of forest resources and fuels on their lands, and important to the conservation of NSO, CSO, and fisher when meeting its responsibilities with respect to developing and implementing timber harvest plans and land management objectives.

CAL FIRE benefits and interests: CAL FIRE will be able to make better decisions regarding the management of forest resources and fuels on lands adjacent to CFLs in California that may contain habitat important to the conservation of NSO, CSO, and fisher.

NFWF benefits and interests: As a grant maker that leverages public and private resources to implement conservation projects, NFWF will have more information

regarding the management of forest resources and fuels important to NSO, CSO, and fisher conservation.

Mutual benefits and interests: The U.S. Forest Service, CFLs, CAL FIRE, and NFWF will be better able to fulfill their respective obligations and goals to manage resources and increase effectiveness of management to contribute to NSO, CSO, and fisher conservation and their habitat by considering data and information applicable to entire landscapes, regardless of ownership.

In consideration of the above premises, the parties agree as follows:

III. CFLs SHALL:

A. Provide the U.S. Forest Service, CAL FIRE, and NFWF with:

   a. Information concerning CFLs' forest fuels management plans near U.S. Forest Service lands and CAL FIRE Demonstration State Forests.
   b. Information that may contribute to the conservation of NSO, CSO, fisher, and other sensitive species.
   c. Other relevant data and information requested by the U.S. Forest Service, CAL FIRE, and NFWF, if agreeable to CFLs.

B. Meet and coordinate regularly with the U.S. Forest Service and CAL FIRE, or as otherwise mutually agreed by the parties, regarding forest fuels management actions on the parties' respective lands.

C. Upon the request of the U.S. Forest Service, CAL FIRE, or NFWF, meet with the requesting party and the U.S. Fish and Wildlife Service to discuss NSO, CSO, and fisher conservation strategies and conservation measures on CFLs lands identified through the implementation of this MOU.

D. Undertake activities consistent with the conservation needs of fisher while implementing this MOU, including the following:

   a. Avoid the poisoning of mountain beavers, porcupines, snowshoe hares, and woodrats;
   b. Retain known fisher natal dens;
   c. Retain or recruit a hardwood component (if available) for mast production and future dens;
   d. Retain or recruit structurally diverse forests; and
   e. Retain shrubs and smaller trees in areas with sparse overstory cover.

IV. CAL FIRE SHALL:

A. Provide the U.S. Forest Service, CFLs, and NFWF with:

a. Information concerning CAL FIRE's forest fuels management plans near CFLs lands and U.S. Forest Service lands.
b. Information that may contribute to the conservation of NSO, CSO, and fisher, and other sensitive species.
c. Other data and information requested by the U.S. Forest Service, CFLs, and NFWF that is not exempt pursuant to the California Public Records Act.

B. Meet and coordinate regularly with the U.S. Forest Service and CFLs, or as otherwise mutually agreed by the parties, regarding forest fuels management actions.

C. Upon the request of the U.S. Forest Service, CFLs, or NFWF, meet with the requesting party and the U.S. Fish and Wildlife Service to discuss California NSO, CSO, and fisher conservation strategies identified through the implementation of this MOU.

V. NFWF SHALL:

A. Provide the U.S. Forest Service, CAL FIRE, and CFLs with:

a. Information concerning NFWF's conservation programs and grant funding opportunities that may support conservation opportunities for the NSO, CSO, fisher, and other sensitive species.
b. Information that may contribute to the conservation of these three species and other sensitive species.
c. Other data and information requested by the U.S. Forest Service, CAL FIRE, and CFLs, if agreeable to NFWF.

B. Meet and coordinate regularly with the U.S. Forest Service, CAL FIRE, and CFLs, or as otherwise mutually agreed by the parties, regarding conservation programs and grant funding opportunities for NSO, CSO, fisher, and other sensitive species.

C. Upon the request of the U.S. Forest Service, CAL FIRE, or CFLs, meet with the requesting party and the U.S. Fish and Wildlife Service to discuss NSO, CSO, and fisher conservation strategies on lands identified through the implementation of this MOU.

VI. U.S. FOREST SERVICE SHALL:

A. Provide CFLs, CAL FIRE, and NFWF with:

a. Information concerning the U.S. Forest Service's forest fuels management plans near CFLs timber lands and CAL FIRE Demonstration State Forests.
b. Information that may contribute to the conservation of NSO, CSO, fisher, and other sensitive species.
c. Other data and information requested by CFLs relating to these subjects if agreeable to the U.S. Forest Service.

B. Meet and coordinate regularly with CFLs and CAL FIRE, or as mutually agreed by the parties, regarding forest fuels management actions on U.S. Forest Service lands.

C. Implement applicable conservation measures as identified in the applicable Forest Plans and/or finalized *California Spotted Owl Conservation Strategy,* as well as NSO and fisher management strategies on National Forest System lands identified through the implementation of this MOU.

D. Coordinate with CFLs and the U.S. Fish and Wildlife Service to discuss conservation strategies and conservation measures for these three species, as well as other sensitive species on National Forest System lands identified through the implementation of this MOU.

E. Encourage direct coordination between the National Forests of the Pacific Southwest Region with the parties to this MOU regarding its implementation.

VII. IT IS MUTUALLY UNDERSTOOD AND AGREED BY AND BETWEEN THE PARTIES THAT:

A. Nothing in this MOU shall modify any other agreements between the parties.

B. PRINCIPAL CONTACTS. Individuals listed below are authorized to act in their respective areas for matters related to this agreement.

Principal Cooperator Contacts:

Cooperator Program Contact	Cooperator Administrative Contact
Name: Dan Tomascheski, SPI Address: P.O. Box 496028 City, State, Zip: Redding, CA 96049-6028 Telephone: (530) 378-8000 FAX: (530) 378-8109 Email: dtomascheski@spi-ind.com	Name: Ed Murphy, SPI Address: P.O. Box 496028 City, State, Zip: Redding, CA 96049-6028 Telephone: (530) 378-8000 FAX: (530) 378-8109 Email: emurphy@spi-ind.com
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Name: Lloyd Bradshaw WT, HF Address: P.O. Box 670 City, State, Zip: McCloud, CA, 96057 Telephone: (530) 964-2425 FAX: (530) 964-2407 Email: lbradshaw@hearst.com	Name: Lloyd Bradshaw WT, HF Address: P.O. Box 670 City, State, Zip: McCloud, CA, 96057 Telephone: (530) 964-2425 FAX: (530) 964-2407 Email: lbradshaw@hearst.com
Name: Sam Porter, LandVest for SCT Address: P.O. Box 492709 City, State, Zip: Redding CA 96049 Telephone: (530) 918-4800 Email: SPorter@LandVest.com	Name: John Vona, LandVest for SCT Address: 3301 Concord Drive, Suite G City, State, Zip: McKinleyville, CA 95519 Telephone: (530) 918-4800 Email: JVona@LandVest.com

Cooperator Program Contact	Cooperator Administrative Contact
Name: Jonathan Birdsong, NFWF Address: 90 New Montgomery Street, Suite 1010 City, State, Zip: San Francisco, CA 94105 Telephone: 415-778-0999 FAX: 415-778-0998 Email: Jonathan.Birdsong@nfwf.org	Name: Grants Department, NFWF Address: 1133 Fifteenth St. NW, Suite 1000 City, State, Zip: Washington, D.C. 20005 Telephone: 202-857-0166 FAX: 202-857-0162 Email: info@nfwf.org

Cooperator Program Contact	Cooperator Administrative Contact
Name: Helge Eng, CALFIRE Address: 1416 9th Street, PO Box 944246 City, State, Zip: Sacramento, CA 94244 Telephone: 916-653-5000 FAX: 916-651-1435 Email: Helge.Eng@fire.ca.gov	Name: Director, CALFIRE Address: 1416 9th Street, PO Box 944246 City, State, Zip: Sacramento, CA 94244 Telephone: 916-653-5000 FAX: 916-651-1435

Principal U.S. Forest Service Contacts:

U.S. Forest Service Program Manager Contact	U.S. Forest Service Administrative Contact
Name: John Exline Address: 1323 Club Drive City, State, Zip: Vallejo, CA 94590 Telephone: 707-562-8689 FAX: 707-562-9229 Email: jexline@fs.fed.us	Name: Constance Zipperer Address: 1323 Club Drive City, State, Zip: Vallejo, CA 94590 Telephone: 707-562-9120 FAX: 707-562-9144 Email: czipperer@fs.fed.us

C. ASSURANCE REGARDING FELONY CONVICTION OR TAX DELINQUENT STATUS FOR CORPORATE ENTITIES. This agreement is subject to the provisions contained in the Department of Interior, Environment, and Related Agencies Appropriations Act, 2012, P.L. No. 112-74, Division E, Section 433 and 434 regarding corporate felony convictions and corporate federal tax delinquencies. Accordingly, by entering into this agreement, the signatory acknowledges that it: (1) does not have a tax delinquency, meaning that it is not subject to any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability, and (2) has not been convicted (or had an officer or agent acting on its behalf convicted) of a felony criminal violation under any federal law within 24 months preceding the agreement, unless a suspending and debarring official of the USDA has considered suspension or debarment is not necessary to protect the interests of the Government. If CFLs, CAL FIRE, or NFWF fails to comply with these provisions, the U.S. Forest Service will annul this agreement as to the violating party, and may recover any funds expended in violation of sections 433 and 434.

D. NOTICES. Any communications affecting the operations covered by this agreement given by the U.S. Forest Service or CFLs is sufficient only if in writing and delivered in person, mailed, or transmitted electronically by e-mail or fax, as follows:

To the U.S. Forest Service Program Manager, at the address specified in the MOU.

To CFLs, at CFLs' address shown in the MOU or such other address designated within the MOU.

To CAL FIRE, at CAL FIRE's address shown in the MOU or such other address designated within the MOU.

To NFWF, at NFWF's address shown in the MOU or such other address designated within the MOU.

Notices are effective when delivered in accordance with this provision, or on the effective date of the notice, whichever is later.

E. PARTICIPATION IN SIMILAR ACTIVITIES. This MOU in no way restricts the U.S. Forest Service, CFLs, CAL FIRE, or NFWF from participating in similar activities with other public or private agencies, organizations, or individuals.

F. ENDORSEMENT. Any of CFLs' contributions made under this MOU do not by direct reference or implication convey U.S. Forest Service, CAL FIRE, or NFWF endorsement of CFLs' products or activities.

G. NONBINDING AGREEMENT. This MOU creates no right, benefit, or trust responsibility, substantive or procedural, enforceable by law or equity. The parties shall manage their respective resources and activities in a separate, coordinated and mutually beneficial manner to meet the purpose(s) of this MOU. Nothing in this MOU authorizes any of the parties to obligate or transfer anything of value.

Specific, prospective projects or activities that involve the transfer of funds, services, property, and/or anything of value to a party requires the execution of separate agreements and are contingent upon numerous factors, including, as applicable, but not limited to: agency availability of appropriated funds and other resources; cooperator availability of funds and other resources; agency and cooperator administrative and legal requirements (including agency authorization by statute). This MOU neither provides, nor meets these criteria. If the parties elect to enter into an obligation agreement that involves the transfer of funds, services, property, and/or anything of value to a party, then the applicable criteria must be met. Additionally, under a prospective agreement, each party operates under its own laws, regulations, and/or policies, and any Forest Service obligation is subject to the availability of appropriated funds and other resources. The

negotiation, execution, and administration of these prospective agreements must comply with all applicable law.

Nothing in this MOU is intended to alter, limit, or expand the agencies' statutory and regulatory authority.

H. USE OF A PARTY'S INSIGNIA. In order for any party to use another party's insignia on any published media, such as a Web page, printed publication, or audiovisual production, permission must be granted in writing, and in the case of the U.S. Forest Service or CAL FIRE, from the U.S. Forest Service's or CAL FIRE's Office of Communications. In the case of the U.S. Forest Service, a written request must be submitted and approval granted in writing by the Office of Communications (Washington Office) prior to use of the insignia.

I. MEMBERS OF U.S. CONGRESS. Pursuant to 41 U.S.C. 22, no U.S. member of, or U.S. delegate to, Congress shall be admitted to any share or part of this agreement, or benefits that may arise therefrom, either directly or indirectly.

J. FREEDOM OF INFORMATION ACT (FOIA). Public access to this MOU or agreement records must not be limited, except when such records must be kept confidential and would have been exempted from disclosure pursuant to Freedom of Information regulations (5 U.S.C. 552) or the California Public Records Act (California Government Code Section 6250, et seq).

K. TEXT MESSAGING WHILE DRIVING. In accordance with Executive Order (EO) 13513, "Federal Leadership on Reducing Text Messaging While Driving," any and all text messaging by Federal employees is banned: a) while driving a Government owned vehicle (GOV) or driving a privately owned vehicle (POV) while on official Government business; or b) using any electronic equipment supplied by the Government when driving any vehicle at any time. All cooperators, their employees, volunteers, and contractors are encouraged to adopt and enforce policies that ban text messaging when driving company owned, leased or rented vehicles, POVs or GOVs when driving while on official Government business or when performing any work for or on behalf of the Government.

L. TRIBAL EMPLOYMENT RIGHTS ORDINANCE (TERO). The U.S. Forest Service recognizes and honors the applicability of the Tribal laws and ordinances developed under the authority of the Indian Self-Determination and Educational Assistance Act of 1975 (PL 93-638).

M. PUBLIC NOTICES. It is the U.S. Forest Service's policy to inform the public as fully as possible of its programs and activities. CFLs, CAL FIRE, and NFWF are encouraged to give public notice of the receipt of this agreement and, from time to

time, to announce progress and accomplishments. Press releases or other public notices should include a statement substantially as follows:

"Pacific Southwest Region of the U.S. Forest Service, Department of Agriculture, "

CFLs, CAL FIRE, and NFWF may call on the U.S. Forest Service's or CAL FIRE's Office of Communication for advice regarding public notices. CFLs, CAL FIRE, and NFWF are requested to provide copies of notices or announcements to the U.S. Forest Service and CAL FIRE Program Manager and to The U.S. Forest Service's and CAL FIRE's Office of Communications as far in advance of release as possible.

N. U.S. FOREST SERVICE ACKNOWLEDGED IN PUBLICATIONS, AUDIOVISUALS AND ELECTRONIC MEDIA. CFLs, CAL FIRE, and NFWF shall acknowledge U.S. Forest Service support in any publications, audiovisuals, and electronic media developed as a result of this MOU.

O. NONDISCRIMINATION STATEMENT – PRINTED, ELECTRONIC, OR AUDIOVISUAL MATERIAL. CFLs, CAL FIRE, and NFWF shall include the following statement, in full, in any printed, audiovisual material, or electronic media for public distribution developed or printed with any Federal funding.

In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, or disability.

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

If the material is too small to permit the full statement to be included, the material must, at minimum, include the following statement, in print size no smaller than the text:

"This institution is an equal opportunity provider."

P. TERMINATION. Any of the parties, in writing, may terminate this MOU in whole, or in part, at any time before the date of expiration.

Q. DEBARMENT AND SUSPENSION. CFLs, CAL FIRE, and NFWF shall immediately inform the U.S. Forest Service if they or any of their principals are presently excluded, debarred, or suspended from entering into covered transactions with the federal government according to the terms of 2 CFR Part

180. Additionally, should CFLs, CAL FIRE, or NFWF, or any of their principals, receive a transmittal letter or other official federal notice of debarment or suspension, then they shall notify the U.S. Forest Service without undue delay. This applies whether the exclusion, debarment, or suspension is voluntary or involuntary.

R. MODIFICATIONS. Modifications within the scope of this MOU must be made by mutual consent of the parties, by the issuance of a written modification signed and dated by all properly authorized, signatory officials, prior to any changes being performed. Requests for modification should be made, in writing, at least 30 days prior to implementation of the requested change.

S. COMMENCEMENT/EXPIRATION DATE. This MOU is executed as of the date of the last signature and is effective through **December 31, 2024,** at which time it will expire.

T. AUTHORIZED REPRESENTATIVES. By signature below, each party certifies that the individuals listed in this document as representatives of the individual parties are authorized to act in their respective areas for matters related to this MOU.

In witness whereof, the parties hereto have executed this MOU Addendum as of the last date written below.

Sierra Pacific Industries — Date: 2/12/20

Soper Company — President — Date: 2/12/2020

Collins Almanor Forest — Date: 2.12.2020

Mendocino Redwood Company, LLC
Humboldt Redwood Company, LLC — 2-12-20 Date

Wyntoon Timberlands, LLC & Hearst Forests, LLC — 2/12/20 Date

Fruit Growers Supply Company — 2/12/20 Date

W. M. Beaty and Associates — 2/12/2020 Date

Green Diamond Resource Company — 2/12/2020 Date

Michigan-California Timber Company — 2/12/2020 Date

Bascom Pacific, LLC — 2-12-2020 Date

TC&I-Shasta, LLC — 2-12-2020 Date

Shasta-Cascades Timberlands, LLC — 2/12/2020 Date

See above also signed under Shasta-Cascades Timberlands, LLC — 2/12/2020 Date

New Forests, Inc Managing Member of New Forests US Timberlands, LLC, General Partner of **California Timberland Investments, LP**, Managing Member of **Shasta Cascades California Timberlands 2, LLC**.

- A sensitive plant habitat assessment has been completed for this THP and shall be verified in the field by a qualified botanist. Seasonally-appropriate sensitive plant surveys have not been completed. To comply with HCP Section 6.12, no timber harvesting operations including, but not limited to, road construction or reconstruction, timber harvesting, yarding, site preparation, and herbicide application shall take place until one of the following occurs:

  1) HRC has conducted sensitive plant surveys, has detected sensitive plant occurrences, has completed consultation with DFG or the USFWS, or consultation is not required because the occurrences are greater than 15.2 meters (50 feet) from proposed timber operations.

  2) Or, through field-based habitat assessments, HRC has determined that the THP, or mapped and delineated areas of the THP, do not contain sensitive plant habitat and therefore no sensitive plant surveys of those areas are required.

  In either case, the results of habitat assessments and sensitive plant surveys shall be submitted to DFG or the USFWS, and along with completed consultations shall be included in the THP Section V. DFG shall have five business days to comment on survey and habitat assessment results with no sensitive plant or habitat detections before timber harvesting operations can begin.

- ***Montia howellii* (Howell's Montia):**
  1. All new occurrences of *Montia howellii* discovered on HRC land shall be reported to the CNDDB and the Eureka DFG Coastal Timberland Planning office.

  2. HRC and DFG have agreed on a multi-year monitoring program which includes *Montia howellii* populations in several sub-basins of the lower Eel River and Van Duzen river drainages. The results will be submitted to DFG and the FWS by December 1 of each year.

  3. HRC roads L46.26 Riverside, A51.19 Jordan Creek, U11 Wrigley Road, C07.2327 Upper Newman Creek and L33.44 Cummings Creek may have year around vehicle traffic of any kind, including hauling. All other HRC seasonal roads occupied by *Montia howellii* shall have vehicle traffic restricted to sport-utility vehicles, such as pickup trucks, and to all-terrain vehicles (quads) during the growing season (1 January to 1 June).

  4. After the growing season, HRC may grade occupied road sections to a depth of no more than 10 centimeters (4 inches). The soil graded from the roadbed shall be transported no further than 61 meters (200 feet) from the occurrence, and the spoils shall be deposited on a roadside berm or across the road surface. HRC shall not apply herbicide within 7.6 meters (25 feet) of the occurrence.

  5. A site-specific consultation with DFG shall be required for HRC to conduct operations in a manner that differs from that described in Items 3 and 4 above.

  A copy of the February 27, 2006, memorandum from Mr. William Condon (DFG) to Mr. Ron Pape (CAL FIRE) is available at the CAL FIRE Fortuna and Santa Rosa offices.

See Plan Addendum to Item 32 in THP Section III, and the Biological Assessment in THP Section IV.

NON-LISTED SPECIES IMPACTS	
c.[☐]Yes **[X]** No	Are there any NON-LISTED species which will be significantly impacted by the operation? **If yes, identify the species and the provisions to be taken for the protection of the species.**

Southern torrent salamander (HCP 6.10): Operational compliance with THP Section II HCP guidelines.

Northern red-legged frog, Foothill yellow-legged frog; Tailed frog (HCP 6.10): Operational compliance with THP Section II *HCP* guidelines.

Northwestern pond turtle (HCP 6.10): Operational compliance with THP Section II *HCP* guidelines.

ITEM # 33 – SNAGS

ITEM #33. SNAGS
Per 14 CCR 919, 939, 959 – Timber operations shall be planned and conducted to maintain suitable habitat for wildlife species as specified by the provisions of Article 9 of the Forest Practice Rules. **Within the logging area all snags shall be retained to provide wildlife habitat with the exception of snags for safety reasons Per 14 CCR 919.1, 939.1, 959.1(a)-(f)**

a.[☐]Yes [X] No	Are there any snags which must be felled for fire protection or safety reasons? To meet the intent of 14 CCR 919.1 Coast Rules, snags that would constitute a fire hazard, as determined by the Director, or safety hazard in the harvesting area will be felled. To provide protections and benefits for wildlife, all other snags will be retained as allowed for under 14 CCR 919.1. All snags (standing dead trees) that do not constitute a safety hazard to workers will be retained during timber harvest. See THP Section II, Item 33(b) - (d) below.
b.[☐]Yes [X] No	Will snags over 20 feet in height and 16 inches dbh be felled within 100 feet of a main ridge that is suitable for fire suppression?
c.[☐]Yes [X] No	Will snags over 20 feet in height and 16 inches dbh be felled within 100 feet of all public roads, permanent roads, landings and railroads? (select all that apply) [☐] Public road(s) [☐] Permanent road(s) [☐] Landing(s) [☐] Railroad(s)
d.[☐]Yes [X] No	Will snags be felled where federal and state safety laws and regulations require the felling of snags?
e.[☐]Yes [X] No	Will snags be felled within 100 feet of structures maintained for human habitation?
f. [☐]Yes [X] No	Will merchantable snags be felled in any location as provided for in the plan?
g.[☐]Yes [X] No	Will snags be felled as required to control insect or disease concerns?

33. **SNAGS and *HABITAT STRUCTURAL COMPONENTS (HCP 6.11.2.2)***

a. ☒ Yes ☐ No Are there any snags which must be felled for fire protection or safety reasons? If Yes, describe which snags are going to be felled and why.

To meet the intent of 14 CCR 919.1 Coast Rules, snags that would constitute a fire hazard, as determined by the Director, or safety hazard in the harvesting area will be felled. To provide protections and benefits for wildlife, all other snags will be retained as allowed for under 14 CCR 919.1. All snags (standing dead trees) that do not constitute a safety hazard to workers will be retained during timber harvest. See THP Section II, Item 33(b) - (d) below.

***Habitat Structural Components* (HCP 6.11.2.2):**

b. ☒ Yes ☐ No Will all snags that do not constitute a safety hazard be retained standing post harvest? *All snags (standing dead trees) that do not constitute a safety hazard to workers will be retained during timber harvest (HCP 6.11.2.2.1).*

c. ☒ Yes ☐ No Has information been gathered on the presence of snags, down logs, hardwoods, and high value wildlife trees within the THP area averaged over a 40-acre harvest unit? Reference: *HCP 6.11.2.2.9 - Snag, high value wildlife tree, hardwood, and down log conservation measures shall apply to THPs, timber harvest exemptions, and notice of emergency timber operations and will be evaluated based on the average number measures over a 40-acre harvest unit.*

The RPF has evaluated the THP area for the presence of habitat structural components including snags, green retention trees (including large hardwoods), and high value wildlife trees. Please see THP Section III – Item 33.

d. ☐ Yes ☒ No Were enough snags present (averaged over a 40-acre harvest unit) to meet the following *HCP* requirement: *At a minimum, the following numbers of snags (conifer and hardwood) shall remain averaged over the THP area following timber harvest and site preparation (larger snags may be substituted for smaller snags)* (HCP 6.11.2.2.2):

- ☐ Yes ☒ No *1.2 snags per acre >30" DBH, > 30' tall* (HCP 6.11.2.2.2.1)?
- ☐ Yes ☒ No *2.4 snags per acre >20" DBH >16' tall* (HCP 6.11.2.2.2.2)?
- ☐ Yes ☒ No *1.2 snags per acre >15" DBH >12' tall* (HCP 6.11.2.2.2.3)?
- ☒ Yes ☐ No ☐ N/A If any box above is checked No, will green snag replacement trees in the same size categories be retained post harvest to meet the HCP per acre retention requirements? Check N/A if the number of snags present meet HCP requirements for all 3 categories.

✓ *Snags in RMZs adjacent to harvest units may be counted toward the objective, but at least half the snags in each size category must be outside Class I and II RMZs.* (HCP 6.11.2.2.3)

✓ *If snags are not present to meet the above objective, green trees in the same size categories shall be retained in numbers sufficient to meet the objective. Green trees with dead or broken tops, complex crowns, animal damage, disease, large cavities and conifer species other than redwood shall have priority for retention. Green trees identified as replacement trees for snags in the over 30 inches DBH category shall be marked and retained during subsequent timber harvest entries throughout the permit term.* (HCP 6.11.2.2.4)

✓ *In the event of an emergency (as described in Section 1052.1 of the FPRs), such as wildfire or pest or disease outbreak, the requirement for retention of all snags may be waived through consultation with and approval by USFWS and CDFW.* (HCP 6.11.2.2.5)

Green trees identified as replacement trees for snags in the over 30 inches DBH category shall be marked with an "L" at DBH and below the cut-line prior to commencement of timber harvest operations. The LTO shall not cut any tree designated for retention with an "L" unless it represents a safety hazard, the supervising RPF has been consulted, and a replacement tree of equal or greater value has been identified for retention in place of the tree to be cut.

e. ☐ Yes ☒ No Have all high value wildlife trees outside of Class I and II RMZs meeting the August 17, 2006, cull/wildlife tree scorecard criteria that do not constitute a safety hazard been marked for retention?

✓ *Mark & retain at least 4 high value wildlife trees per acre that do not constitute a safety hazard outside of Class I and II RMZs. Trees 30" dbh & trees with visible defects such as broken tops, deformities, or cavities will have priority for retention. High value wildlife trees may include trees with merchantable logs. These trees shall be retained during subsequent timber harvest entries through the permit term so long as they do not constitute a safety hazard.* (HCP 6.11.2.2.6)

High Value Wildlife Trees (HVWT) shall be marked with an "L" at DBH and below the cut-line prior commencement of timber harvest operations. The LTO shall not cut any such identified HVWT unless it represents a safety hazard and the supervising RPF is notified.

f. ☐ Yes ☒ No Are there any live hardwood trees greater than 30" DBH that do not constitute a safety hazard identified for retention? The HCP requirement is to retain all live hardwood trees over 30 inches in DBH to a maximum of two per acre if they exist.

✓ *All live hardwood trees over 30" dbh that do not constitute a safety hazard will be retained following timber harvest & site preparation, to a maximum of 2 per acre. Hardwoods within all RMZs count towards this objective.* (HCP 6.11.2.2.7)

Live hardwood trees greater than 30" DBH designated for retention shall be marked with an "L" at DBH and below the cut-line prior commencement of timber harvest operations. The LTO shall not cut any tree designated for retention unless it represents a safety hazard and supervising RPF is notified.

g. ☒ Yes ☐ No Are there at least 2 downed logs per acre outside of Class I and II RMZs greater than 15" DBH and 20' in length identified for retention? If No, less than an average of 2 downed logs per acre is present pre harvest and there is no requirement to maintain them where they do not exist.

✓ *Two logs per acre greater than 15 inches in diameter and over 20 feet long will remain following timber harvest and site preparation. One of these logs per acre must be in decay class 1, 2, or 3 (Maser and Trapp, 1984). Hollow logs over 30 inches in diameter will have priority for retention. Logs in Class I and II RMZs will not be counted toward this objective. There will be no requirement to leave down logs where they do not exist currently unless results of the first five years of monitoring indicate management objectives are unlikely to be met.* (HCP 6.11.2.2.8)

For more information on snags and habitat structural components, see THP Section III, Plan Addendum to Item 33.

ITEM # 34 – LATE SUCCESSIONAL FOREST STANDS

ITEM #34 LATE SUCCESSIONAL FOREST STANDS	
a.[☐]Yes [**X**] No	Are any Late Successional Forest stands proposed for harvest?
Describe:	

LATE SUCCESSION FOREST STANDS (FPRs) & LATE SERAL FOREST (HCP) - The FPRs have incorporated the California Wildlife Habitat Relationships (WHR) manual to describe wildlife habitat. This item addresses forest stands that meet the standards of WHR 5M, 5D and 6. There are several terms used in the FPRs and in the landowner's HCP, which describe functional characteristics of these stands and require minimum stand acreages. The definitions of these terms are provided in Section III, Plan Addendum to Item 34 for reference. The FPRs in 14 CCR 919.16 and HCP 6.11.2.1 address THP requirements with regard to "late succession forest stands" (919.16) and "late seral forest" (HCP 6.11.2.1*). The requirements of these FPRs are addressed under this item.

The FPRs also require, in 14 CCR 912.9 - Technical Rule Addendum #2, that the submitter address potential cumulative impacts to "Late Seral (Mature) Forest Characteristics" and "Late Seral Habitat Continuity". These two terms are described in the referenced technical rule addendum, and are reprinted for reference in the Biological Assessment portion of the Cumulative Impacts Assessment in Section IV of this THP. These two terms describe stands that may differ significantly from stands that are required to be analyzed under 14 CCR 919.16 and HCP 6.11.2.1. It is important to note, therefore, that the analysis provided in the cumulative impacts assessment considers impacts to a significantly different stand type than does the analysis provided under Item 34. * The landowner's HCP contains requirements for the retention of late seral type.

☐ Yes ☒ No Are any Late Succession Forest Stands proposed for harvest? If Yes, describe the measures to be implemented by the LTO that avoid long-term significant adverse effects on fish, wildlife and listed species known to be primarily associated with late succession forests.

HRC will not harvest old growth as defined, below. HRC will identify all previously un-harvested stands displaying old growth and late successional characteristics, and will permanently protect these stands.

HRC will preserve the character and functionality of all previously harvested stands with at least 6 -15[2] old growth trees or more per acre. The residual old growth trees and late successional characteristics of these stands are protected and only silviculture such as thinning from below is allowed to enhance or extend these stands.

The remaining previously logged second-growth forests on HRC lands are estimated to contain some scattered residual old growth trees in very low densities. These old trees are being preserved based on a policy that protects them by age, size, function, and characteristics specific to particular species. HRC (and its sister company, Mendocino Redwood Company) is the only large industrial forestland owner known to have such a comprehensive old growth protection policy. Trees preserved from harvesting include:

1. Any redwood tree, 48" dbh and larger, established prior to 1800.
2. Any Douglas-fir tree, 36" dbh and larger, established prior to 1800.
3. Any tree established prior to 1800 (conifer or hardwood), regardless of diameter size, with a preponderance of species-specific old growth characteristics.
4. In addition to above, HRC retains any tree (conifer or hardwood), established prior to 1800, that cannot be replaced in size or ecological function within 80-130 years, regardless of diameter or presence of old growth characteristics (generally most applicable to areas of exceptionally low site, for example – serpentine soils, site five, and shallow rocky outcroppings.

On-site inspections and examinations of HRC G.I.S. maps and aerial photos have been conducted. These examinations have encompassed the entire HCP defined Watershed Assessment Area, focusing down to the Plan level. Based upon thorough assessment, Late Succession Forest Stands are not associated with this proposed project.

☐ Yes ☒ No Is any Late Seral Forest, as defined in the HCP (EIS/EIR 3.9.1.3, page 3.9-17 and 7. Glossary, page 7-5) proposed for harvest? If Yes, demonstrate consistency with the HCP late seral requirements.

The landowner (Section I, Item 1 & 2) has an approved HCP and ITP. These documents demonstrate how late seral forests will be managed, and how late seral stand attributes will be recruited, maintained, and monitored. Based upon the information analyzed in the HCP process, Late Seral Forest is not associated with this proposed project.

ITEM # 35 –OTHER WILDLIFE PROTECTION REQUIRED BY FOREST PRACTICE RULES

a.[☐]Yes [**X**] No	Are there any other provisions for wildlife protection required by the rules?
Description:	

ITEM # 36 – CULTURAL RESOURCES

ITEM #36 ARCHAEOLOGICAL / HISTORICAL	
a.[**X**]Yes [☐] No	Has an archaeological / historical survey been made for the THP area?
b.[**X**]Yes [☐] No	Has a current archaeological / historical records check been conducted for the THP area?
c.[**X**]Yes [☐] No	During pre-field research and surveys were archaeological or historical sites identified within the plan area? **If YES, THIS INFORMATION IS CONFIDENTIAL AND NOT AVAILABLE TO REVIEW AGENCIES, OTHER THAN CAL FIRE, AND THE GENERAL PUBLIC.**

If a person discovers a potentially significant archaeological or historical site after this plan is accepted by the Director, the landowner shall conform to 14 CCR § 929.3 Post-Review Site Discovery.

(a) The person who made the discovery shall immediately notify the Director, LTO, RPF, or timberland owner of record.
(b) The person first notified in (a) shall immediately notify the remaining parties in (a).
(c) No timber operations shall occur within 100 feet of the identified boundaries of the new site until the plan submitter proposes, and the Director agrees to, protection measures pursuant to 14 CCR § 929.2.
(d) A minor deviation shall be filed to the plan.

ITEM # 37 – GROWTH AND YIELD INFORAMTION

[☐]Yes [**X**] No	Has any inventory or growth and yield information designated "TRADE SECRET" been submitted in a separate confidential envelope in Section VI of this THP?

[2] The Forest Stewardship Council Pacific Coast standards are currently under review, in the process of creating a national standard, and subject to change.

PLAN ADDENDUM TO ITEM 33

SECTION III

SNAGS and HABITAT STRUCTURAL COMPONENTS (HCP 6.11.2.2)

THP Specific Information regarding retention of snags, green (snag replacement) trees including large hardwoods, and high value wildlife trees:

Habitat structural components including snags, green retention trees (including large hardwoods), and high value wildlife trees were evaluated during THP preparation to provide an estimate of frequency and distribution across the plan area. When and where necessary, green snag replacement trees over 30 inches DBH, High Value Wildlife Trees (HVWT), live hardwoods greater than 30 inches DBH, and down logs have been or shall be marked for retention prior to commencement of timber harvest operations. A summary of snags, green replacement trees, and high value wildlife trees recorded to date is provided in the table(s) below.

HCP Management Objectives :

Habitat Structural Components (6.11.2.2)

- *All snags (standing dead trees) that do not constitute a safety hazard to workers will be retained during timber harvest.*
- *At a minimum, the following numbers of snags (conifer and hardwood) shall remain averaged over the THP area following timber harvest and site preparation (larger snags may be substituted for smaller snags):*
  - *1.2 snags per acre over 30 inches DBH and over 30 feet tall*
  - *2.4 snags per acre over 20 inches DBH and over 16 feet tall*
  - *1.2 snags per acre over 15 inches DBH and over 12 feet tall*
- *Snags in RMZs adjacent to harvest units may be counted towards the objective, but at least half the snags in each size category must be outside Class I and II RMZs.*
- *If snags are not present to meet the objective, green trees in the same size categories shall be retained in numbers sufficient to meet the objective. Green trees with dead or broken tops, complex crowns, animal damage, disease, and/or large cavities and conifer species other than redwood shall have priority for retention. Green trees identified as replacement trees for snags in the over 30 inches DBH category shall be marked and retained during subsequent timber harvest entries through the permit term.* **This THP is using group selection silviculture requiring a minimum 75 square feet of conifer basal area per acre be retained post-harvest. Trees to be harvested versus retained during this entry is controlled by timber marking. An estimate of snags by size classification and approximate 40 acre sub-unit (see map) is provided in the table below. Green 'snag replacement' trees with the characteristics described above are prioritized for retention and retained in sufficient number to meet HCP requirements. Green trees identified as replacement trees for snags in the over 30 inches category shall be individually marked for retention prior to commencement of timber harvest operations and retained during subsequent timber harvest entries through the HCP permit term. The RPF has evaluated the THP area and harvest history for potential overlap with previous HCP timber harvests to avoid double-counting green snag replacement trees previously retained to meet HCP requirements for areas outside this current THP.**
- *In the event of an emergency (as described in Section 1052.1of the FPRs) such as wildfire or pest or disease outbreak, the requirement for retention of all snags may be waived through consultation with, and approval by, USFWS and CDFW.*
- *Mark and retain at least four high value wildlife trees per acre that do not constitute a safety hazard outside of Class I and II RMZs. Trees 30 inches DBH and trees with visible defects such as broken tops, deformities, or cavities will have priority for retention. High value wildlife trees may include trees with merchantable logs. These trees shall be retained during subsequent timber harvest entries through the permit term so long as they do not constitute a fire hazard.*
- *All live hardwood trees over 30 inches DBH that do not constitute a safety hazard will be retained following timber harvest and site preparation, to a maximum of two per acre. Hardwoods within all RMZs count towards this objective.*
- *Two logs per acre greater than 15 inches in diameter and over 20 feet long will remain following timber harvest and site preparation. One of these logs per acre must be in decay class 1,2, or 3 (Maser and Trapp. 1984). Hollow logs over 30 inches in diameter will have priority for retention. Logs in Class I and II RMZs will not be counted toward this objective. There will be no requirement to leave down logs where they do not exist currently, unless results of the first five years of monitoring indicate management objectives are unlikely to be met.*
- *Snag, high value wildlife tree, hardwood, and down log conservation measures shall apply to THPs, timber harvest exemptions, and notice of emergency timber operations and will be evaluated and reported based on the average number measured over a 40-acre harvest unit.*

HCP Habitat Component information stated in the unit table(s) below are based on pre-harvest stand conditions. Information may change as a result of timber operations. The HCP requirements (HCP 6.11.2.2) for snags and green replacement trees will be met post-harvest and following site preparation.

HCP 6.11.2.2 Habitat Structural Component Information (HW = Hardwoods, RW = Redwood, NON RW = Misc. White Woods/Conifers)

Unit #: 1 (A) Harvest Acres: 36 Size Classes:↓	Snags in Class I and/or II RMZ	Snags outside Class I and/or II RMZ	Green replacement trees in Class I and/or II RMZ			Green replacement trees outside Class I and/or II RMZ			Total snags and green replacement trees			HCP required number of snags and/or green replacement trees
Species mix			HW	RW	NON RW	HW	RW	NON RW	HW	RW	NON RW	
15-19" DBH, >12' HT.	0	0	0	22	0	0	22	0	0	44	0	44
20-29" DBH, >16' HT.	0	0	0	30	14	0	30	14	0	60	28	87
>30" DBH, >30' HT.	0	2	0	15	2	0	24	2	0	41	4	44(Complete)

A) 0 = Total number of live cull/wildlife trees outside of Class I and II RMZs meeting August 17, 2006, cull/wildlife trees scorecard criteria that do not constitute a safety hazard. (HCP 6.11.2.2.6)
0 = Number of live cull/wildlife trees per acre meeting August 17, 2006 scorecard criteria (based on THP area excluding Class I & II RMZs) that do not constitute a safety hazard. (HCP 6.11.2.2.6)
B) 0 = Number of *live hardwood trees per acre over 30" that do not constitute a safety hazard.* (HCP 6.11.2.2.7)
C) 3.0 = # of *logs per acre greater than 16" dia. & over 20' long that do not constitute a safety hazard outside of Class I & II RMZs.* (HCP 6.11.2.2.8)
D) 2.0 = Number of *logs per acre* listed in (C) above *in decay class 1, 2, or 3 (Maser and Trapp 1984), greater than 15 in diameter and over 20 feet long that do not constitute a safety hazard outside of Class I and II RMZs.* (HCP 6.11.2.2.8)

Unit #: 1 (B) Harvest Acres: 40 Size Classes:↓	Snags in Class I and/or II RMZ	Snags outside Class I and/or II RMZ	Green replacement trees in Class I and/or II RMZ			Green replacement trees outside Class I and/or II RMZ			Total snags and green replacement trees			HCP required number of snags and/or green replacement trees
Species mix			HW	RW	NON RW	HW	RW	NON RW	HW	RW	NON RW	
15-19" DBH, >12' HT.	0	0	0	24	0	0	24	0	0	48	0	48
20-29" DBH, >16' HT.	0	0	0	24	24	0	24	24	0	48	48	96
>30" DBH, >30' HT.	2	2	0	15	9	0	24	0	0	42	10	48 (Complete)

A) 1 = Total number of live cull/wildlife trees outside of Class I and II RMZs meeting August 17, 2006, cull/wildlife trees scorecard criteria that do not constitute a safety hazard. (HCP 6.11.2.2.6)
0025 = Number of live cull/wildlife trees per acre meeting August 17, 2006 scorecard criteria (based on THP area excluding Class I & II RMZs) that do not constitute a safety hazard. (HCP 6.11.2.2.6)
B) 0 = Number of *live hardwood trees per acre over 30" that do not constitute a safety hazard.* (HCP 6.11.2.2.7)
C) 3.0 = # of *logs per acre greater than 15" dia. & over 20' long that do not constitute a safety hazard outside of Class I & II RMZs.* (HCP 6.11.2.2.8)
D) 2.0 = Number of *logs per acre* listed in (C) above *in decay class 1, 2, or 3 (Maser and Trapp 1984), greater than 15 in diameter and over 20 feet long that do not constitute a safety hazard outside of Class I and II RMZs.* (HCP 6.11.2.2.8)

Unit #: 1 (C) Harvest Acres: 39.6 Size Classes:↓	Snags in Class I and/or II RMZ	Snags outside Class I and/or II RMZ	Green replacement trees in Class I and/or II RMZ			Green replacement trees outside Class I and/or II RMZ			Total snags and green replacement trees			HCP required number of snags and/or green replacement trees
Species mix			HW	RW	NON RW	HW	RW	NON RW	HW	RW	NON RW	
15-19" DBH, >12' HT.	2	0	0	24	0	0	24	0		50		48
20-29" DBH, >16' HT.	3	0	0	30	15	0	33	15		66	30	96
>30" DBH, >30' HT.	2	1	0	18	5	0	22	3		45	8	48 (Complete)

A) 0 = Total number of live cull/wildlife trees outside of Class I and II RMZs meeting August 17, 2006, cull/wildlife trees scorecard criteria that do not constitute a safety hazard. (HCP 6.11.2.2.6)
0 = Number of live cull/wildlife trees per acre meeting August 17, 2006 scorecard criteria (based on THP area excluding Class I & II RMZs) that do not constitute a safety hazard. (HCP 6.11.2.2.6)
B) 0 = Number of *live hardwood trees per acre over 30" that do not constitute a safety hazard.* (HCP 6.11.2.2.7)
C) 3.0 = # of *logs per acre greater than 15" dia. & over 20' long that do not constitute a safety hazard outside of Class I & II RMZs.* (HCP 6.11.2.2.8)
D) 2.0 = Number of *logs per acre* listed in (C) above *in decay class 1, 2, or 3 (Maser and Trapp 1984), greater than 15 in diameter and over 20 feet long that do not constitute a safety hazard outside of Class I and II RMZs.* (HCP 6.11.2.2.8)

Unit #: 2 Harvest Acres: 23.4 Size Classes:↓	Snags in Class I and/or II RMZ	Snags outside Class I and/or II RMZ	Green replacement trees in Class I and/or II RMZ			Green replacement trees outside Class I and/or II RMZ			Total snags and green replacement trees			HCP required number of snags and/or green replacement trees
Species mix			HW	RW	NON RW	HW	RW	NON RW	HW	RW	NON RW	
15-19" DBH, >12' HT.	0	0	0	0	0	0	15	14	0	15	14	29
20-29" DBH, >16' HT.	0	0	0	0	0	0	30	23	0	30	23	67
>30" DBH, >30' HT.	0	5	0	0	0	1	22	7	1	27	7	29 (Complete)

A) 0 = Total number of live cull/wildlife trees outside of Class I and II RMZs meeting August 17, 2006, cull/wildlife trees scorecard criteria that do not constitute a safety hazard. (HCP 6.11.2.2.6)
0 = Number of live cull/wildlife trees per acre meeting August 17, 2006 scorecard criteria (based on THP area excluding Class I & II RMZs) that do not constitute a safety hazard. (HCP 6.11.2.2.6)
B) 1 = Number of *live hardwood trees per acre over 30" that do not constitute a safety hazard.* (HCP 6.11.2.2.7)
C) 3.0 = # of *logs per acre greater than 15" dia. & over 20' long that do not constitute a safety hazard outside of Class I & II RMZs.* (HCP 6.11.2.2.8)
D) 2.0 = Number of *logs per acre* listed in (C) above *in decay class 1, 2, or 3 (Maser and Trapp 1984), greater than 15 in diameter and over 20 feet long that do not constitute a safety hazard outside of Class I and II RMZs.* (HCP 6.11.2.2.8)

Unit #: 3 Harvest Acres: 21.6 Size Classes:↓	Snags in Class I and/or II RMZ	Snags outside Class I and/or II RMZ	Green replacement trees in Class I and/or II RMZ			Green replacement trees outside Class I and/or II RMZ			Total snags and green replacement trees			HCP required number of snags and/or green replacement trees
Species mix			HW	RW	NON RW	HW	RW	NON RW	HW	RW	NON RW	
15-19" DBH, >12' HT.	0	5	0	0	0	0	22	0	0	27	0	27
20-29" DBH, >16' HT.	0	4	0	0	0	0	36	13	0	36	17	53
>30" DBH, >30' HT.	0	0	0	0	0	0	18	16	0	18	16	27 (Complete)

A) 0 = Total number of live cull/wildlife trees outside of Class I and II RMZs meeting August 17, 2006, cull/wildlife trees scorecard criteria that do not constitute a safety hazard. (HCP 6.11.2.2.6)

0 = Number of live cull/wildlife trees per acre meeting August 17, 2006 scorecard criteria (based on THP area excluding Class I & II RMZs) that do not constitute a safety hazard. (HCP 6.11.2.2.6)

B) 0 = Number of *live hardwood trees per acre over 30" that do not constitute a safety hazard.* (HCP 6.11.2.2.7)

C) 3.0 = # of *logs per acre greater than 15" dia. & over 20' long that do not constitute a safety hazard outside of Class I & II RMZs.* (HCP 6.11.2.2.8)

D) 2.0 = Number of *logs per acre* listed in (C) above *in decay class 1, 2, or 3 (Maser and Trapp 1984), greater than 15 in diameter and over 20 feet long that do not constitute a safety hazard outside of Class I and II RMZs.* (HCP 6.11.2.2.8)

Unit #: 4 (A) Harvest Acres: 29 Size Classes:↓	Snags in Class I and/or II RMZ	Snags outside Class I and/or II RMZ	Green replacement trees in Class I and/or II RMZ			Green replacement trees outside Class I and/or II RMZ			Total snags and green replacement trees			HCP required number of snags and/or green replacement trees
Species mix			HW	RW	NON RW	HW	RW	NON RW	HW	RW	NON RW	
15-19" DBH, >12' HT.	0	2	0	15	0	0	16	2	0	33	2	35
20-29" DBH, >16' HT.	0	2	0	25	10	0	25	10	0	52	20	70
>30" DBH, >30' HT.	3	2	0	15	0	0	18	0	0	38	0	35 (Complete)

A) 0 = Total number of live cull/wildlife trees outside of Class I and II RMZs meeting August 17, 2006, cull/wildlife trees scorecard criteria that do not constitute a safety hazard. (HCP 6.11.2.2.6)

0 = Number of live cull/wildlife trees per acre meeting August 17, 2006 scorecard criteria (based on THP area excluding Class I & II RMZs) that do not constitute a safety hazard. (HCP 6.11.2.2.6)

B) 0 = Number of *live hardwood trees per acre over 30" that do not constitute a safety hazard.* (HCP 6.11.2.2.7)

C) 3.0 = # of *logs per acre greater than 15" dia. & over 20' long that do not constitute a safety hazard outside of Class I & II RMZs.* (HCP 6.11.2.2.8)

D) 2.0 = Number of *logs per acre* listed in (C) above *in decay class 1, 2, or 3 (Maser and Trapp 1984), greater than 15 in diameter and over 20 feet long that do not constitute a safety hazard outside of Class I and II RMZs.* (HCP 6.11.2.2.8)

Unit #: 4 (B) Harvest Acres: 25.6 Size Classes:↓	Snags in Class I and/or II RMZ	Snags outside Class I and/or II RMZ	Green replacement trees in Class I and/or II RMZ			Green replacement trees outside Class I and/or II RMZ			Total snags and green replacement trees			HCP required number of snags and/or green replacement trees
Species mix			HW	RW	NON RW	HW	RW	NON RW	HW	RW	NON RW	
15-19" DBH, >12' HT.	0	1	0	0	0	0	20	10	0	21	10	31
20-29" DBH, >16' HT.	0	2	0	0	0	0	35	25	0	37	25	62
>30" DBH, >30' HT.	0	6	0	0	0	0	20	5	0	25	6	31 (Complete)

A) 0 = Total number of live cull/wildlife trees outside of Class I and II RMZs meeting August 17, 2006, cull/wildlife trees scorecard criteria that do not constitute a safety hazard. (HCP 6.11.2.2.6)

0 = Number of live cull/wildlife trees per acre meeting August 17, 2006 scorecard criteria (based on THP area excluding Class I & II RMZs) that do not constitute a safety hazard. (HCP 6.11.2.2.6)

B) 0 = Number of *live hardwood trees per acre over 30" that do not constitute a safety hazard.* (HCP 6.11.2.2.7)

C) 3.0 = # of *logs per acre greater than 15" dia. & over 20' long that do not constitute a safety hazard outside of Class I & II RMZs.* (HCP 6.11.2.2.8)

D) 2.0 = Number of *logs per acre* listed in (C) above *in decay class 1, 2, or 3 (Maser and Trapp 1984), greater than 15 in diameter and over 20 feet long that do not constitute a safety hazard outside of Class I and II RMZs.* (HCP 6.11.2.2.8)

Unit #: 4 (C) Harvest Acres: 25 Size Classes:↓	Snags in Class I and/or II RMZ	Snags outside Class I and/or II RMZ	Green replacement trees in Class I and/or II RMZ			Green replacement trees outside Class I and/or II RMZ			Total snags and green replacement trees			HCP required number of snags and/or green replacement trees
Species mix			HW	RW	NON RW	HW	RW	NON RW	HW	RW	NON RW	
15-19" DBH, >12' HT.	0	0	0	0	0	0	20	10	0	20	10	30
20-29" DBH, >16' HT.	0	0	0	0	0	0	40	20	0	40	20	60
>30" DBH, >30' HT.	0	0	0	0	0	0	20	10	0	20	10	30 (Complete)

A) 0 = Total number of live cull/wildlife trees outside of Class I and II RMZs meeting August 17, 2006, cull/wildlife trees scorecard criteria that do not constitute a safety hazard. (HCP 6.11.2.2.6)

0 = Number of live cull/wildlife trees per acre meeting August 17, 2006 scorecard criteria (based on THP area excluding Class I & II RMZs) that do not constitute a safety hazard. (HCP 6.11.2.2.6)

B) 0 = Number of *live hardwood trees per acre over 30" that do not constitute a safety hazard.* (HCP 6.11.2.2.7)

C) 3.0 = # of *logs per acre greater than 15" dia. & over 20' long that do not constitute a safety hazard outside of Class I & II RMZs.* (HCP 6.11.2.2.8)

D) 2.0 = Number of *logs per acre* listed in (C) above *in decay class 1, 2, or 3 (Maser and Trapp 1984), greater than 15 in diameter and over 20 feet long that do not constitute a safety hazard outside of Class I and II RMZs.* (HCP 6.11.2.2.8)

Unit #: 4 (D) Harvest Acres: 36 Size Classes:↓	Snags in Class I and/or II RMZ	Snags outside Class I and/or II RMZ	Green replacement trees in Class I and/or II RMZ			Green replacement trees outside Class I and/or II RMZ			Total snags and green replacement trees			HCP required number of snags and/or green replacement trees
Species mix			HW	RW	NON RW	HW	RW	NON RW	HW	RW	NON RW	
15-19" DBH, >12' HT.	0	0	0	0	0	0	30	14	0	30	14	44
20-29" DBH, >16' HT.	0	0	0	0	0	0	57	30	0	57	30	87
>30" DBH, >30' HT.	0	3	0	0	0	0	22	19	0	24	20	44 (Complete)

A) 0 = Total number of live cull/wildlife trees outside of Class I and II RMZs meeting August 17, 2006, cull/wildlife trees scorecard criteria that do not constitute a safety hazard. (HCP 6.11.2.2.6)

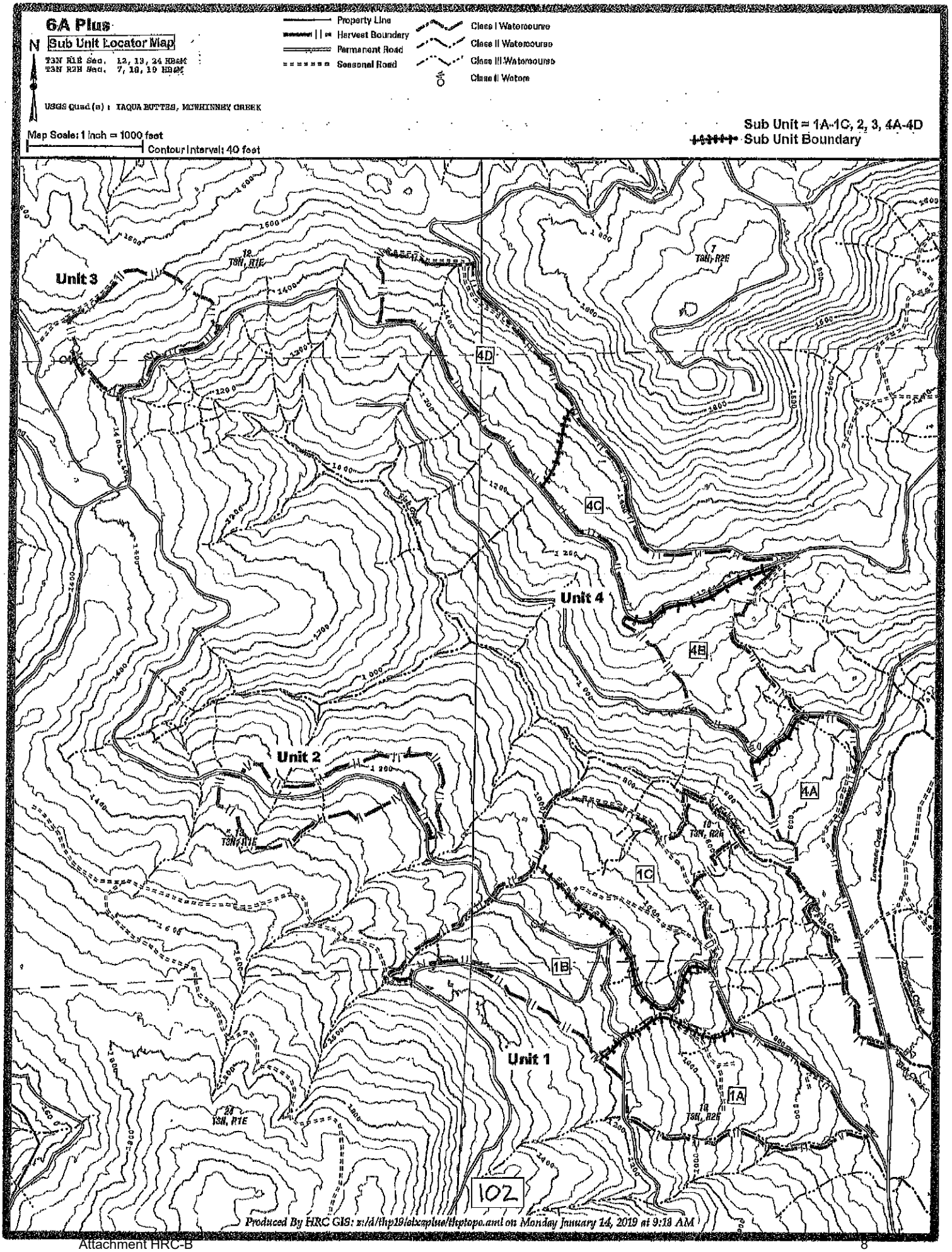
0 = Number of live cull/wildlife trees per acre meeting August 17, 2006 scorecard criteria (based on THP area excluding Class I & II RMZs) that do not constitute a safety hazard. (HCP 6.11.2.2.6)

B) 0 = Number of *live hardwood trees per acre over 30" that do not constitute a safety hazard.* (HCP 6.11.2.2.7)

C) 3.0 = # of *logs per acre greater than 15" dia. & over 20' long that do not constitute a safety hazard outside of Class I & II RMZs.* (HCP 6.11.2.2.8)

D) 2.0 = Number of *logs per acre* listed in (C) above *in decay class 1, 2, or 3 (Maser and Trapp 1984), greater than 15 in diameter and over 20 feet long that do not constitute a safety hazard outside of Class I and II RMZs.* (HCP 6.11.2.2.8)

See Item #33 d through g in Section II for additional information.


6A Plus
Sub Unit Locator Map
T3N R1E Sec. 12, 13, 24 HB&M
T3N R2E Sec. 7, 18, 19 HB&M
USGS Quad(s) : YAQUA BUTTES, MCWHINNEY CREEK
Map Scale: 1 inch = 1000 feet
Contour Interval: 40 feet
Property Line
Harvest Boundary
Permanent Road
Seasonal Road
Class I Watercourse
Class II Watercourse
Class III Watercourse
Class II Water
Sub Unit = 1A-1C, 2, 3, 4A-4D
Sub Unit Boundary
Unit 1
Unit 2
Unit 3
Unit 4
1A
1B
1C
4A
4B
4C
4D
12 T3N, R1E
24 T3N, R1E
18 T3N, R2E
7 T3N, R2E
102
Produced By HRC GIS: x:/d/thp19/sixsplus/thptopo.aml on Monday January 14, 2019 at 9:18 AM

PLAN ADDENDUM TO ITEM 34

SECTION III

LATE SUCCESSION FOREST STANDS PROPOSED FOR HARVEST

BACKGROUND

The issue of harvesting late succession forest stands is confounded by differing definitions found in the California Forest Practice Rules (FPR) versus those in the landowner's Habitat Conservation Plan (HCP) and the Final Environmental Impact Statement/Environmental Impact Report (FEIS/EIR). For clarification, here are the definitions:

FPR DEFINITIONS:

Functional Wildlife Habitat: means vegetative structure and composition which function to provide essential characteristics for wildlife feeding, reproduction, cover and movement between habitats. The habitat components must be in sufficient quantities and arrangement to support the diverse assemblage of wildlife species that are normally found on or use forestlands within that area. Within this definition the following terms mean:

Function(al): Refers to ecological relationships between both the habitat components and needs of the species which allows for all of the normal life cycle including, migration corridors, genetic pathways, food availability, temperature protection, moisture retention, nutrient cycling, denning, spawning, nesting, and other functions necessary to complete a life cycle.

Composition: Refers to the types, abundance, distribution, and ecological relationships of species of terrestrial and aquatic vegetation within the forest stand including dominance, richness, trophic levels and other population and community features at levels which affect the long-term survival of individual forest species.

Structure: Refers to the physical arrangement of and relationships between living and non-living terrestrial and aquatic components within the forest stand including, age, size, height and spacing of live vegetation in the forest in addition to seeps, spawning gravels, pools, springs, snags, logs, den trees, meadows, canopy coverage, levels of canopies and other physical features necessary to allow species to function (14 CCR 895.1).

Late Succession Forest Stands: means stands of dominant and predominant trees that meet the criteria of WHR class 5M, 5D, or 6 with an open, moderate or dense canopy closure classification, often with multiple canopy layers, and are at least 20 acres in size. Functional characteristics of late succession forests include large decadent trees, snags, and large down logs (14 CCR 895.1).

HCP AND FEIS/EIR DEFINITIONS:

LSH: late seral/old-growth (FEIS/EIR, List of Acronyms and Abbreviations, page xix); further classified by patch-size classes and by interior forest habitat (FEIS/EIR 3.10.1.1, page 3.10-21)

LSH: late-successional habitat (FEIS/EIR Figure 3.10-1, page 3.10-23)

Late seral forest: areas with trees over 24 inches dbh and that have begun to develop a multi-storied structure. It occurs in some redwood stands as young as 40 years but usually in stands more than 50 years old. (Late seral includes forests classified under the California WHR system as late-successional types 5M, 5D, and 6). (FEIS/EIR 3.9.1.3, page 3.9-17 and 7. Glossary, page 7-5)

Late seral habitat: areas with trees that average over 24 inches diameter breast height (dbh) that have begun to develop a multi-storied structure (California Wildlife Habitat Relationships categories 5M, 5D, and 6). Late-seral/old-growth habitat (LSH) includes both redwood- and Douglas-fir-dominated forest stands. (FEIS/EIR Summary, page S-19)

Late seral or late-successional stage: period in a forest's development generally separated into two stages. The single-storied late-successional stage contains large trees with some holes, but multiple canopies have not yet developed. The multi-storied stage, true old-growth, develops over the next 100 to 200 years, as the multiple canopies with large snags and many large fallen trees become completely formed (USDA Forest Service and USDI Bureau of Land Management, 1994) (FEIS/EIR 3.9.1.3, page 3.9-16)

Late seral prescription: silvicultural prescription (240 square-foot-per-acre conifer basal area following harvest) on PALCO lands bordering old-growth marbled murrelet habitat on public lands (applied within 300 feet of parks and reserves). (HCP 6.1.2.3.1, page 25)

Late-successional Forest Associates: Sharp-shinned hawk, Cooper's hawk, Northern goshawk, Band-tailed pigeon, Flammulated owl, Vaux's swift, Red-breasted sapsucker, Olive-sided flycatcher, Pacific-slope flycatcher, Western wood-pewee, Hammond's flycatcher, Golden-crowned kinglet, Ruby-crowned kinglet, Swainson's thrush, Hermit thrush, Solitary vireo, Yellow-rumped warbler, Townsend's warbler, Hermit warbler, Western tanager, Dark-eyed junco, Pine siskin (FEIS/EIR, Table 3.10-8, page 3.10-65); Humboldt ground beetle Table 3.10-1. on page 3.10-2; Marbled murrelet, Northern spotted owl, Northern goshawk, Sharp-shinned hawk, Ruffed grouse, Vaux's swift, Great blue heron, Great egret, Table 3.10-3, pages 3.10-(5-13); California wolverine, Long-eared myotis, Humboldt marten, Pacific fisher, Red tree vole, Table 3.10-4, pages 3.10-(14-17)

Late successional habitat: forested habitat that has late successional forest conditions. These are forests or stands of trees with structural attributes that support biological communities and processes associated with old-growth and/or mature forests. (FEIS/EIR 7. Glossary, page 7-5)

Old growth: technically, these stands are part of the late-successional seral stage but they are listed as a separate stage by HRC. They generally have multiple canopy layers dominated by trees over 30 inches dbh, with a shrub and herb layer and high snag and down log levels. HRC only includes unentered stands as old-growth stands. Previously harvested stands with residual old-growth trees are included in the late seral category. (FEIS/EIR Glossary, pg. 7-6)

SUPPORTING INFORMATION AND DOCUMENTATION

The following items are presented to substantiate a determination that post-harvest late seral forests (EIS/EIR) or functional wildlife habitat (FPR) will continually provide adequate structure and connectivity to avoid or mitigate long-term significant adverse effects on fish, wildlife, and listed plant species known to be primarily associated with late succession forests (Late Successional Forest Associates (EIS/EIR)) within the planning watersheds.

A. The Plan Submitter has an approved Habitat Conservation Plan (HCP), Environmental Impact Statement/Environmental Impact Report (EIS/EIR) and Incidental take permits (ITP) from the following agencies: National Marine Fisheries Service, ITP# 1157 and the United States Fish and Wildlife Service, ITP# TE828950-0.

   The HCP incorporates measures to provide adequate structure and connectivity to avoid or mitigate long-term significant adverse effects on fish, wildlife, and listed plant species known to be primarily associated with late seral forests within the planning watersheds. This HCP was deemed to be sufficient for the granting of the ITP's mentioned above for listed species primarily associated with late seral forests.

B. The HCP demonstrates how late seral forests will be managed, and how late seral stand attributes will be maintained, recruited and monitored. The effects of harvesting on functional wildlife habitat for species primarily associated with late seral forests are discussed, including impacts on vegetation structure, connectivity, and fragmentation in the Watershed Assessment Areas (WAAs), as appropriate. As stated in the HCP and EIS/EIR, the landowner will maintain 10% of the ownership covered by the HCP in late seral type by WAA.

C. HRC's GIS Department has completed an analysis of seral types pre harvest and post harvest acres specific to this THP. These are exhibited in the following table:

WHR Seral Stage Summary on HRC's HCP Covered Lands within the Yager Creek WAA

WHR Seral Stage	Total Acres	Pre Harvest % Total Acres	Post Harvest Acres	Post Harvest % Total Acres	Post Harvest % Forested Acres	Acres Changing
Non Timber	0.0	0.0	0.0	0.0	0.0	0.0
Perennial Grassland	87.9	0.3	87.9	0.3	0.0	0.0
Montane Hardwood	504.6	1.5	504.6	1.5	1.5	0.0
Forest Openings	911.2	2.7	911.2	2.7	2.7	0.0
Young Forests	17,548.6	51.5	17,693.8	52.0	52.1	145.2
Mid Successional	10,648.0	31.3	10,503.0	30.8	30.9	-145.0
Late Seral	4351.1	12.8	4353.9	12.8	12.8*	-0.2
TOTAL	34,054.3	100.0%	34,054.3	100.0%	100.0%	0.0

*This demonstrates that HRC will maintain 10% of the forested lands in late seral type within each WAA, thereby complying with the HCP (HCP 6.11.2.1).

In addition to the acreage figures for this THP, the acreage figures shown in the above table include in the pre-harvest and post-harvest figures the following Timber Harvesting Plans that were submitted under the Habitat Conservation Plan. For the purpose of analysis, in the above table, all the THPs in the table below are assumed to have been harvested prior to consideration of this THP. This assumption is reflected in both the preharvest and postharvest acreage figures.

Previously Submitted THPs Under the Habitat Conservation Plan - Yager Creek WAA Watershed Assessment Area

THP#	THP Name	Status	Late Successional Forest Stand Acreage (to be harvested)	Late Seral (HCP) Acreage (to be harvested)
1-99-017HUM	Camp 10	COMPLETED/STOCKED	0	0.00
1-99-082 HUM	Ruth Ridge	COMPLETED/STOCKED	0	2.90
1-99-255 HUM	Camp 15	COMPLETED/STOCKED	0	0.90
1-99-427 HUM	Blanton 36	COMPLETED/STOCKED	0	15.50
1-99-468 HUM	Thirty 5B	COMPLETED/STOCKED	0	26.50
1-99-481 HUM	Bald Jessie West	COMPLETED/STOCKED	0	26.80
1-00-070 HUM	Middle Yager 9	COMPLETED/STOCKED	25	25.20
1-00-120 HUM	Redwood House 23	COMPLETED/STOCKED	0	43.80
1-00-121 HUM	North Fork 3	COMPLETED/STOCKED	0	68.10
1-00-248 HUM	South Gift	COMPLETED/STOCKED	111	110.60
1-00-351 HUM	Yager Junction	COMPLETED/STOCKED	84.4	84.40
1-00-419 HUM	Turnbuckle	COMPLETED/STOCKED	0	8.20
1-00-428 HUM	N90	COMPLETED/STOCKED	0	2.30
1-00-453 HUM	Road 7	COMPLETED/STOCKED	112.5	100.70
1-00-475 HUM	Wagon Top	COMPLETED/STOCKED	0	0.00
1-01-003 HUM	Elk Heart Residual	COMPLETED/STOCKED	0	0.00
1-01-036 HUM	West Blanton	COMPLETED/STOCKED	0	4.80
1-01-094 HUM	Bohanna 34	COMPLETED/STOCKED	0	0.00
1-01-095 HUM	Around Allen	COMPLETED/STOCKED	0	7.80
1-01-163 HUM	Short Cummings	COMPLETED/STOCKED	0	0.00
1-01-237 HUM	Yager 8	COMPLETED/STOCKED	0	0.00
1-01-295 HUM	Allen Thin	COMPLETED/STOCKED	2	2.40
1-01-307 HUM	North Camp	COMPLETED/STOCKED	0	42.20
1-01-396 HUM	North Blanton	COMPLETED/STOCKED	0	0.00
1-02-109 HUM	South Camp	COMPLETED/STOCKED	0	0.00
1-02-154 HUM	Prairie West	COMPLETED/STOCKED	0	0.00
1-02-168 HUM	Four Ridges	COMPLETED/STOCKED	0	55.80
1-02-215 HUM	East Cooper	COMPLETED/STOCKED	0	32.90
1-02-221 HUM	BX2	COMPLETED/STOCKED	0	0.00
1-02-223 HUM	Uncle Jessie	COMPLETED/STOCKED	0	0.00
1-02-236 HUM	BX 1	COMPLETED/STOCKED	0	0.00
1-02-250 HUM	Yagermeister	COMPLETED/STOCKED	0	0.00
1-02-251 HUM	Around Quarry	COMPLETED/STOCKED	33	36.50
1-02-286 HUM	On Deck	COMPLETED/STOCKED	0	15.60
1-03-031 HUM	Up Hill	COMPLETED/STOCKED	0	1.30
1-03-032 HUM	D B Cooper	COMPLETED/STOCKED	0	28.00
1-03-121 HUM	Blanton Junction	COMPLETED/STOCKED	0	40.40
1-03-151 HUM	Yager Thin	COMPLETED/STOCKED	0	51.00
1-03-157 HUM	West Cooper	COMPLETED/STOCKED	0	57.10
1-03-199 HUM	North Fork 1	COMPLETED/STOCKED	0	24.20
1-03-201 HUM	Around Allen 2	COMPLETED/STOCKED	0	8.30
1-03-223 HUM	Camp Selection	COMPLETED/STOCKED	0	10.60
1-03-228 HUM	Blanton 3536	COMPLETED/STOCKED	0	22.00
1-04-085 HUM	Pit Side	COMPLETED/STOCKED	0	14.00
1-04-160 HUM	Bell 20	COMPLETED/STOCKED	0	1.90
1-05-019 HUM	Blanton West	COMPLETED/STOCKED	0	0.10
1-05-025 HUM	Powers Booth	COMPLETED/STOCKED	0	7.40
1-05-041 HUM	Owl Creek South	COMPLETED/STOCKED	0	8.70
1-05-061 HUM	Power Run	COMPLETED/STOCKED	0	0.00
1-05-115 HUM	Road 3 South	COMPLETED/STOCKED	0	0.00
1-05-197 HUM	Blanton Corner	COMPLETED/STOCKED	0	4.70
1-06-023 HUM	Road 1 Allen	COMPLETED/STOCKED	0	33.90
1-06-071 HUM	Wolverton Cooper	COMPLETED/STOCKED	0	0.80
1-10-074 HUM	Mini Cooper	COMPLETED/STOCKED	0	0.10
1-10-115 HUM	Kitty Chow	COMPLETED/STOCKED	0	7.70
1-11-076 HUM	Wolverton 11	COMPLETE	0	1.70
1-11-089 HUM	Mini II	COMPLETED/STOCKED	0	87.50
1-12-037 HUM	Bell Boooths	COMPLETE	0	1.30
1-12-096 HUM	Blanton	COMPLETE	0	178.1
1-13-035 HUM	Mountain View	COMPLETE	0	115
1-14-055 HUM	Side 8 to Corner	COMPLETE	0	35.6
1-16-005 HUM	Yager Logger	COMPLETE	0	30.6
1-17-075 HUM	Strawberry	Approved/Active	0	52.7
1-18-073 HUM	Yager Vista	Approved/Active	0	9.2
xx-xx-xxxxx HUM	6A PLUS	SUBMITTED	0	0.2
			367.9	**1550.0**

Any future plans submitted on covered lands which propose to harvest late seral will be required to demonstrate compliance with the HCP requirement to maintain 10% of forested acres in late seral type. With regard to future plans in the **Yager Creek** WAA, please refer to the discussion in Section IV, 3. Past, Present, and Future Projects.

D. Issuance of the Incidental Take Permits, and signing of the HCP, was based on the agency findings that in conducting harvest operations consistent with the HCP terms and conditions, PALCO would, to the maximum extent practicable, minimize and mitigate the impacts of any incidental take of covered species.

E. In the EIS/EIR, page 3.9-37 and page 3.9-43, the following provisions for late seral forest and overall habitat diversity have been adopted:
- At least five percent of PALCO's forested lands in each WAA will be mid-seral.
- PALCO timberlands in each WAA should include at least five percent forest opening, five percent young forest, five percent mid-successional, and 10 percent late seral forest at all points in the Plan period (excluding WAA 6).
- Throughout the Plan period, at least 10 percent of PALCO timberlands in each WAA (excluding WAA 6) should be suitable nesting habitat for northern spotted owls.
- WLPZs should average a 150' slope width along Class I streams with an 100' slope width along Class II streams.
- Harvest within 300 feet of suitable marbled murrelet habitat on adjacent public lands should be limited to the regular late seral prescription (i.e., selection harvest every 20 years, 240 square-foot-per-acre stand retention after).

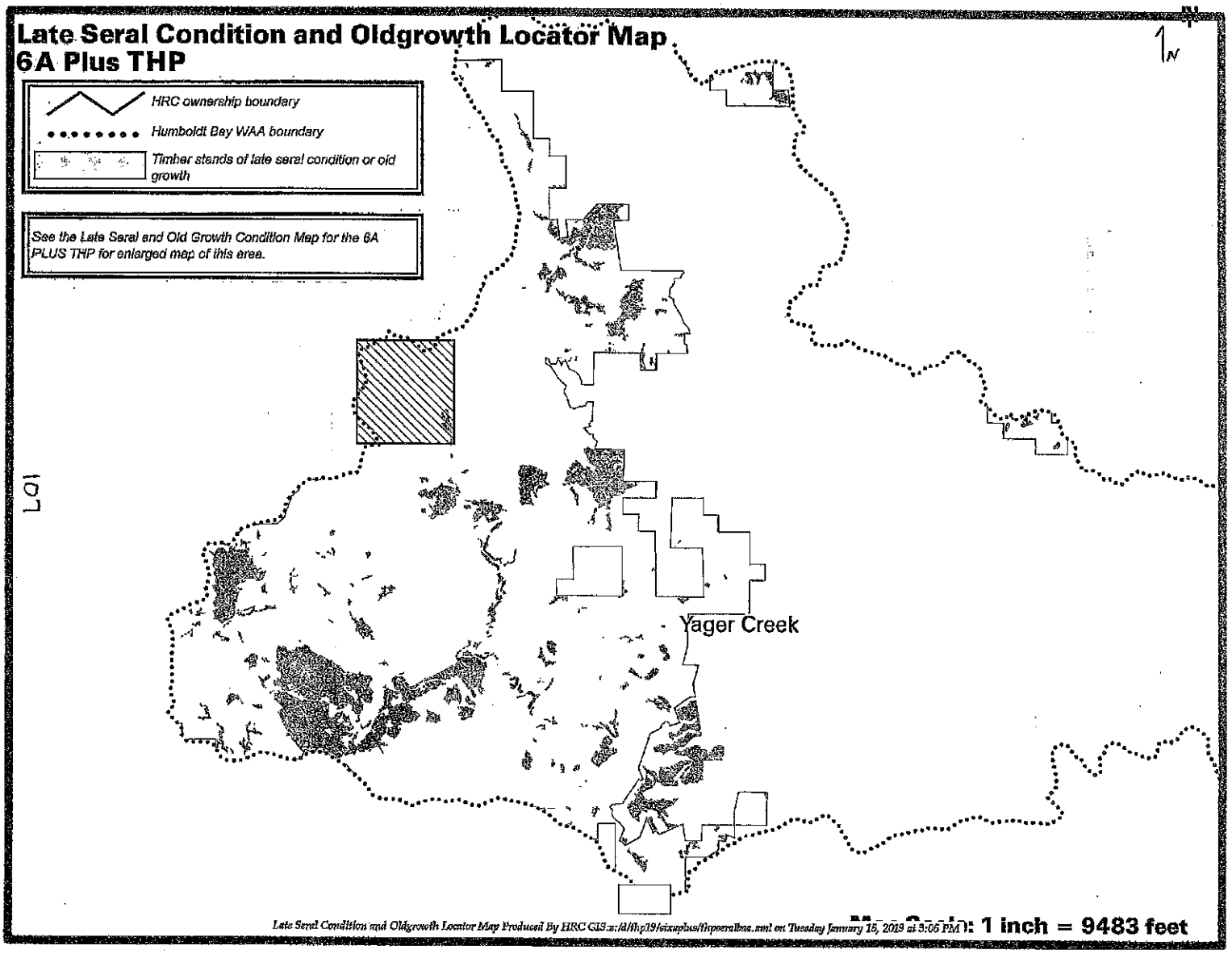
F. In a Record of Decision (ROD) by the U.S. Department of the Interior, Fish and Wildlife Service, Bureau of Land Management, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, under the section pertaining to old growth forest on page 25, it states:

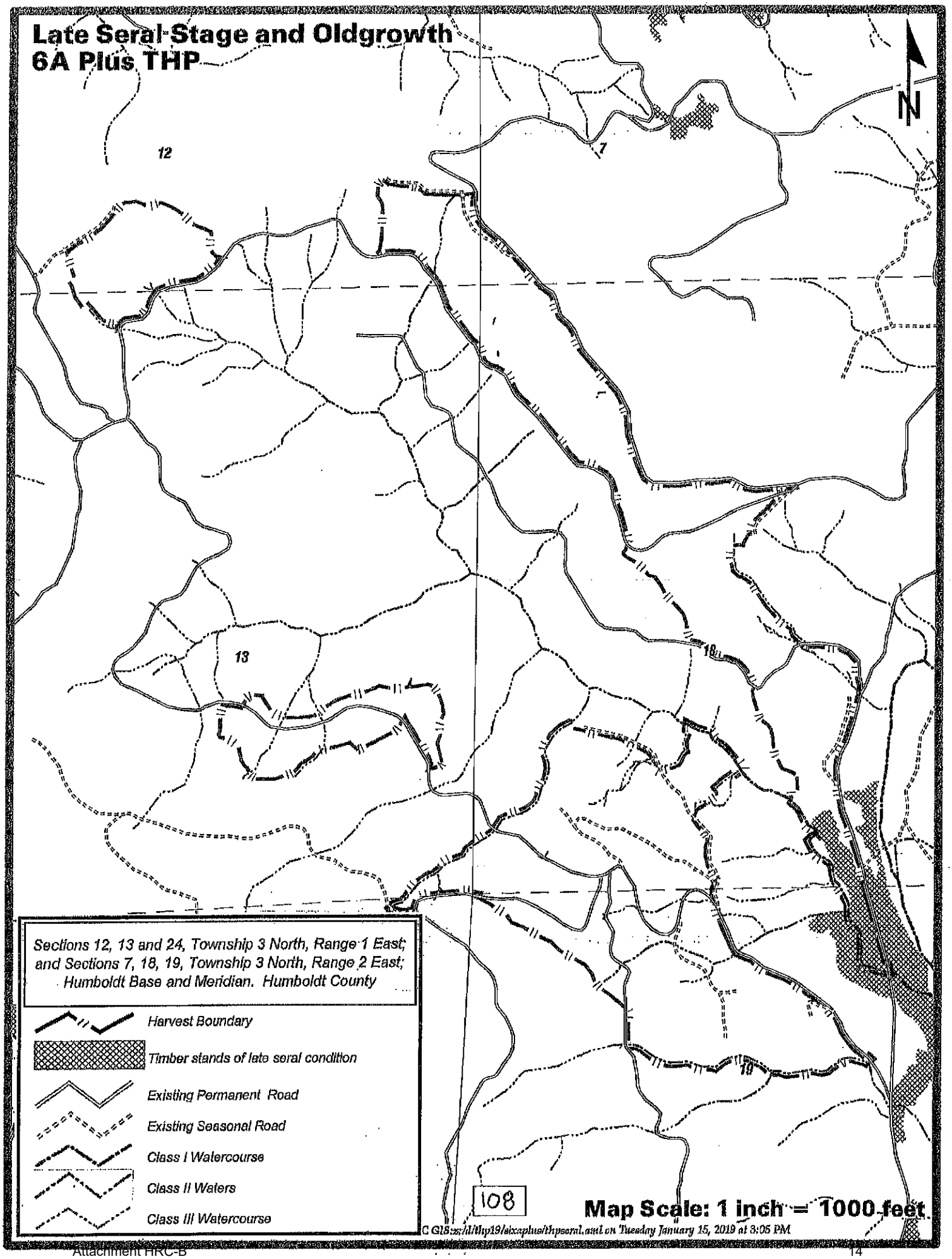
"Overall, 35 percent of the property's old growth acreage (including both uncut old growth and residual old-growth) would be protected in acquisitions or reserves, and an additional 18 percent would be within riparian management zones. Of the 12,347 acres available for harvest, 74 percent is residual. The acquisition of the Headwaters Reserve and establishment of the MMCAs would protect the largest, most ecologically valuable aggregations of old growth, and the HCP measures for the remainder of the property would maintain functional populations of all covered species that depend on old growth or older forests. Therefore, the effects on old-growth habitat and on the species that depend on this habitat would be minimized to the greatest feasible degree."

OTHER REFERENCES NOT INCLUDED ABOVE

1. EIS/EIR, Volume 1, Chapter 3.9.1.4 page 17, Seral Stages and Forest Types.
2. EIS/EIR, Volume 1, Chapter 3.9.4.2, pgs. 47-48, which includes mitigation for natural vegetation & commercial timber (for harvesting).
3. EIS/EIR, Volume 1, Chapter 3.9, page 30, Alternative 2 (Proposed Action/Proposed Project).
4. EIS/EIR, Volume 1, Chapter 3, Impacts of the HCP on covered species. Refer to HCP 7.0, Tables 8 through 10 and figures 5 and 6 for a summary of effects on vegetation and RMZs.
5. EIS/EIR, Volume 1, Chapter 3.10-21, pages 21-22, LSH, Late Seral Forest, Figure 3.10-1, Current Acreage of LSH in the project area within each WAA.
6. EIS/EIR, Volume 1, Chapter 3.10-3, Figure 3.10-3, Current Distribution of LSH Patches in the Project Area.
7. EIS/EIR, Volume 1, Chapter 3.10-3, Figure 3.10-6, Table 3.10-6, Current and Projected Acreage of Suitable Marbled Murrelet Habitat (uncut and residual old growth).
8. The July 1998 Draft SYP/HCP, Volume II Part C, pages 1-3, Plan Area Profile.
9. The July 1998 Draft SYP/HCP, Volume II Part L, Habitat Guilds.
10. The July 1998 Draft SYP/HCP, Volume II Part M, pages 1-7, Structural Components of Wildlife Habitat: Snags, Downed Logs, and Hardwoods.
11. The July 1998 Draft SYP/HCP, Volume III Part B, Section 4, Table 6, pages 33-35, WHR Types and Associated Habitat Characteristics (PALCO's WHR types "cross walked" to seral types).
12. The July 1998 Draft SYP/HCP, Appendices Section, Appendix 14, Methods & Assumptions for Calculating the LTSY Projections.
13. The February 1999 HCP, Measures to Conserve Habitat Diversity & Structural Components (HCP 6.11, pgs 77-78).
14. Terrestrial Habitat Features Discussion in the Biological Cumulative Impacts Assessment in Section IV of this THP.
15. See Appendix "A" in Section IV of this THP.

CONCLUSION - As stated in the Conclusion of Detailed Responses in the EIS/EIR on page T-216, "The agencies believe that the definition of late seral forest (and late successional forest as described in the Draft EIS/EIR) are adequate for the analysis of impacts of the proposed HCP. The Draft EIS/EIR clearly defines and describes both late seral and old growth forest." The evidence supports a determination that post-harvest late seral forests or functional wildlife habitat will continually provide adequate structure and connectivity to avoid or mitigate long-term significant adverse effects on fish, wildlife, and listed plants species known to be primarily associated with late seral forests within the planning watersheds.


Late Seral Condition and Oldgrowth Locator Map
6A Plus THP
HRC ownership boundary
Humboldt Bay WAA boundary
Timber stands of late seral condition or old growth
See the Late Seral and Old Growth Condition Map for the 6A PLUS THP for enlarged map of this area.
N
LO1
Yager Creek
Late Seral Condition and Oldgrowth Locator Map Produced By HRC GIS:x:/d/thp19/sixplus/lnperalbna.aml on Tuesday January 15, 2019 at 3:06 PM
1 inch = 9483 feet


Late Seral Stage and Oldgrowth
6A Plus THP
N
12
1
13
18
19
24
Sections 12, 13 and 24, Township 3 North, Range 1 East; and Sections 7, 18, 19, Township 3 North, Range 2 East; Humboldt Base and Meridian. Humboldt County
Harvest Boundary
Timber stands of late seral condition
Existing Permanent Road
Existing Seasonal Road
Class I Watercourse
Class II Waters
Class III Watercourse
108
Map Scale: 1 inch = 1000 feet
C GIS:x:/d/thp19/sixplus/thpseral.aml on Tuesday January 15, 2019 at 3:05 PM

HABITAT STRUCTURAL COMPONENTS EFFECTIVENESS MONITORING REPORT

A report of the current status of snags, green snag replacement trees, and down logs on Humboldt Redwood Company Lands

June 18, 2013

Humboldt Redwood Company PROJECT SUMMARY

Forest Sciences Project Plan

Subject Area: Habitat Conservation Plan (HCP) monitoring

Contributing Authors: Sal Chinnici, Mike Miles, Maralyn Renner, Jon Woessner

GIS Analysis: Eric Johnson

Project manager: Mike Miles, Director, Forest Sciences

Project Title: Habitat Structural Components Monitoring

Project Summary:

HRC engaged third party contractors to conduct a property-wide forest inventory beginning in 2011. As of early 2013 data compilation has been completed in eleven of the thirteen designated sub-units on the property. We used this data to investigate the quantity of snags, live cull trees, hardwoods, and down wood, and present the data property-wide and by both geographic sub-units and harvest history. The numbers obtained were compared to the HCP goals for retention in these categories. Field inventory data will be continuously maintained into the future and will be the basis for periodic monitoring reporting as required by HCP §6.11.3

We find that in general, snags and retained green trees for future snag development are moving toward desired future conditions. Some geographic sub-units of the property may be of interest for implementing measures to enhance or accelerate snag development. Hardwoods greater than 30" dbh appear to be retained where they exist, and where they don't exist there are younger hardwoods that can be retained to grow to the desired size. No change in management strategy is needed for down wood, which across the property meets HCP objectives except in local areas which are either outside the redwood zone where down trees decay more rapidly, or have a long history of burning and/or salvage logging.

Original signed by:

Mike Miles, Director, Forest Science

Cover photo: Snag in N. Fk. Mattole drainage, HRC Staff

REPORT ON EFFECTIVENESS MONITORING AND ADAPTIVE MANAGEMENT FOR MEASURES TO CONSERVE HABITAT DIVERSITY AND STRUCTURAL COMPONENTS (HCP 6.11)

Introduction

HCP § 6.11.3.2 requires that the effectiveness of habitat diversity and structural components (HDSC) recruitment measures will be evaluated against the conservation plan objectives based on monitoring and an intensive inventory and measuring of stand components. This report analyzes the current status and trends of HDSC using data gathered during HRC's recently completed property-wide timber inventory. We also investigate effectiveness to date of the HDSC conservation measures both property-wide and by Sustainability Unit (SU). We intend that this information may be used to develop adaptive management that takes into consideration uneven-aged management to achieve HCP objectives.

Key Findings

1. HCP objectives for snag density in the 15"-20" size class is being met or exceeded throughout the property, with the exception of the Shively SU. Snag densities alone, in the two larger size classes (20"-30" and >30" dbh), are not yet meeting the objectives.
2. For the 20"-30" and >30" size classes, there are sufficient green trees retained in post-HCP harvest areas to meet the HCP allowance for green snag replacement trees, so that in combination with snags, HCP snag objectives are met throughout the property. A subset of these larger green trees, approximately 1.4 per acre property-wide, are reported as "damaged" trees (i.e., >25 percent of tree cull or missing, broken or forked tops).
3. Large snags (>30" size class) are most prominently lacking in the Shively and McCann SU's, where on average less than one per every ten acres (<0.1/acre) currently exists.
4. Large snags (>30" size class) occur most frequently in the Freshwater, Mattole, and Elk River SU's, all of which on average contain one per every four acres (>0.25/acre).
5. Across the property there is currently an average of two (2) hardwoods >20" dbh per acre, including 0.4 per acre >30" dbh. Large hardwoods (>30" dbh) are most common in the Mad River and Mattole SUs where they average ≥ 1 per acre.
6. The HCP goal for down logs is currently exceeded on average throughout the property and within all individual SUs except for Shively, Larabee, and the Mattole.
7. Effectiveness trends:
    a. There are more snags in post-HCP managed units than in pre-HCP managed units, with the exception of pre-HCP partial cuts (small sample).
    b. Snag density in PALCO HCP regeneration cuts (clearcuts) is currently higher by 0.8 snags/acre compared to pre-HCP regeneration cuts.

c. Snag density in HRC partial-cut units (selection) is currently higher by 1.0 snags/acre and by 5.0 snags per acre in HRC regeneration cuts (rehabilitation/variable retention – small sample) compared to pre-HCP regeneration units.

Field Inventory Methods

Over the past three years HRC has established a forest resource inventory system. Highlights of this system are as follows:

- HRC lands have been divided into 13 Sustainability Units (SU). Using aerial photos and corresponding ortho-imagery, each SU is divided into 20 to 40 vegetation strata based on the species, and size and density of overstory and understory trees and brush.
- Within each stratum, usually 15 to 60 plot locations are selected from a random-start grid laid over the sustainability unit. Field inventory plots are established at each location. An average of 1000 plots is placed in each SU.
- At each plot, standing trees are measured in a system of variable-radius and fixed-area plots, depending on tree size. Data recorded includes tree species, diameter, height, crown percent, damage/cull type and amount, condition (alive or dead, old growth), and recent diameter growth. Down logs are also measured at each plot.
- Field inventory work is done and data compilation is complete (as of May 2013) for eleven of the 13 sustainability units. Data compilation for the remaining two units (Lawrence Creek and Bear River) will be available by July 2013.
- Field inventory data will be continuously maintained into the future. New imagery will periodically be acquired, and each Sustainability Unit will be re-stratified every 5-10 years. Additional field plots will be established and measured each year as needed to maintain appropriate statistics for strata types as vegetation changes.

To produce the current structural habitat tables, the following steps were taken:

- Using the information in the Strata Type GIS layer, the lands in each Sustainability Unit were divided into eight general harvest history categories: PALCO pre-HCP (regeneration harvests or partial cut harvests), PALCO HCP (regeneration or partial cut harvests), HRC (regeneration or partial cut harvests), other recently managed (within ~30 years) lands with incomplete or no harvest records, and lands with no record or observable indication of recent management.
- The GIS layers representing plot locations within each sustainability unit were laid over the harvest history category layer. Appendix A contains a summary of acres and the number of plots by SU and Harvest Era/Type.
- Using the field inventory databases for the eleven completed sustainability units, plots that fell into each harvest history category were compiled and averages computed for snags, old growth trees, hardwoods, damaged trees, down logs and undamaged young growth green trees in the above categories (Appendix B).

Analysis

Assumptions

The HCP allows for half of the habitat structural components to be within the Class I and II Riparian Management Zones (RMZs) (HCP 6.11.2.2). For the purposes of this analysis, HCP RMZs and their associated forest structure counts (i.e. snags, OG trees, hardwoods, damaged trees, and undamaged trees) are included in the "No Management" category. It is assumed that since there are significant harvest restrictions in the RMZs – including a no-cut prohibition within the inner band – the RMZs are meeting this objective with a combination of snags and retained green trees. This analysis was designed to concentrate on the area where the harvest-related management effect is the greatest: outside the RMZ. Therefore, data in the six management categories (pre-HCP, PALCO HCP, and HRC, each further divided into regeneration vs. selection) are taken from plots located outside the RMZs. Accordingly, in our analysis the HCP objective used for comparison, per acre, is 0.6 snags/green replacement trees greater than 15-20" dbh, 1.2 snags/replacement trees greater than 20-30" dbh, and 0.6 snags/replacement trees greater than 30"dbh.

Live cull/wildlife trees are currently being retained during THP layout according to the Live Cull/Wildlife Tree Scorecard process. A recent (circa 2010) internal analysis of THPs using this scoring system reported an average of 0.5 green trees per acre meeting these structural habitat value criteria. We assume these live cull/wildlife trees are a subset of the damaged and old growth trees identified in this report.

The HCP specifies that down log objectives will be met by logs outside of RMZs.

Results

Appendix A is a summary of acres and inventory plots by SU and harvest era/type. Refer to Appendix B for tables summarizing results of the inventory analyses. Significant data points mentioned in the discussion are highlighted in these tables.

Snags

The HCP was written with the awareness that snag numbers across the property were likely deficient. To date, the snag objective in the 15-20" class has been achieved in all but one SU (Shively), while we have generally not yet met the HCP objectives for snags in the larger size classes (Table B-1). However the HCP has proven effective in that HCP harvested areas have greater snag frequency than pre-HCP harvested areas (Table B-2). Snag density in PALCO HCP regeneration cuts (typically clearcuts) is currently higher by 0.7 snags/acre compared to pre-HCP regeneration cuts. Snag density in HRC partial-cut (selection/group selection) is currently higher by 1.0 snags/acre compared to pre-HCP regeneration cuts (Table B-3).

We also looked at how the HCP objectives and managed stands compare to snag levels in older forest stands found on HCP covered lands using timber type 6P stands for comparison. HRC timber type 6P stands are those that either are, or most closely resemble, late seral conditions

in that greater than 25 percent of the forest canopy originates from trees greater than 32 inches at dbh. We found that across the ownership, the 15-20" size class snag numbers in younger managed stands are equivalent to numbers found in 6P stands, but the 20-30" and 30+" size classes are found in lower numbers in these younger managed stands than in the 6P stands. Older forests with a larger diameter tree component generate larger snags over time, suggesting uneven-age management and other forest conservation measures such as NSO Habitat Retention Areas will promote large snag development over time. Recruitment of snags in these larger tree size classes from green trees retained in HCP even-age (regeneration cut) managed stands is not yet apparent, nor would it be expected at the end of the first decade of HCP habitat structure conservation measure implementation considering the typical life span (>100 years) of the retained green snag replacement trees.

Sum of All Snags and Trees with Habitat Structural Components

Using available inventory attributes we summed all trees with observed habitat features including old growth, damaged trees (i.e. forked tops, broken tops, or >25% non-merchantable/missing), and hardwoods. These are trees most likely to provide particular value to wildlife in the near term (e.g. cavities, hollows, large limbs, forked or broken tops, complex crowns), and are referred to as "structure trees" for the purpose of this discussion. Snags and structure trees together are referred to as "standing habitat elements."

The data shows that property-wide there is an average of 11.6 standing habitat elements per acre, with 9.8 of these being structure trees. In HCP managed stands, HRC partial cut units have 9.3 standing habitat elements (7.3 structure trees) per acre compared to 4.1 (2.4 structure trees) in PL_HCP regeneration units (Table B-3). This illustrates the difference in structural component retention frequency resulting from silvicultural method (clearcutting versus selection/group selection).

Looking at the data by SU, structure trees are sufficient in number to meet the green replacement tree objectives for future snag recruitment in all SUs in the 20"-30" dbh size, and sufficient in all but Shively and McCann in the >30" dbh size (Table B-1). Structure trees are often further along in the process of becoming snags than undamaged green trees, and are also presumed to provide important habitat value to forest stands, as described above. In the two SUs where snags plus structure trees do not meet the HCP objectives in the largest size class, undamaged green trees in the same 30+" size are present in sufficient numbers to meet HCP snag/green replacement tree objectives.

Live Cull/High Value Wildlife Trees (HVWT)

We could not identify HVWT (HCP "live cull") from the data collected, but we assume a subset of the structure trees described above (old growth, large hardwoods, and damaged trees) will score out as HVWTs using the current Live Cull Scorecard.

Long-term Snag Recruitment

Long-term recruitment of snags is also provided by "non-structure" green trees that are retained post harvest. Some of these trees will eventually be affected by natural processes, developing into structure trees, and subsequently snags over time. Our data indicates that recruitment trees retained in managed forests utilizing partial harvest are adequate to meet HCP snag/green replacement tree objectives in all diameter classes, and that uneven-aged management does not preclude future options for snags and/or habitat structure retention and development across the target size classes.

Down Wood

HCP objectives (2 logs per acre that meet HCP specifications for decay class) are typically exceeded in all SUs with the exception of the Shively, Larabee and Mattole. Where lacking, it is likely due to a long history of burning, salvage logging, and/or a consequence of being outside of the redwood zone where tree species (e.g. Douglas-fir), once dead and on the ground, decay more rapidly than redwood. An increase in the number of downed logs over time is likely to occur with increased snag retention and recruitment. As previously reported, HCP harvest areas currently have more snags than pre-HCP harvest areas. These numbers are presumably a result of HCP snag conservation and recruitment measures minus previously retained snags that have fallen down over time.

An increase in the number of down logs is also likely to occur in units where uneven-aged management is practiced, as snag and structure tree densities are greater than in clearcut units, and broadcast burning is typically not feasible or necessary post harvest. Thus we do not anticipate a problem continuing to meet HCP objectives for downed logs in the majority of SUs, and foresee a potential in the future for increased down wood in those SUs not currently meeting objectives.

Recommendations

HRC intends to re-submit our request for an Adaptive Management language change to HCP §6.11. As a result of this analysis, key elements of our preferred strategy have been revised and are summarized below.

1. Snags and standing structural elements:
    a. For silvicultural methods retaining an average of 50 ft^2 of basal area or greater per acre (including but not limited to selection/group selection):
        i. Unless a safety hazard exists, retain all snags greater than 15 inches.
        ii. Retain all High Value Wildlife Trees as identified by the Live Cull Tree scoring system.
        iii. Retain two hardwoods greater than 30" dbh per acre (where present).

iv. Retain green trees >30" dbh in numbers necessary to meet the existing 1.2 snag/replacement trees per acre requirement averaged over 40 acres (there is no requirement to mark these trees for leave, but they must be retained in the unit upon completion of operations). Verification of green tree retention will be through future inventory-based and in-house monitoring.

b. For silvicultural methods retaining an average of less than 50 ft^2 of basal area per acre, habitat structural retention shall be the same as the current HCP requirements.

c. Regardless of silvicultural method, green tree retention shall be designated at the time of THP development for each planned harvest, prioritizing trees with the greatest near-term snag recruitment/wildlife habitat value for retention. *The requirement to retain designated green trees for the remaining life of the HCP is removed from the language.*

d. In SU's where an average of less than one large (>30" dbh) snag exists per ten acres (i.e. currently McCann and Shively SUs), create (e.g. girdle during operations) one or more snags per ten acres from green trees in the greater than 30 inch dbh size class or next the size class down where present, concurrent with timber operations on a THP by THP basis.

2. Hardwoods: No change in management strategy.
3. Down wood: No change in management strategy.
4. Monitoring: No change in monitoring strategy – continue to report on status and trends on a 5-10 year return interval in conjunction with scheduled re-inventory of the property.

APPENDIX A

Table A: Summary of Acres and Inventory Plots by Sustainability Unit and Harvest Era/Type

Table A
SUMMARY of Acres and Inventory Plots by Sustainability Unit and Harvest Era/Type

	Harvest_Era HarvestType	*PL_PreHCP RegenCut*	*PL_PreHCP PartialCut*	*PL_HCP RegenCut*	*PL_HCP PartialCut*	*HRC RegenCut*	*HRC PartialCut*	*(Other Mngd, Inc. Records)*	*(No Mgmt Records)*	*Totals*
MAD	Acres (net forested acres)	0	0	0	0	0	0	3,637	638	4,275
MAD	Count of 2011 Inv Plots	0	0	0	0	0	0	213	63	276
FRW	Acres (net forested acres)	3,075	33	2,767	150	15	1,800	1,156	5,458	14,454
FRW	Count of 2011 Inv Plots	387	7	206	27	1	139	135	648	1,550
ELK	Acres (net forested acres)	1,449	74	2,097	715	204	1,535	8,730	6,303	21,107
ELK	Count of 2011 Inv Plots	70	7	119	84	16	116	566	608	1,586
STR	Acres (net forested acres)	1,583	14	979	194	0	0	761	961	4,492
STR	Count of 2011 Inv Plots	99	1	68	23	0	0	42	112	345
YGR	Acres (net forested acres)	4,357	0	2,027	411	0	172	8,578	2,295	17,840
YGR	Count of 2011 Inv Plots	236	0	88	20	0	26	599	222	1,191
VDZ	Acres (net forested acres)	1,567	3	3,798	3,440	71	1,837	7,573	2,819	21,108
VDZ	Count of 2011 Inv Plots	58	0	115	271	0	107	467	250	1,268
SHV	Acres (net forested acres)	4,066	0	2,885	823	0	346	2,199	3,204	13,523
SHV	Count of 2011 Inv Plots	179	0	132	96	0	35	149	328	919
LRB	Acres (net forested acres)	4,191	0	4,909	632	355	800	6,575	4,485	21,947
LRB	Count of 2011 Inv Plots	159	0	105	62	9	59	343	463	1,200
EEL	Acres (net forested acres)	3,105	0	4,964	1,025	140	1,133	7,492	4,466	22,325
EEL	Count of 2011 Inv Plots	94	0	171	94	9	110	403	418	1,299
MCN	Acres (net forested acres)	311	14	1,057	561	0	182	3,828	1,138	7,091
MCN	Count of 2011 Inv Plots	15	5	64	56	0	2	290	143	575
MTL	Acres (net forested acres)	791	0	694	109	0	0	9,582	4,277	15,453
MTL	Count of 2011 Inv Plots	74	0	46	20	0	0	631	490	1,261
TOTALS	Acres (net forested acres)	24,495	138	26,177	8,060	785	7,805	60,111	36,044 0	163,615
TOTALS	Count of 2011 Inv Plots	1,371	20	1,114	753	35	594	3,838	3,745 0	11,470

APPENDIX B

Table B-1

Habitat Structural Elements by Sustainability Unit (All management units combined) 5/29/2013

Property-Wide Structural Habitat Trend Report

	Mad	Freshwater	Elk	Strongs	Yager	Van Duzen	Shively	Larabee	Eel	McCann	Mattole	Total All SUs
Acres (net forested acres)	4,275	14,454	21,107	4,492	17,840	21,108	13,523	21,947	22,325	7,091	15,453	192,976
Count of 2011 Inv Plots	276	1,550	1,586	345	1,191	1,268	919	1,200	1,299	575	1,261	11,484
Snags per Acre												
15-20" DBH	0.90	0.98	2.16	1.05	0.69	0.61	0.25	0.94	0.90	0.88	1.00	1.01
20-30" DBH	0.53	0.74	0.96	0.37	0.55	0.50	0.21	0.39	0.63	0.35	0.78	0.61
30+" DBH	0.25	0.29	0.26	0.13	0.18	0.11	0.07	0.10	0.22	0.04	0.27	0.20
Snag Totals	1.69	2.01	3.38	1.55	1.42	1.22	0.52	1.43	1.74	1.27	2.05	1.82
Snags + Structure Trees[1] per Acre												
15-20" DBH	15.37	4.57	5.25	4.36	5.39	2.55	2.68	7.83	5.05	5.11	13.92	5.66
20-30" DBH	7.88	3.70	2.56	1.41	2.60	1.64	1.75	2.82	2.26	2.07	8.25	2.62
30+" DBH	1.75	1.68	1.17	0.63	4.74	0.60	0.48	1.05	1.11	0.47	3.50	1.52
Totals	25.00	9.96	8.98	6.40	12.73	4.79	4.91	11.71	8.41	7.64	25.67	9.81
Hardwoods per Acre[2]												
15-20" DBH	14.18	1.10	1.34	1.080	3.90	1.43	2.21	6.79	3.29	4.24	10.55	4.67
20-30" DBH	6.89	0.31	0.32	0.117	1.28	0.28	0.92	2.09	1.06	1.59	5.80	1.72
30+" DBH	1.00	0.01	0.01	0.018	0.13	0.01	0.02	0.41	0.17	0.18	1.34	0.37
HardwoodTotals	22.08	1.42	1.67	1.22	5.31	1.72	3.15	9.29	4.51	6.01	17.69	6.76
DownLogs/Acre (15"+)	3.79	6.90	7.84	5.79	5.43	3.63	0.78	1.70	3.87	8.94	1.68	4.56
Undamaged YG Green Trees per Acre												
15-20" DBH	4.90	9.49	17.22	8.47	16.96	21.50	9.53	9.34	13.47	17.37	3.59	14.65
20-30" DBH	3.44	11.65	14.42	4.97	12.10	18.34	9.03	8.15	11.65	9.58	2.59	11.83
30+" DBH	0.65	5.74	4.09	2.88	2.21	3.88	2.49	3.28	3.40	1.64	1.23	3.66
Green Tree Totals	9.00	26.88	35.74	16.32	31.28	43.72	21.05	20.77	28.52	28.59	7.40	30.14

[1]Structure Trees are trees most likely to provide particular value to wildlife in the near term (e.g. cavities, hollows, large limbs, forked or broken tops, complex crowns)

[2]Hardwoods per acre is a subset of the "Snags + Structure Trees per Acre" category above.

Table B-2
Snag Trends by Management Type
Structural Habitat Trend Report
Property-Wide (All Eleven SUs Reported Here)

Harvest_Era HarvestType	*PL_PreHCP RegenCut*	*PL_HCP RegenCut*	*HRC RegenCut*	*PL_PreHCP PartialCut*	*PL_HCP PartialCut*	*HRC PartialCut*
Acres (net forested acres)	27,841	28,780	1,184	251	8,157	8,055
Count of 2011 Inv Plots	1,371	1,128	35	20	753	594
Snags per Acre						
15-20" DBH	0.61	0.97	3.83	2.37	0.92	1.22
20-30" DBH	0.27	0.58	1.93	0.00	0.47	0.64
30+" DBH	0.11	0.15	0.13	0.07	0.10	0.14
Snag Totals	0.98	1.70	5.89	2.44	1.48	2.00

Note: HRC RegenCut and PL PreHCP PartialCut are based on total acres and plot numbers that are substantially lower than the other combinations. Care must be taken comparing them.

Habitat Structural Elements by Management Type 5/29/2013

Structural Habitat Trend Report

Property-Wide (All Eleven SUs Reported Here)

Harvest_Era / HarvestType	*PL_PreHCF RegenCut*	*PL_PreHCF PartialCut*	*PL_HCF RegenCut*	*PL_HCF PartialCut*	*HRC RegenCut*	*HRC PartialCut*	*(Other Mngd Inc. Records)*	*(No Mgmt Records)*	*Totals*
Acres (net forested acres)	27,841	251	28,780	8,157	1,184	8,055	78,835	39,873	192,976
Count of 2011 Inv Plots	1,371	20	1,128	753	35	594	3,838	3,745	11,484
Snags per Acre									
15-20" DBH	0.605	2.365	0.971	0.917	3.831	1.217	0.975	1.293	1.014
20-30" DBH	0.268	0.000	0.579	0.467	1.929	0.644	0.616	0.845	0.610
30+" DBH	0.109	0.071	0.153	0.095	0.131	0.140	0.202	0.319	0.198
Snag Totals	**0.982**	**2.436**	**1.703**	**1.479**	**5.891**	**2.001**	**1.793**	**2.457**	**1.821**
OG Trees/Acre	0.122	0.000	0.071	0.236	0.108	0.111	0.460	2.287	0.704
Hardwoods per Acre									
15-20" DBH	7.522	2.216	1.026	1.717	3.038	2.093	5.995	3.879	4.670
20-30" DBH	1.415	0.000	0.337	0.497	5.675	0.694	2.512	1.717	1.720
30+" DBH	0.961	0.183	0.093	0.017	0.399	0.093	0.344	0.327	0.368
HardwoodTotals	**9.898**	**2.399**	**1.456**	**2.231**	**9.112**	**2.880**	**8.851**	**5.923**	**6.758**
Damaged Trees/Acre									
15-20" DBH	1.530	0.000	0.531	0.585	0.000	1.549	0.894	1.131	0.988
20-30" DBH	0.735	1.104	0.260	1.302	0.000	1.759	0.651	1.750	0.902
30+" DBH	0.146	0.407	0.105	0.413	0.113	0.972	0.262	1.208	0.453
Damaged Tree Totals	**2.411**	**1.511**	**0.896**	**2.300**	**0.113**	**4.280**	**1.807**	**4.089#**	**2.343**
Sub-Total Structure Trees/Acre									
15-20" DBH	9.052	2.216	1.557	2.302	3.038	3.642	6.889	5.010#	5.658
20-30" DBH	2.150	1.104	0.597	1.799	5.675	2.453	3.163	3.467#	2.622
30+" DBH	1.229	0.590	0.269	0.666	0.620	1.176	1.066	3.822#	1.524
Structure Tree Totals	**12.431**	**3.910**	**2.423**	**4.767**	**9.333**	**7.271**	**11.118**	**12.299#**	**9.805**
Total - Standing Habitat Elements/ Acre (snags + structure t	**13.413**	**6.346**	**4.126**	**6.246**	**15.224**	**9.272**	**12.911**	**14.756#**	**11.626**
DownLogs/Acre (15"+)	3.574	2.500	3.901	3.187	2.857	4.882	4.573	5.968	4.558
Undamaged YG Green Trees per Acre									
15-20" DBH	14.096	26.469	3.973	22.542	13.530	17.352	17.889	18.226	14.653
20-30" DBH	5.847	22.115	2.073	20.669	10.955	16.670	12.766	22.227	11.834
30+" DBH	1.069	9.994	0.564	6.367	2.637	6.161	2.377	10.544	3.657
Green Tree Totals	**21.012**	**58.578**	**6.610**	**49.578**	**27.122**	**40.183**	**33.032**	**50.997**	**30.144**

All data shown is developed from HRC's 2010-12 field inventory.

To produce this report, HRC lands were divided into harvest "Eras" and general harvest Type:

Harvest Era

PL_PreHCF Harvested between ~1990 and 19
PL_HCF Harvested between ~2000 and 20
HRC Harvested in 2009 or lat

Harvest Type

RegenCut Clearcut, SHR, STR, Rehab, Variable Retenti
PartialCut Selection, Group Selection, Thin, SH

"Other Mngd, Inc. Records" are lands for which records are incomplete, but are believed to have been harvested in the past 30 years.
"No Mgmt Records" are lands with no record or clear indication of management.

Habitat Elements are:

** Snags/acre, divided into the three HCP size categories for snags
** Down Logs/acre; logs had to be at least 15" diameter at the large end and at least 20' long
** Old Growth trees/acre (live trees)
** Hardwood trees/acre, divided into the same 3 size classes as for snags
** Damaged Trees/Acre - a damaged tree is defined as at least 25% of the volume cull or missing, or a broken or forked top with at least a 10" diameter at the break. Damaged trees also have to be at least 15" DBH and at least 20' tall

1.2	
2.4	
1.2	

Notes:
1. Trees are not double-counted; i.e. if a tree with damage is old growth, it is counted in OG, not in damaged.
2. Structure trees are damaged trees, hardwoods, and old growth. The old growth are counted by default in the >30" size.

System for Rating Cull/Wildlife Trees: Rating Table/Scorecard

Applies only to conifers ≥30" dbh and hardwoods ≥20" dbh; and not to smaller trees

For any tree, only one score is applied for a category, e.g., if multiple large limbs are present, the tree's score for large limbs is 2, or if both a cavity and basal hollow are present, 5 points apply for that column.

	TREE CHARACTERISTICS							
	Large Tree Size		Structural Features Present					
	Conifer: dbh ∃36"	Hardwood: dbh ∃24"	Cavity, Hollow, or Basal hollow	Large Limb(s)	Mistletoe broom or limb cluster	Broken Top ∃18" diameter	Complex crown, diseased, or small cavity	**Total Points** max =15 - conifer, max = 16 - hardwood
Points	3	4	5	2	2	2	1	15 or 16
Example		4					1	5
Example	3			2			1	6

Example 1: 28" dbh tanoak: large size plus small cavity: **5 pts**, does not count towards 4/ac in HCP 6.11.2.2 ("live cull trees")
Example 2: 45" dbh redwood: large size, cavity, broken top 14" diameter at break (complex crown): **6 pts**, counts towards 4/ac

Criteria for Tree Characteristics:

Broken top ∃18" diameter: any broken-topped tree with a minimum diameter at the break of 18 inches or larger

Large limb(s): tree has one or more limbs 12" or greater in diameter

Cavity/Basal Hollow/Hollow:

Cavity: A cavity (or void within a tree bole or large limb), with a relatively small opening; includes all cavities with entrances 2.5-to-6" across the smallest direction (for example, a vertical slit-like opening 4" across would count, as would a more circular entrance).

Notes: Can include enlarged woodpecker nest cavities as well as natural cavities. Cavities with smaller entrances (see Complex crown below) and larger openings (see Basal hollow) are addressed separately below. Entrances should be above the ground level (see Basal Hollow for ground-level cavities); entrance height is often above 15 feet, but cavities with lower entrances may be used by fishers and other species, and are included as cavities. In practice, interior dimensions are usually not visible, so classification should be based primarily on dimensions of the opening.

Basal hollow (including goose pens): a hollow at ground level, extending at least 1/3 of the distance into the trunk diameter, or (for trees larger than 54" dbh) for a distance of at least 18".

Notes: Typically formed by fire which destroys cambium on a portion of the bole, and fire also plays an important role in maintaining and enlarging many basal hollows. Basal hollows are generally at least one to several feet tall (tall enough to provide shelter to fisher-size or larger wildlife).

Hollow: Hollows have similar characteristics as cavities, are located above ground, but have a larger entrance (larger than criteria above for "cavities").

Complex Crown/Small Cavity/Diseased:

Complex Crown: Crown features not otherwise listed, including: multiple crown leaders/reiterated trunks, broken tops 6-18" diameter at break, and epicormic branches (large branches that sprout from adventitious buds on the bole of a tree, usually when it tree is stressed or bole is subjected to full sunlight).

Notes: To be counted, multiple leaders/reiterated trunks and epicormic branches should be large enough or form a large enough crotch to provide a nesting or resting opportunity for a Pacific fisher, peregrine falcon, or similar-sized species.

Small Cavity: Cavities with entrances 1- 2.5" across the smallest direction (smaller than criteria for "Cavity" above).

Diseased: Visible signs of disease that are indicative of heart rot, notably presence of fruiting fungi on the bole (such as conks) or at the base of the tree.

Mistletoe brooms and limb clusters: a cluster of branches dense or large enough to form a potential platform or fisher rest site.

Notes: "Platform" or other potential rest site structure must be of sufficient size to provide a nesting or resting opportunity for a Pacific fisher, peregrine falcon, or similar-sized species. Single large limbs are treated separately.

5.2.7. Conservation Measure 7: Management for Habitat Elements and Operational Standards

Conservation Measure 7 supports the third conservation goal for this HCP (to provide key owl habitat needs and specific habitat elements in future timber stands) by incorporating provisions for retention and recruitment of Habitat Elements into harvest planning and operations. These retention standards are intended to allow the Mixed land class to continue as prey producing, spotted owl foraging, and nesting/roosting habitat, and for the Regen and Even land class to develop these characteristics by retention and through growth as quickly as possible. Retention of elements should accelerate the rate of spotted owl habitat development in Even stands (See Section 6.7, Monitoring of Even Habitat Use by Spotted Owls).

Prey species for owls rely on snags, down logs, brush, and hardwoods capable of significant mast production and cavity formation (citations summarized in Roberts 2017). In the Mixed land class, these habitat elements are currently represented in HF4, HF2H, and HF2 stands. By retaining habitat elements, this measure ensures that many of these elements persist immediately after harvest or continue to be produced through time. This retention and recruitment of elements will enable the planted Regen and Even land class stands to better function as habitat associated with spotted owl prey as they develop through HF1, HF2, and HF2H. As these young stands mature, the elements retained from the previous stands, or that develop naturally through time from climatic forces and biological processes, will not only provide prey habitat, but also provide nesting structures within future stands of HF2H and HF4. These future HF2H and HF4 habitats will contribute to the owl PHAs during the term of the HCP.

The operational standards of this Conservation Measure are provided in a list below, with additional discussion of each measure in a subsequent section. Standards are provided for regeneration harvest units (even-aged silvicultural prescriptions) and for non-regeneration harvest areas (selection, salvage, and intermediate silvicultural prescriptions). Road construction and rock pit development will not include the management of habitat elements. These activities remove all the vegetation and overburden from a site making habitat element retention infeasible.

CFPRs provide a general guidance stating: "Retain or recruit late and diverse seral stage habitat components for wildlife concentrated in the watercourse and lake zones and as appropriate to provide for functional connectivity between habitats." There are no specific standards mandating specific quantities, sizes or locations in the CFPRs; site specific measures are resolved during THP plan review. In this light, the HCP requirements described below in Sections 5.2.7.1 through 5.2.7.7 are much more specific and protective for the covered species and apply to all harvest methods and terrestrial locations as well.

Conservation Measure 7 standards are the same as Conservation Measure 3 in SPI's Fisher CCAA (Permit #TE09082C-0). Under that permit, these specific measures are enforceable until November 2026. Including them in this HCP extends these requirements for the HCP 50-year permit period.

SPI commits to the standards in 5.2.7.1 through 5.2.7.7 of Conservation Measure 7 by incorporating the standards into THP language, which also makes them enforceable by CAL FIRE.

An overview of these standards are as follows:

1. SPI will retain all spotted owl nest structures for the permit period (i.e., trees where spotted owls are known to have nested currently or in the past or those discovered in the future) wherever they exist (see Section 5.2.7.1).

2. SPI will retain HRAs (defined in Section 5.2.7.2) at a rate of 2 percent of each harvest area. In regeneration harvest areas, HRAs will occur at a rate of 2 percent of the regeneration area.

3. SPI will retain Wildlife Trees (defined in Section 5.2.7.3), where available, at a rate of one per 5 acres, in all regeneration units, non-regeneration harvest, rehabilitation areas, and fire salvage areas.

4. SPI will retain Legacy Trees (as defined in Section 5.2.7.4), wherever they exist.

5. SPI will retain Additionally Retained Trees (small hardwoods or conifers, further defined in Section 5.2.7.5) in regeneration harvest units such that there are no locations that exceed a distance of 150 feet from other retained elements (HRAs, Wildlife Trees, Legacy Trees).

6. SPI will retain and recruit Hardwoods (defined in Section 5.2.7.6). In all non-regeneration harvest areas, SPI will retain at least two hardwoods greater than 22 inches dbh per acre, when available. If unavailable, the next largest diameter hardwoods will be retained at a rate of two per acre. In regeneration harvest units, SPI will retain small hardwoods (<6 inches dbh) or regenerate (recruit) stump-sprouting hardwoods at a rate of two per regenerated acre where they exist.

7. SPI will retain Snags and Green Culls (non-merchantable snags and green culls ≥15 inches dbh, further defined in Section 5.2.7.7) during all regeneration or non-regeneration harvest activities, as feasible, unless determined to be a safety hazard or a regulation requires their removal.

8. Thinning in Plantations (defined in Section 5.2.7.8) Portions of plantations will not be thinned, in order to maintain density induced mortality processes.

5.2.7.1. Management for Spotted Owl Nest Structures

Since the mid-1990s trees containing spotted owl nesting structures known to have been active were identified with a SPI wildlife tag. This process will continue for all newly discovered nesting structures. SPI will retain all spotted owl nest structures for the permit period (i.e., trees where spotted owls are known to have nested currently or in the past) wherever they exist. Such nest trees shall be retained in HRAs, except the additional HRA area surrounding a nest tree will not

be designated in the rare circumstance where other required HRAs around Legacy trees and would exceed 3 percent of the unit area (e.g., 0.6 acre in a 20-acre unit). This circumstance has not occurred prior to the writing of this HCP. Under this exception, the nest tree will still be retained, just not inside a HRA.

5.2.7.2. Habitat Retention Areas

The primary measure to maintain and recruit habitat elements into future stands will be the establishment of HRAs in all regeneration harvest units. SPI biologists and foresters work closely together to identify and protect habitat elements. HRAs will preferentially contain one or more Wildlife Trees, Legacy Trees, and, if available, large woody debris that contributes towards owl habitat. An HRA will consist of a representative sample of the species and diameter classes of trees present prior to harvest, retained at a rate of 2 percent of the total harvest unit area, excluding acres within WLPZs. HRAs will be retained for the rotation length of the regeneration and rehabilitation or fire salvage areas and thus are intended to become potential nesting or roosting sites within those stands over the next rotation as the crop trees grow larger and the stand becomes denser. HRAs in regeneration and rehabilitation or fire salvage areas will not be entered for salvage harvesting over the rotation length.

In non-regeneration harvest areas larger than 20 acres, the distribution of HRAs will occur at a rate of 2 percent per each 20 acres. In all harvest areas of greater than 2.5 acres and fewer than 20 acres, HRAs will occur at 2 percent of the harvest area. No HRAs are required in harvest areas less than 2.5 acres. Acreage of required retained WLPZs is excluded from the calculation of the unit area and the 2 percent retention standard is based upon the non WLPZ harvest area only. The overall acreage of retention of mature trees may be greater than the 0.4 acre per 20 acres of the HRAs where there is WLPZ retention, which represent approximately 12 percent of SPI lands. As described earlier, approximately 43 percent of the existing Mixed stands containing mature trees will be retained throughout the permit period. Adding up all retention types averages 4.34 to 4.64 trees/acre (87 to 93 trees in a 20-acre harvest unit) (See analysis in Section 5.2.7.10 for details). HRAs will preferentially contain one or more Wildlife Trees, Legacy Trees, and, if available, large woody debris that contributes elements of owl habitat. HRAs will consist of a representative sample of the species and diameter classes of trees present before harvest. In non-regeneration harvest areas, the HRAs will remain un-entered for harvest until the next harvest entry, at which time they will be either retained or re-designated.

The cross-plot inventory SPI conducted on known nest sites in its forests (Appendix 4.1 and 4.2), as well as other literature (Thome et al. 1999; Blakesley et al. 2005), demonstrates that a nest site is often a small stand of large trees surrounding the nest structure. Known nesting trees, and whenever possible Wildlife Trees (potential nest structures), will be included within an HRA. The arrangement of HRAs will be variable. For example, in a 20-acre harvest area there will be one to four small groups ranging in size from 0.1 to 0.4 acre, which will consist of a representative sample of the species and diameter classes of trees present before harvest. These small groups of trees are expected to persist, grow, and develop age-related defects during the stand's rotation period. The HRAs in regeneration areas will be retained for the entire stand rotation period and not be thinned or salvage harvested. Figure 5.1 provides photographs of example HRAs and Wildlife Trees.

Retention of HRAs will provide elements of older forest structure, ensuring management options at the end of the rotation period. Those options may include continued retention of the entire HRA, or any portions thereof, or designation of other stand elements of higher wildlife value (e.g., recruited hardwoods), as replacement for these structural components.

5.2.7.3. Wildlife Trees

The retention of Wildlife Trees where available, at an average rate of one per 5 acres, is specifically intended to provide potential nest and roost structures in all future stands outside WLPZs. A Wildlife Tree is a hardwood ≥22 inches dbh or a non-merchantable live green conifer ≥30 inches dbh with the characteristics described below. Such trees are within the size range of existing spotted owl nest trees and will grow to even larger diameters over time as the surrounding stand grows up around them. Wildlife Trees will be selected from among the oldest and largest available. These Wildlife Trees should be selected for their potential to function as a nesting structure either presently or in the future. If Wildlife Trees of the requisite minimum diameters are unavailable, preference will be given first to hardwoods that have the next highest wildlife value, because of their value to prey species and as potential nest trees, and second, to conifers below the target diameter that exhibit wildlife characteristics. Wildlife characteristics include: age, diameter, longevity/persistence, signs of previous use by wildlife (e.g., excavated cavities), indication of current or incipient heart rot (conks, natural cavities), species (hardwoods preferred), presence of large mistletoe broom, crooks, reformed tops, forks or large lateral limbs, etc. Known past nest trees outside retained nest stands will be included as Wildlife Trees. Prior to the regeneration unit being harvested, Wildlife Trees will be marked for retention or designated by description. Wildlife Trees will be preferentially retained within or at the edge of an HRA (Figure 5.1).

Figure 5.1. Example Habitat Retention Areas and Wildlife Trees.
Photo credits: Phil Detrich

Regardless of harvest type, Wildlife Trees may be unevenly distributed prior to harvest. For this reason, we cannot establish a mandatory standard for the distribution of Wildlife Trees. It is still SPI's intent to reach the objective of leaving an average of four per 20 acres. In the unlikely circumstances where the requisite numbers of Wildlife Trees are not available, Wildlife Trees will not be designated, but retention of existing trees will still occur in HRAs. Given the protection afforded to HRAs, these trees will likely develop characteristics of wildlife trees over time. Age and tree density are the most significant contributing factors for trees to develop the characteristics of wildlife trees. The existing HF4 and HF2H stands generally have trees in the

120-year age class and if left in an HRA, many of these trees will likely persist for the rotation length (60 to 80 years), reaching a total age of 180 to 200 years. Over that time period, standing at high density in a shorter and younger growing stand, they will experience more wind, lightning, and other exposures that aid in creating wildlife tree characteristics and potential snags.

5.2.7.4. Legacy Trees

A Legacy Tree is any hardwood tree ≥36 inches dbh or non-merchantable live green conifer ≥30 inches dbh. HRAs will be preferentially placed to include Legacy Trees within or at the edge of a HRA. The only exceptions to this retention standard are if the Legacy Tree has been determined to be an OSHA safety hazard, other regulation requires their removal, or under the exception specified in Management for Nest Structures (Section 5.2.7.1). Prior to the unit being harvested, Legacy Trees will be marked for retention or designated by description.

5.2.7.5. Additionally Retained Trees

The spatial distribution of structural elements and areas of dense cover are important components of spotted owl foraging habitat. SPI's GPS transmitter study located spotted owls using many scattered perch trees within various foraging habitats, including lower successional stands (Appendix 3.6 and Appendix 3.8, and Atuo et al. 2018). In order to provide for perch trees in regeneration units, additional trees will be retained during harvest, such that there are no locations that exceed a distance of 150 feet from other retained elements (HRAs, Wildlife Trees, Legacy Trees) in or adjacent to the unit, or between a retained element and the existing forest edge. For this purpose, a forest edge is an edge between a proposed harvest unit and stands of HF2, HF3, HF2H, or HF4. Where such a forest edge does not exist, additional small hardwoods or conifers shall be retained along that edge every 300 feet to meet the desired spacing that there are no locations that exceed a distance of 150 feet from retained elements. Although these scattered trees may be small, they will grow over time. They also contribute to visually breaking up the area and may assist in spotted owls avoiding detection by predators such as great horned owls. Preference will be given to hardwoods so as to favor tree species that may contribute to small mammal habitat. These additionally retained trees can be conifers at least 10 inches dbh or hardwoods that are at least 6 inches dbh at the time the unit is harvested (approximately one per 2 acres).

When available, hardwoods are preferred, and in practice, the minimum diameters will likely be exceeded due to the irregular distribution of candidate trees in a given harvest unit. The retention of these trees will provide conservation benefits for spotted owls both immediately following harvesting and into the future as the retained trees and the surrounding forest stands mature. These additionally retained trees will provide perch trees for foraging in younger stands and may develop nest tree characteristics over time. If additionally retained conifers persist in an exposed "open grown" condition, they are more likely to develop characteristics often found in spotted owl nest trees, such as large lateral branches, high live crown ratios, and low height to diameter ratios (Sensenig et al. 2013). Habitat for spotted owls will be further enhanced, as these additionally retained trees create another scattered height class to promote vertical heterogeneity in the regenerating stand.

5.2.7.6. Hardwood Retention and Recruitment

In all non-regeneration harvest areas, SPI will retain at least two hardwoods greater than 22 inches dbh per acre, when available. If unavailable, the next largest diameter hardwoods will be retained at a rate of two per acre.

In regeneration harvest units, SPI will retain small hardwoods (<6 inches dbh) or regenerate stump-sprouting hardwoods at a rate of two per regenerated acre where they exist and maintain them as co-dominants for the rotation of the stand. These retained/regenerated trees may be clumped within the harvested area. When maintained as co-dominants, these hardwoods will provide mast production during the life of the stand and recruit potential Legacy hardwoods or wildlife replacement trees through time for retention in the next rotation. This retention/recruitment standard will be more observable after PCT, but will be demonstrated through time by the implementation monitoring reporting requirement.

5.2.7.7. Snags, Green Culls, Down Logs

In addition to individual Wildlife Trees, other structural elements will be retained to provide late/mature legacy structures in the Even and Mixed land classes. During all regeneration or non-regeneration harvest activities, SPI will retain, as feasible, non-merchantable snags and green culls (≥15 inches dbh) unless determined to be a safety hazard, obstructions to timber operations or a regulation requires their removal. The term "feasible" refers to the fact that some snags and green culls are accidentally knocked over or must be felled to carry out harvest operations. A non-merchantable conifer (alive or dead) contains <25 percent merchantable volume that can be recovered as lumber. SPI does not pay loggers for the falling, yarding, or delivery of non-merchantable conifers. The result has been an increase in the number of non-merchantable conifers being retained standing in the forest for the benefit of wildlife, including owls. If felled for safety reasons or knocked down during operations, trees or snags will be left on site or, if necessary, moved to a nearby safe location. Retention will not occur in any road right-of-way and only Legacy hardwoods and previous spotted owl nest or fisher den trees will be retained in fuel breaks.

Hazardous or obstructive non-merchantable snags ≥15 inches dbh that are felled (or toppled by operations) will be left on the ground as operationally feasible for the purposes of providing down wood for prey base production. Wherever they exist, large non-merchantable logs (≥20 inches large end) will be retained during harvesting and site preparation activities.

A non-merchantable log contains <25 percent merchantable volume that can be recovered as lumber. To the extent practicable, these logs will be left undisturbed. If accumulations of snags and down wood create excessive fuel loading and preclude meeting the purposes of CFPR 14 CCR §915/935/955 (Site Preparation), the RPF may propose treatments to remedy those conditions. In such cases, the RPF must balance snag and log retention with management of excess fuels and increased fire risk.

Large cull logs or trees may be removed if they are a safety hazard or carry pathogens detrimental to the future health of the plantation. Green cull trees felled due to the multiple risks they represent (e.g., shading, disease vectors, safety hazard) would then be treated as down logs and retained or treated as described above.

5.2.7.8. Thinning in Plantations

During pre-commercial and commercial thinning of plantations, SPI will leave 2 percent of the area un-thinned, which will remain until the next harvest entry. Preferentially and if available, such areas would contain previously retained habitat elements (e.g., Wildlife Trees, Legacy Trees and Additionally Retained Trees).

Following pre-commercial thinning (PCT) the typical outcome is an 18-foot by 18-foot tree spacing. Two percent of the treated stand (or 0.4 acre per 20 acres) will be retained at the 13-foot by 13-foot planting spacing. This retention is intended to promote natural density-induced mortality, which will increase the likelihood of recruitment of snags. Tree diameter estimated by the University of California Research Cooperative G-space (G-space) tree growth model is projected to be 16 inches to 18 inches dbh, the point when mortality is expected to begin to occur. While snags of this size may be of limited value as spotted owl nest sites, they will provide habitat for spotted owl prey species and important forest ecosystem function. PCT also will maintain the regenerating hardwood trees (two per acre) in a codominant/dominant crown position.

Eventual commercial thinning is timed to avoid tree mortality predicted to occur by the G-space tree growth model. During the commercial thin, 2 percent of the treated stand (or 0.4 acre per 20 acres) will be retained at the 18-foot by 18-foot PCT spacing. Tree diameter estimated by the G-space tree growth model is projected to be 24 inches dbh, at which point mortality is expected to begin to occur. The reason for this retention is to promote natural density-induced mortality. This retention will increase the likelihood of recruiting snags projected to be 24 inches dbh or larger in each of the retained islands.

Due to the numerous factors that cause mortality, the models do not attempt to quantify mortality; they only estimate when such mortality will begin. Snags produced by high densities and those caused by other stochastic events will produce a continued supply of downed wood, in addition to the amount of smaller downed wood generated by harvesting. Such down wood provides habitat and foraging locations for spotted owl prey.

5.2.7.9. Enhancement of Heterogeneity to Promote Spotted Owl Habitat

Implementation of all the above retention measures will allow nest trees/structures, habitat for prey production, and stand structural complexity to be maintained or developed across the Plan Area. Retention and recruitment of habitat elements that provide cover or are known to support prey production can also enhance the reproductive output and survival of spotted owls. Many owl researchers have suggested that within limits, such heterogeneity is beneficial to spotted owls (Franklin et al. 2000; Hobart et al. 2019a, 2019b; citations summarized in Roberts 2017).