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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

FRIENDS OF GUALALA RIVER, et al.,

Plaintiffs,

vs.

GUALALA REDWOOD TIMBER, LLC,

Defendant.

Case No. 20-cv-06453-JD

DECLARATION OF DOMINICK DELLASALA IN SUPPORT OF PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION

Date:	June 24, 2021
Time:	10:00 a.m.
Courtroom:	11
Judge:	Hon. James Donato
Action Filed:	September 15, 2020
Trial Date:	None

I, Dominick A. DellaSala, Ph. D, declare as follows:

1. If called as a witness, I could and would truthfully testify to the following based on my personal knowledge.

2. Attached hereto as Exhibit A is true and correct copy of my expert report concerning the impact of the project at issue in this litigation on Northern Spotted Owls (*Strix occidentalis caurina*) prepared at the request of Plaintiffs Friends of Gualala River and Center for Biological Diversity in this action.

3. The content of Exhibit A, inclusive of its exhibits, are true and correct.

I declare under the penalty of perjury under the laws of the United States of America and the State of California that the foregoing is true and correct.

Executed on May 17, 2021 in Talent, Oregon.

Dominick DellaSala

Dominick DellaSala

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EXHIBIT A

REPORT OF DOMINICK DELLASALA REGARDING IMPACT OF THE PROJECT ON NORTHERN SPOTTED OWLS (*STRIX OCCIDENTALIS CAURINA*)

I. EXECUTIVE SUMMARY

I was asked by the Plaintiffs in the action titled *Friends of Gualala River, et al. v. Gualala Redwood Timber, LLC,* No. 20-cv-6453 (the "Action") to evaluate the likelihood that the proposed logging and associated activities (collectively, the "Project") of certain floodplain areas of the Gualala River, in northern Sonoma County, California, as identified and described in the Dogwood Timber Harvest Plan (THP), Approved March 30, 2018, (the "Dogwood THP Area") is reasonably certain to result in the incidental "take" of the Northern Spotted Owl (*Strix occidentalis caurina*) (NSO). I have been informed by counsel for Plaintiffs in the Action that I should base my report on whether there is reasonable certainty of NSO being harassed, harmed, killed, or injured by project actions. I have been further informed that "harm" includes habitat modification that may kill or injure NSO individuals by impairing essential behavioral functions, including breeding, feeding, or sheltering. "Harass" means an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, sheltering, and territorial defense. I have applied this take standard, inclusive of these definitions, to the analysis contained herein. This report is based on my personal expertise as an NSO researcher, knowledge of the relevant literature, site visit of the Project on April 23, 2021, and knowledge of the U.S. Fish & Wildlife Service take avoidance guidelines for coast redwood (https://www.fws.gov/yreka/NSO-TakeAvoidanceAnalysis_Att_A-B_2019-1101.pdf) and private lands in northern California (https://www.fire.ca.gov/media/4937/usfws_-nso_takeavoidanceguidelines_sciencesupportdocument_121409.pdf).

In sum, the proposed logging of large trees and the additional resultant fragmentation of forest canopies in the Project area will reduce essential NSO habitat below necessary canopy thresholds for nesting and survival, thereby making the Gualala River corridor even more permeable to the aggressive competitor Barred Owl (*Strix varia*) that has increased in numbers at the expense of NSO. While individual actions of the Dogwood THP appear to meet some of the U.S. Fish & Wildlife Service guidelines for avoiding take, the U.S. Fish & Wildlife Service has determined that take avoidance measures on private lands in northern California that are typical of those employed in the Dogwood THP are inadequate.[1] I concur with U.S. Fish & Wildlife Service's overall assessment to which I add my own observations and finding with reasonable certainty that incidental take to NSO would occur from cumulative actions within the Project area and surroundings.

II. QUALIFICATIONS

I am forest scientist with more than three decades in wildlife biology, ecology, climate change, and endangered species management. I hold a B.S. degree in Biology from Adelphi University (1979), M.Sc. from Wayne State University (1982), and Ph. D in Natural Resources from the University of Michigan (1986). As a post-doctoral research fellow in the 1980s, I conducted field studies of NSO foraging and habitat needs at the HJ Andrews Experimental Station in Blue River, Oregon, and of endangered birds on the Platte River in Nebraska. I have served as Adjunct Faculty at Southern Oregon University, have published over 200 scientific papers and books on forest ecosystems, imperiled species (including NSO), and climate change, served on the editorial boards of scientific journals (*Natural Areas Journal, Diversity, Conservation Biology*), and as chief editor of global biodiversity and endangered species

[1]https://www.fire.ca.gov/media/4937/usfws_ nso_takeavoidanceguidelines_sciencesupportdocument_121409.pdf

encyclopedias (Elsevier, Inc, United Kingdom). Since 1993, I have acted as Chief Scientist for three non-profits (World Wildlife Fund, Geos Institute, Wild Heritage). In 2006-2008, I served as an endangered species expert on the US Fish & Wildlife Service recovery team for the NSO and have been involved in recovery efforts of this species since. For the past two years, I have been collecting NSO survey and habitat data in northern California and southern Oregon to assess NSO occupancy rates and nesting success in logged areas.

My curriculum vitae is attached hereto as Exhibit 1 and includes a list of my publications.

III. PROCESS EMPLOYED TO EVALUATE THE PROJECT'S POTENTIAL TO RESULT IN THE TAKE OF NORTHERN SPOTTED OWLS

A. Documents Reviewed

The primary document that I reviewed to prepare this report is the Dogwood THP Approved March 30, 2018 ("Approved Dogwood THP"), including: (1) the Plan of Timber Operations contained in Sections II, III, and IV of the Approved Dogwood THP; (2) the Northern Spotted Owl Surveys in the Dogwood THP Area 2016-2020; (3) Gualala Redwood Timber, LLC Timber Harvest Plan Letter of Conformance (July 31, 2019); and (4) Official response to significant environmental points raised during the timber harvesting plan evaluation process concerning revisions to the alternatives and cumulative impacts sections of the plan from the director of the California Department of Forestry and Fire Protection (CAL FIRE).

In addition, I reviewed the Complaint filed in the Action, the Regulatory and Scientific Basis for U.S. Fish & Wildlife Service Guidelines for Evaluation of Take for Northern Spotted Owls on Private Timberlands in California's Northern Interior Region and coast redwoods as cited above, Google Earth imagery and LiDAR high resolution imagery of the Project area available from 1-meter canopy cover dataset on Sonoma County's website (http://sonomavegmap.org/data-downloads/), camera photo points taken along transects within logging units visited on April 23, the US Fish & Wildlife Service NSO recovery plan of 2011, the CAL FIRE Forest Practice Rules, each of the citations in the literature of my declaration, and NSO detection surveys submitted to CAL FIRE by GRT.

B. Site Visit

On April 23, 2021, I visited the Dogwood Project area and made detailed observations at 6 logging units and several road-side stops in Exhibit 2A. The dots on Exhibit 2A refer to all locations of NSO sightings in relation to logging units and the surroundings based on NSO detections available from the California Natural Diversity Database from 1989-2020 (https://wildlife.ca.gov/Data/CNDDB/Maps-and-Data). Exhibit 2B shows LiDAR based canopy cover and level of forest fragmentation just to the east and west of the Gualala River corridor where proposed logging units are marked in red. Methods used for evaluating the LiDAR and photo points findings are in Exhibit 3. During my site visit, I took 167 photos of the forest canopy to assess canopy coverage and several large trees marked for logging at Project units using my iphone7. I also provide some example photos of very large trees to be logged in the Project area as illustrated in the panels presented in Exhibits 4 and 5 to help visualize the impacts of large tree removals to NSO nesting, roosting, foraging, and dispersal habitat.

IV. RELEVANT BACKGROUND REGARDING THE NORTHERN SPOTTED OWL AND ITS HABITAT REQUIREMENTS

A. Northern Spotted Owl Habitat Requirements

The NSO is a relatively long-lived, medium-size, forest dwelling, nocturnal avian predator that feeds primarily on woodrats, flying squirrels, voles, gophers, and mice and occasionally hunts other types of small mammals, birds, and large insects (Forsman 2004). It inhabits forests in the Coastal Ranges and Cascades Mountains from southern British Columbia in Canada (functionally extirpated) to Marin County, California. Adult NSO are territorial, have large home ranges (up to thousands of acres), and high fidelity to a breeding site – that is, they and or their progeny typically use the same nest sites or alternate sites nearby repeatedly. Juvenile survival is related to the quality of old forest habitat needed to avoid predation from other raptors like Great Horned Owls and to allow young NSO opportunity to set up breeding territories (Sovern et al. 2015).

NSO site occupancy is strongly related to the amount of late-successional forests and large-diameter trees (typically trees >80 years old, >20 inches diameter at breast height - dbh). A 2011 Forest Service General Technical Report PNW-GTR-805 entitled Status and Trends of Northern Spotted Owl Populations and Habitats (Davis et al. 2011) generally states on page 38:

> High-quality NSO habitat includes older, multi-layered, structurally complex forests characterized by **large-diameter trees**, **high amounts of canopy cover**, numerous large snags, and lots of downed wood and debris. Forest age and structure used by NSO ranges from canopy emergent trees ~40 to 60 years old in northwest California (redwood zone) to most (>60%) of the area in mature (80-199 years old) and old-growth forests (≥200 years old). In general, NSO require multilayered tree canopies dominated by **large trees typically from 20 to 80 inches dbh**.

Large trees, high canopy closure, and multiple layers of trees (emergent, mid, and lower story) allow the NSO to nest and perch in the shade during the heat of a summer day (USFWS 2011, Dugger et al. 2016). The structural complexity of older forests also provides suitable habitat for canopy-dwelling prey species (e.g., flying squirrels, tree voles) while offering large trees for hunting and nesting. Smaller trees are also sometimes used by owls, provided there is no clearcutting nearby, there is a mixture of conifers and hardwoods to provide shade and perch sites, and diverse canopy layers and shrubs for prey species (Thome et al. 1999). When any or all of these habitat features are altered by timber management, site occupancy, survival rates, and reproductive success of NSO are known to decline (Anthony et al. 2006, Dugger et al. 2011, Forsman et al. 2011, Dugger et al. 2016). Importantly, in mixed-evergreen forests of northwestern California, female NSO summer home ranges averaged 1,329 acres while male home range averaged 835 acres (Solis et al. 1990). Logging within NSO home ranges reduces habitat and places NSO at further risk of Barred Owl invasions (Forsman et al. 2011, Dugger et al. 2016, Irwin et al. 2020).

B. <u>Northern Spotted Owl Status and Threats</u>

The NSO was listed as federally threatened under the Endangered Species Act in 1990 due to destruction and adverse modification of its late-successional forest habitat and inadequacy of regulatory mechanisms (Federal Register, 55 FR 26114). More specifically, the US Fish & Wildlife Service Recovery Plan (2011) noted the main threats to NSO survival as: low populations, declining populations, limited habitat, declining habitat, inadequate distribution of habitat or populations, isolation of populations within physiographic provinces, predation and competition, lack of coordinated conservation measures, inadequacy of regulatory mechanisms, and vulnerability to natural disturbances.

Recognizing the owls' more recent accelerated decline, conservation groups in 2015 petitioned the NSO for uplisting to Endangered status (range-wide extinction is possible). The petition was declared "*warranted but precluded*" by the U.S Fish & Wildlife Service in January 2021. NSO remains dangerously close to extinction and already has been nearly extirpated (3 remaining wild birds) in southern British Columbia due to logging and habitat fragmentation (USFWS 2011, Hobbs 2019). Industrial logging in northwest California similar to that in British Columbia runs the risk of NSO extirpation given there is precedent that the species not only declines from large-scale logging operations but can be permanently eliminated from the area causing irreparable harm.

C. <u>Logging Impacts</u>

NSO are known to decline or abandon nesting territories when logging destroys or degrades structurally complex and older forest habitat (USFWS 2011). Even "moderate intensity" logging that lowers canopy closure (e.g., < 70%) such as "selective logging" or degrades NSO nesting, foraging, and roosting habitat (Odion et al. 2014). Importantly, in a meta-analysis of Spotted Owl habitat, Tempel et al. (2016) found that for each incremental reduction in forest with high canopy closure (>70%), the probability of Spotted Owl territory extinction increased. That is - for every reduction in the amount of high canopy cover (defined as >70%) or medium canopy closure (defined as 40–69%), there is a concomitant reduction in occupancy.[2] The researchers further noted that when medium-intensity harvests were implemented within high-canopy forests, they reduced the canopy sufficiently to be reclassified into a lower-canopy class in >90% of the treated areas. Such changes were associated with reductions in NSO survival and territory colonization rates, as well as increases in territory extinction rates. Simply put, the more forest canopies are opened up (fragmented) by logging (even moderate logging), the greater the risk of local extirpation. Conversely, retaining high canopy closure and ensuring a long-term supply of large trees at the territory scale provide recolonization opportunities for NSO, especially if habitat protection is coupled with Barred Owl removal (see below).

Importantly, Seamans and Gutiérrez (2007) found that logging >50 acres of mature conifer forest within a female California Spotted Owl's 1000-acre home range resulted in lower spotted owl territory colonization and higher local extirpation rates in the central Sierra Nevada. Notably, that is just 5% of a 1000-acre owl territory. Wood et al. (2018) monitored 64 California Spotted Owl territories in the Eldorado Study Area over 22 years and found territories with greater amounts of habitat were more likely to be recolonized by spotted owls and less likely to be abandoned. Spotted owl habitat was defined as >70% canopy closure with a quadratic mean diameter of trees >**24 inches**. Northern and California Spotted Owls are closely related subspecies and use similar habitat types; thus, the findings are applicable to high canopy closure and large trees needed to provide recolonization opportunities for NSO in search of territories.

[2] Note – canopy closure is the degree of tree crown closure as estimated from the ground looking up (e.g., photo points described below). Canopy cover is degree of tree crown cover as estimated using LiDAR from above. They are related and both are important to NSO.

Additionally, in the life cycle of spotted owls it is common for juvenile birds to move into vacant Spotted Owl territories (Sovern et al. 2015) but if the territories are degraded by logging that would constitute harm of juvenile NSO because they are prevented from reaching suitable nesting habitat.

D. Barred Owls and NSO Interactions

Decades of very intensive monitoring of NSO population demographics have been conducted within eleven study areas throughout Washington, Oregon, and northern California. These studies involved capturing and individually marking and sometimes radio-tagging owls in measuring survival, reproduction, movements, and territory occupancy over time as functions of habitat, climate, and the presence of Barred Owls. Barred Owls are a slightly larger, more aggressive, and related[3] owl species whose range was limited east of the Great Plains historically but expanded into northern California around the 1980s and are now increasingly depressing NSO populations (USFWS 2011). Removing large-diameter trees and reducing forest canopy closure intensifies interference competition, with Barred Owls the consistent winner (Forsman et al. 2011, Dugger et al. 2011, USFWS 2011, Wiens 2018). Additionally, fragmenting NSO habitat has been associated with NSO depredation by Great Horned Owls (Dugger et al. 2011, USFWS 2011, Wiens 2018). The Dogwood THP Section IV p. 181 recognizes this effect, including predation by Great Horned Owls (detected during GRT NSO surveys) and competition with Barred Owls (detected during GRT NSO surveys).

Barred Owls have a competitive advantage over NSO because of their aggressive defense of territories, adaptability to logged areas, and robust diets that overlap with NSO (USFWS 2011). Continued logging of large-diameter trees, alteration of forest canopies, and associated

[3] Both are in the same genus *Strix*

fragmentation of NSO habitat further tips the competitive advantage toward Barred Owls, while increasing the probability of local NSO extirpation that can accumulate over time, leading to eventual NSO population collapse (Dugger et al. 2011). Further, according to National Park Service (2017), Barred Owls in northern California occupy much less area than NSO and can therefore densely pack into NSO territories. Both species use patches of old conifer forest for nesting and riparian areas for foraging. Barred Owls take a wider variety of prey species than NSO, including prey active in the day, and Barred Owls nest more often, more successfully, and produce more young than NSO.

Dugger et al. (2011) stated "increased habitat protection for spotted owls may be necessary to provide for sustainable populations in the presence of barred owls, and it is obvious from our results that these two additive stressors on spotted owl populations cannot be decoupled in any conservation efforts." Dugger et al. (2016) also found "the most consistent pattern in Northern Spotted Owl territory occupancy dynamics was the strong positive association between the presence of Barred Owls and territory extinction rates of Spotted Owls in all 11 study areas." Additional analysis of long-term territorial occupancy dynamics of both NSO and Barred Owls in the same eleven study areas showed that more recent declines in NSO territory occupancy were driven by increasing prevalence of Barred Owls (Yackulic et al. 2019). NSO territory extinction rates are higher in the presence of Barred Owls in all study areas, and the Barred Owl population has been stable or increasing in all eleven study areas.

In light of this, the USFWS (2011) recommended, in addition to habitat protection, Barred Owl removal (controlled killing) to increase NSO occupancy rates. This has been borne out on industrial lands (Green Diamond) in northwest California where Barred Owls have been experimentally removed (Diller et al. 2016).

Barred Owl presence also has a dampening effect on NSO detection rates (Kelly et al. 2003, Olson et al. 2004). That is, when Barred Owls are present, NSO tend to go silent to avoid detection (i.e., do not respond to survey calls), and this could result in false negative detections. Moreover, nesting pairs – a better indicator of site occupancy than single detections – are even more difficult to detect when Barred Owls are present (Dugger et al. 2011). Consequently, researchers have concluded that surveys must adjust for imperfect and variable detectability from the effect of Barred Owls to properly interpret NSO occupancy. Not doing so, is likely to under-report NSO occupancy that could harm NSO nest sites by allowing logging and/or other disruptive activities in what is falsely presumed as an unoccupied territory. To mitigate interference competition and improve NSO detection rates, researchers recommend conserving large amounts of contiguous, old-forest habitat and large trees (Olson et al. 2004, Dugger et al. 2011).

Importantly, NSO territory extinction probabilities are known to be much lower in areas with high amounts of older forests at the territory scale where Barred Owls are present (Figure 1). Thus, it is the combination of habitat protection and Barred Owl removal that matters most in avoiding harm to NSO in areas where Barred Owls are especially dense.

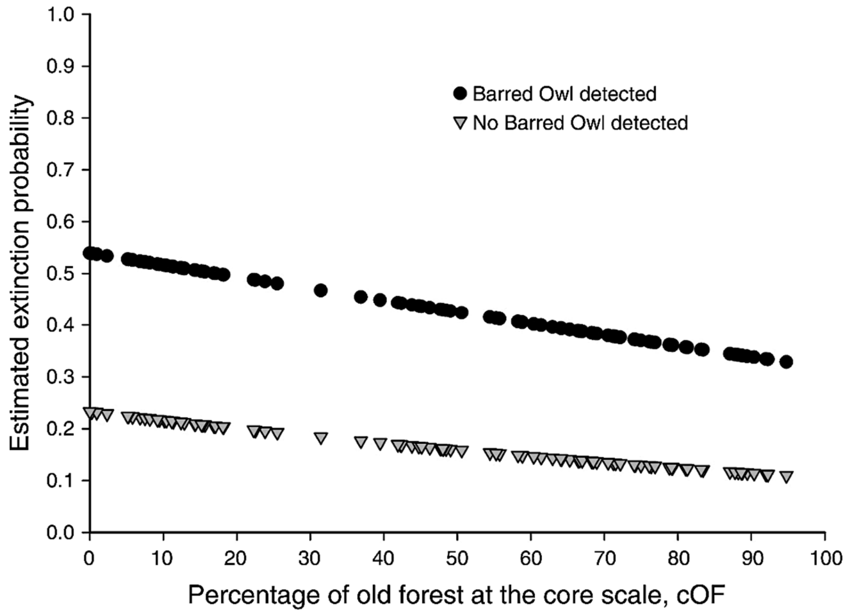


Figure 1. Mean extinction probability from 1991-2005 for Northern Spotted Owl territories when Barred Owls were detected vs. percentage of old forest at the core (territory) scale in southern Oregon (Dugger et al. 2011).

In addition to Barred Owls, Buchanan (2004) notes that reducing the amount of old forest habitat can increase the abundance of a top NSO predator, the Great Horned Owl, which is a large predatory owl that has been detected on the Project Area as noted in the Dogwood THP Section IV p. 181.

V. DOGWOOD PROJECT AREA SITE CHARACTERISTICS (SITE VISIT)

During my site visit, I inspected Units 5, 6, 8, 9, 10, 17, 21, and 1. Additionally, several roadside stops were made along the main stem and side channels of the Gualala River to assess watershed condition and NSO habitat potential. In general, logging units were on gentle to moderate slopes on or adjacent to alluvial floodplains within the river corridor where redwoods are known to grow fast and tall (see Exhibits 4-6). Sites were indicative of productive redwood-mixed evergreen stands on poorly drained (wet) soils with an understory of giant chain fern (*Woodwardia imbricata*), western sword fern (*Polystichum munitum*), lady fern (*Athyrium filix-femina*), California stinging nettle (*Urtica dioica*), coast hedge nettle (*Stachys chamissonis*), redwood sorrel (*Oxalis oregana*), meadow rue (*Thalictrum species*), Oregon grape (*Mahonia spp.*), Pacific poison oak (*Toxicodendron diversilobum*), blackberry (*Rubus ursinus*), giant horsetail (*Equisetum telmateria*), trillium (*Trillium ovatum*), redwood violet (*Viola sempervirens*), and corn lily (*Veratrum californicum*).

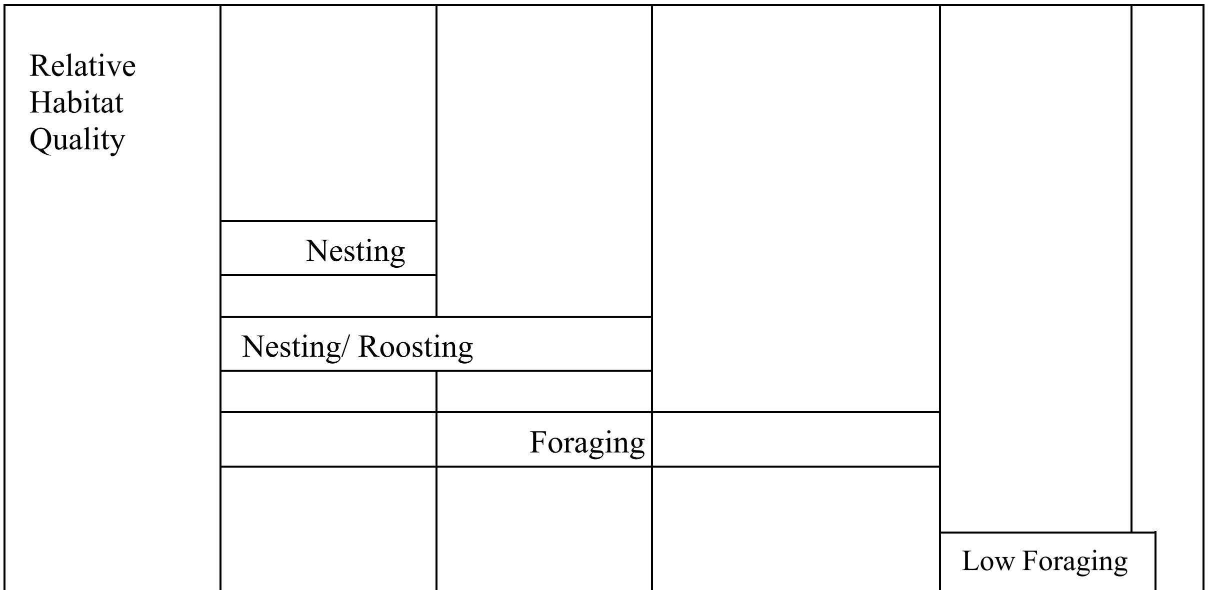
Each logging unit had emergent trees towering to >100 feet, verified by LiDAR imagery, and there were several dead standing emergent trees (snags) and live trees with complex upper canopy branching and broken tops that appeared suitable for NSO nesting, roosting, and foraging (e.g., Exhibit 4). I noted that for several of the units, blue paint was used to mark large trees for potential removal (Exhibits 5-6). Depending on the unit, even the 14th largest tree – which can be logged under California Forest Practice Rules – were large canopy emergents that could otherwise function as nesting, roosting, or foraging habitat, especially in unit 1 where the 14th largest tree was quite large (Exhibit 5-6). Thus, I am reasonably certain that even taking the 14th largest tree would cause harm to individual NSO by eliminating potential nesting, roosting, foraging habitat and further opening the forest canopy. As noted in Exhibit 5-6, retaining up to the 13th largest tree is a misleading practice for avoiding take as the next cohort of trees (14th largest etc) are still quite large and form a contiguous forest canopy that otherwise will be degraded by logging.

A. Forest Canopy Estimates (LiDAR and photo points)

NSO need continuous canopy to sustain nesting and roosting behaviors. Adult survival is strongly related to canopy cover while foraging can include a mix of natural open areas where owls hunt (Franklin et al. 2000, Dugger et al. 2011). It is adult survival that is most limiting to

NSO populations (that is - if adults are dying due to a lack of nesting habitat, then they cannot produce young to replace themselves). When canopies are fragmented, adult survival is put at risk mainly from predation (e.g., Great Horned Owls) and competition (Barred Owls). Exhibits 2A-2B demonstrate the scale of logging just east and west of the Dogwood THP Project where canopy has been substantially reduced and fragmented. Note, on these exhibits the few remaining relatively continuous forest canopies within the Gualala River corridor that GRT now seeks to log. Thus, even if GRT is maintaining canopy at levels sufficient for roosting and foraging, they are doing so at the expense of nesting and this would constitute harassment.

Using Figure I.A.I from the U.S. Fish & Wildlife Service take guidelines (relabeled in my report as Figure 2), I evaluated forest canopy estimates in the Project area using two methods: (1) LiDAR processed for Project units by GIS expert Curt Bradley (see Exhibit 3 for methods); and (2) photo points taken by myself along transects in 6 of the sites visited on April 23 as described below. LiDAR is typically used to determine ranges (variable distance) by targeting an object with a laser from orbiting satellites and measuring the time for the reflected light to return to the receiver. It can be used to accurately make forest measurements, including tree height and tree canopy cover and is an acceptable method for habitat typing when inventory data are lacking, as noted by the U.S. Fish & Wildlife Service (2019). That is – the U.S. Fish & Wildlife Service (2019) concluded that imagery alone can provide reasonably accurate canopy closure estimations but ground truthing is also helpful.



Basal Area[1]	300	200	150	120	80
QMD[2]		20"	15"	13"	11"
TPA > 26"[3]	50		8	5	
Canopy	100%	80%		60%	40%
WHR size[4]			4		
WHR density		D		M	

[1] Square feet per acre, [2]Quadratic Mean Diameter of trees >5"dbh,[3] Trees per acre > 26 inch diameter at breast height, [4] California Wildlife Habitat Relationships System

Figure 2. Conceptual model of spotted owl habitat functions, relative habitat quality, and associated forest structural conditions as developed by the U.S. Fish & Wildlife Service.

1. **<u>LiDAR Canopy Coverage Project Area Estimates</u>**

I used the mean value within each logging unit to arrive at the canopy cover estimates in Table 1. Based on LiDAR, 19 of the 24 Project units have mean values at or above the 80% canopy cover threshold. However, 5 units (units 6, 13, 22, 23, 24) were already below the threshold and thus have yet to acquire optimal canopy cover. These units will become even more fragmented as nesting habitat (high canopy cover) is further reduced as noted from interpolating Figure 2 above.

Table 1. Mean percent canopy cover for 24 logging units within the Dogwood Project Area, Gualala River, California as estimated using LiDAR. Canopy cover <80% is highlighted in yellow.

Unit Number	Mean % Canopy Cover
Unit1	81.97
Unit5	86.28
Unit6	78.56
Unit7	84.45
Unit8	87.19
Unit9	86.18
Unit10	80.41
Unit11	80.74
Unit12	84.61
Unit13	72.80
Unit14	85.20
Unit15	86.16
Unit16	87.28
Unit17	80.96
Unit18	83.41
Unit19	83.05
Unit20	82.12
Unit21	80.41
Unit22	71.47
Unit23	74.10
Unit24	76.83

2. <u>Canopy Closure Photo Point Estimates</u>

During my site visit, I took 167 photos of the forest canopy at Project units using my iphone7 held consistently at arms-length and chest height and as level as possible. Sixty-eight photos were systematically taken along a meandering transect within units 17 (n=29), 21 (n=11), and 1 (n=28) that have not been logged for decades (i.e., unlogged). Ninety-nine photos were systematically taken in recently (in past 5 years) logged units 8 (n=24), 9 (n = 42), and 10 (n = 33 photos) (i.e., logged). Photo points were regularly spaced at approximately 10-foot intervals along transects by pacing (2 photos were later dropped as they were partially obscured by objects in the viewing field). All photos were processed in Python programming language to estimate percent canopy closure for each of the units (see Exhibit 3 for methods, Curt Bradley). I assessed canopy closure in relation to GRTs claim made during the site visit that they were maintaining high-quality habitat with at least 80% canopy coverage on all units to avoid take. My site photos also were used to ground truth the LiDAR findings as suggested by the U.S. Fish & Wildlife Service (2019) guidelines. Consequently, I believe my presentation of canopy closure is more reliable than unspecified ocular estimates stated by GRT during the site visit that to my knowledge were not verified for accuracy using remote sensing as herein.

Table 2. Photo point estimates of canopy closure for logged (Units 8, 9, 10 - gray) vs. unlogged (Units 17, 21, and 1 - yellow) and comparisons to LiDAR canopy estimates for the Dogwood Project Area.

Averages	**n**	**Photo Mean % CC**	**Photo Min % CC**	**Photo Max % CC**	**LiDAR (2013) Mean % CC**	**Photo - LiDAR**
Unit1	28	80.72	65.34	93.81	81.97	-1.26
Unit8	25	75.08	67.07	81.32	87.19	-12.11
Unit9	41	72.28	60.13	80.39	86.18	-13.90
Unit10	32	74.41	62.01	94.29	80.41	-6.00
Unit17	29	82.15	73.42	93.02	80.96	1.19
Unit21	10	79.59	74.41	89.96	80.41	-0.81

Two conclusions can be immediately drawn from the LiDAR and photo canopy data:

1. *LiDAR canopy cover estimates are highly correlated with the photo point estimates* and therefore LiDAR is a reliable method for estimating canopy cover for NSO over the Project area. Note: how in the unlogged sites (in yellow), the mean canopy closure estimates for photo points matches closely with the mean LiDAR estimates and therefore the estimators are interchangeable.

2. *Canopy cover was reduced by 6 to 13.9% in the logged units compared to unlogged as highlighted in pink*. The reduction in canopy from logging after the 2013 LiDAR overflight has resulted in canopy closure estimates below what is needed to maintain high-quality nesting habitat (>80%) for adult NSO based on estimates of high-quality habitat in Figure 1A1 above.

My canopy findings overall refute the claim made by GTR during the April 23 site visit that their operations are maintaining canopy cover above the 80% threshold. It is also reasonable to assume that logging proposed under the Dogwood THP will reduce canopy cover for at least the other 3 units (1, 7, 21) that I visited that are pretty close to the 80% threshold in their current unlogged condition. To reiterate, while foraging habitat may become available to NSO in the logged units, it comes with a price of nesting habitat. This tradeoff is not trivial as it could mean NSO adult survival rates drop at the logging units and, as mentioned in the literature review above, incremental reductions in canopy cover result in concomitant reductions in site occupancy by NSO (Tempel et al. 2016) and may explain why NSO levels have been consistently dropping in the Project area (along with Barred Owl invasions, see below).

VI. REASONABLY CERTAIN IMPACTS OF PROJECT ON RESIDENT NORTHERN SPOTTED OWLS

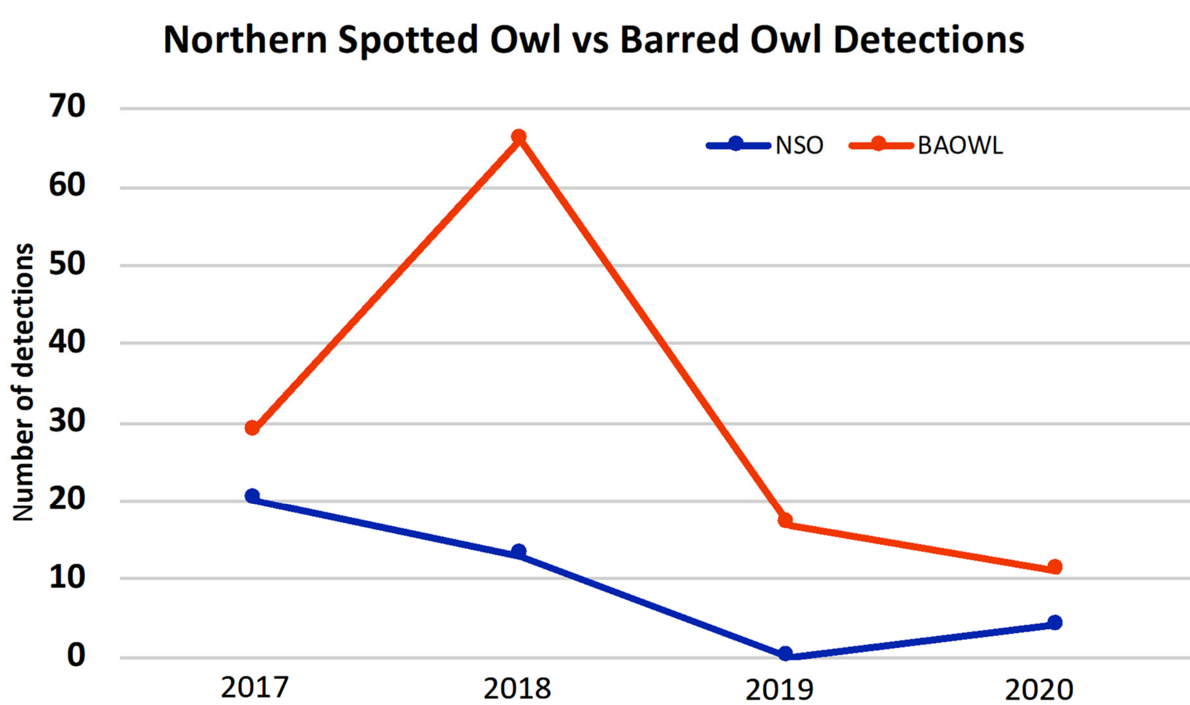
A. Barred Owls and NSO Habitat Loss

Based on my review of the Dogwood THP and site visit, I am reasonably certain that removal of large remnant redwood and Douglas-fir on the Dogwood Project Area will cause harm to individuals, pairs, and young NSO that would irreparably harm a species already in widespread decline. The NSO, in general, has been dealing with the accumulation of threats throughout the Project and surroundings consistent with those cited in the U.S Fish & Wildlife Service 2011 recovery plan. As noted in the NSO recovery plan, logging is likely to contribute to ongoing low and declining NSO populations; limited, declining, and inadequate distribution of habitat; isolation of populations; predation (e.g., Great Horned Owls) and competition (Barred Owls). This type of harm also has generally been noted in the U.S. Fish & Wildlife Service review of the take avoidance guidelines on private lands in northern California (see below).

Given the large number of Barred Owls on the Dogwood Project Site (Figure 2), it is reasonable to assume that NSO detection surveys are underestimating NSO occupancy due to NSO lack of response to call surveys when Barred Owls are at such high numbers. That is – GTR cannot prove with certainty that NSO are no longer present at activity centers or in the Project area writ large. The potential for false negative detections would then subject NSO sites (assumed unoccupied) to harm by GRT seeking exceptions to habitat protections. I deduced this problem from my examination of NSO and Barred Owl detections on the Dogwood THP from 2017-2020, as reported by GRT to CAL FIRE. The steepest decline in NSO detections coincided with the largest increase in Barred Owl detections (Figure 3). This inverse relationship is either due to interference competition from Barred Owls at the exclusion of NSO (the site is no longer

NSO occupied) or a lack of NSO response to survey calls due to Barred Owl suppression of NSO territorial defense as could be happening for individual NSO (territorial males) and especially for nesting pairs that are even more difficult to detect with high densities of Barred Owls (as cited above). It appears that GRT did not take this into consideration in adjusting detection probabilities for the lowered NSO detection rate in a densely populated Barred Owl area. Therefore, an essential NSO behavior – territorial defense – maintained by NSO hooting– may be suppressed by Barred Owls and harm to individual NSO is reasonably certain given if NSO cannot be detected due to the Barred Owl suppression then logging may be permitted under the false conclusion that NSO is absent.

Figure 3. Number of Spotted Owls vs. Barred Owl detections on the Dogwood THP Area as reported by GRT surveys. Note the spike up in Barred Owl detections in 2018 corresponds to the decline in NSO detections a year later (i.e., a one-year lag in steep NSO detection declines).



B. Google Earth and Fragmentation

I am reasonably certain that logging and related actions proposed in the Project Area that further fragment NSO habitat will accumulate over the Project area causing harm to individual NSO, pairs and young. This is because the scale of NSO habitat-altering activities is clearly visible from Google Earth images within and adjacent to the Project Area (Exhibit 2A-B panels). Such habitat degrading actions – alone and in combination – have caused expansive fragmentation in the surroundings (outside the river corridor) and a reduction in canopy closure in river corridor logging units is adding to this loss given the aggressive Barred Owl is well positioned to occupy logged sites at the expense of NSO as even recognized in the Dogwood THP Section IV p. 181. As noted, NSO extirpation is likely to increase with shrinking NSO habitat in the presence of Barred Owls and Great Horned Owl predation. Based on the canopy estimates, I am reasonably certain of NSO take in units already at or below the required 80% threshold.

The few remaining remnant large trees in the Dogwood THP are mostly concentrated within the narrow Gualala River floodplain, the exact area proposed for logging that will remove remnant trees causing harm to individual NSO territories. Logging operations may also damage large retained trees adjacent to those being removed through co-lateral damage during tree felling operations and given that they are taking place in the river corridor – a preferred habitat area for Barred Owls as well - they are likely making the Project Area even more permeable to Barred Owls as noted.

In addition, the GRT Cumulative Impact Assessment Section IV lists “mitigation” practices that in my professional opinion are either not being followed (canopy thresholds) or are grossly inadequate to reduce interference competition with Barred Owls. GTR will therefore harm individual NSO, pairs, and young by removing large trees (e.g., Exhibits 5-6), given so few remain in the Project Area and surroundings. Notably, there are no protective provisions for juvenile NSO in search of new territories on site or in the nearby surroundings that will also be harmed.

Specifically, the THP calls for no harvesting within 500 feet of NSO sites, without amendment, and maintaining nest/roosting habitat between 500-1,000 feet, without amendment. Based on home range sized reported by Solis et al. (1990) for California Spotted Owls, that means only ~18 acres (female home range) to 36 acres (male home range) is within the no-cut buffer (without amendment), which is a fraction of the total home range of an individual female (1.4% to 2.7% in the buffer) or individual male NSO (2.2% to 4.3% in the buffer). Notably, site occupancy is known to decline in NSO territories with as little as 5% of territories impacted by logging (Seamans and Gutiérrez 2007). Seasonal restrictions in the Dogwood THP also extend out to just 0.25 miles, representing 160 acres of temporary restrictions that also fall far short of individual NSO home range requirements as noted. Moreover, the Dogwood THP provides no habitat protections for dispersing juveniles likely to be impacted by Great Horned Owls due to increased fragmentation in the river corridor, which would only accelerate the decline of the NSO population in the Project area if juveniles are not surviving to occupy vacant NSO territories. Thus, I am reasonably certain that these very limited no-harvest buffers and temporary restrictions will harm individual, pairs, and young NSO leading to take.

I also would like to note that in its determination of regulatory guidelines on private timberlands in California's Northern Interior Region, the U.S Fish & Wildlife cited evidence from hundreds of THPs that the regulatory guidelines – such as those in GRT's THP – are inadequate to avoid incidental take. U.S Fish & Wildlife Service (FWS) indicated widespread loss of NSO territories under California Forest Practice Rules. These specific conclusions paraphrased from the FWS Guidelines supplemented with my field observations are especially noteworthy and were used to inform my report analysis:

- The accumulation of published research results, combined with direct field experience with management of NSO and their habitat, resulted in substantial changes in the quantity and quality of habitat the FWS considered necessary to maintain continued occupancy and reproduction at NSO territories. *Note – based on my field observations, Google imagery, LiDAR, and photo points, I conclude that – like the U.S. Fish & Wildlife Service – the Dogwood THP take avoidance is insufficient as it would result in substantial loss of quantity and quality of NSO habitat and therefore take.*
- Application of habitat retention guidelines in the absence of expert review may limit managers' flexibility to classify habitat based on specific local conditions. *Note: my observations of canopy cover using LiDAR differ from what I was told by GRT in the field regarding their claim about retaining high-quality 80% canopy closure as five of the units are already operating below the 80% threshold as noted from both the LiDAR and photo point estimates. Thus, I was not able to verify GRT's canopy retention claims, which I believe are falsely stated by them.*
- The FPR (forest practices rules) guidelines for avoiding incidental take of NSO were based on comparison of proposed post-harvest habitat conditions with the amount and quality of habitat observed at occupied NSO sites described in various studies. Under this standard, habitat modification potentially could result in substantial reduction of reproduction, survival, and occupancy at NSO activity centers without the appearance of take, because habitat conditions still resemble

other lower-quality NSO territories. *Note – given prior logging in the surroundings and on the Project area, what remains in the Gualala River corridor constitutes relatively higher quality or recovering habitat. Thus, it cannot be assumed that take will be avoided given habitat already was cumulatively degraded and the corridor represents the only remaining intact patches for NSO. That is – the NSO is being increasingly squeezed into less and less habitat at the same time Barred Owls have been increasing.*

- … the use of existing minimum habitat standards such as those currently in the FPRs may result in take of NSO and are insufficient for programmatic use in take avoidance reviews of THPs. *Note – based on my review of the Dogwood THP guidelines, I conclude that avoidance measures are clearly insufficient as well.*
- .. our combined experience with hundreds of THPs indicates that the cumulative effects of repeated entries within many NSO home ranges has reduced habitat quality to a degree causing reduced occupancy rates and frequent site abandonment. In a large proportion of technical assistance letters to CALFIRE and industrial timberland owners during the past five years, we noted the lack of NSO responses at historic territories, and described habitat conditions considered inadequate to support continued occupancy and reproduction. This highlights the need for refined, objective criteria to determine the likelihood of NSO take when assessing THPs. *Note –the lack of 2019 NSO detections and very low detections in 2020 at the Dogwood Project is likely due to substantial habitat alterations in the surroundings that have enabled Barred Owl invasions to either suppress or*

eliminate NSO. Additional habitat removals will only intensify interference competition leading with reasonable certainty to take of individual NSO sites.

- … 57 private-land activity centers had verified NSO status in at least one year between 1989 and 2007; 44 of these sites had supported pairs during at least one year. Of these verified pair sites, 54% declined from pair status to no response, and an additional 23% declined from pair status to a territorial single owl during subsequent protocol surveys. On Forest Service-administered lands, 80% of pair sites did not change status during the same time periods……the strong differences in trends observed on private versus federal lands supports the contention that management on private timberlands is creating habitat conditions that do not support sustained occupancy by NSO. *Note – I confirm that suboptimal habitat conditions are also the result of logging within the Project area and surroundings.*
- Nesting, roosting, and foraging habitat within the 0.5-mile radius must be as contiguous as possible. Minimize fragmentation of foraging habitat as much as possible. *Note – my observation of the GRT Project area indicates the river corridor is all that remains of relatively unfragmented, contiguous habitat and that logging entries proposed in the Dogwood THP would disrupt the few remaining intact areas, leading with reasonable certainty to take. This includes foraging habitat as NSO prey tend to concentrate in riparian areas with contiguous forest canopy (Anthony et al. 2003).*

VII. CONCLUSIONS AND FINDINGS

Based on my site visit, inspection of THP and satellite imagery, and knowledge of NSO habitat, logging treatments proposed in the GRT THP are unsupported by the literature on NSO habitat requirements and thus will cause irreparable harm of NSO at the local and species level. Specifically, minimal no-cut buffers and seasonal restrictions are clearly inadequate to avoid take and would likely lead to further collapse of the NSO population as the Gualala River corridor becomes increasingly permeable (canopy reductions) to Barred Owls and potentially Great Horned Owl depredation of NSO. At least five of the logging units, already are operating below optimal nesting NSO habitat requirements despite statements to the contrary made by GRT during my site visit. I therefore conclude with reasonably certainty that implementation of the Dogwood THP will cause irreparable harm to individual NSO, NSO pairs, and young NSO seeking to reoccupy sites that are otherwise now reaching mature structural conditions and optimal nesting habitat. By enabling Barred Owl encroachment in the river corridor, logging also would likely harm NSO behavior (prevent territory defense via calling), survival of adults and young, and reproduction rates by intensifying competition with Barred Owls and possibly predation by Great Horned Owls.

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EXHIBIT 1

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I am a passionate scientist also serving as a CEO with three decades of expertise in conservation biology, biodiversity, and climate change planning from regional to international. I have >200 scientific publications; extensive public speaking, media and government relations; have founded and directed organizations and governing boards; managed small and large numbers of staff; and stewarded large donors and multi-year gifts. I seek to inspire, support, and communicate effectively in goal-oriented and science-based conservation.

Education (1979-89)

Adelphi University, Garden City, New York
Bachelor's Degree (highest honors) May 1979
Foraging behavior of birds and reptiles in old-fields, Long Island, NY

Wayne State University, Detroit, Michigan
Master's Degree (highest honors) May 1982
Nesting, foraging behavior of yellow warblers in old fields and riparian areas, MI

University of Michigan, Ann Arbor, Michigan
Ph. D (highest honors) June 1986
Effects of forest fragmentation on neotropical migratory songbirds, MI

Post-doc Research Fellowships on Endangered Species: Oregon State University (1986-88), University of Wyoming (1989)

Employment (1993-present)

World Wildlife Fund, Washington, D.C; Director (1993-2006)
Management and staffing for domestic forest program tiered to WWF international programs, including large budgets, donor cultivation, corporate and government funding/relations

Oregon State and Southern Oregon Universities, Adjunct faculty (2008-16)
Course development, student advisor

Geos Institute, Ashland, Oregon; Chief Scientist/President (founder) (2006 – 2020)
Budgeting, staffing/contracting, fund raising, board relations for climate change organization.

Wild Heritage, a project of Earth Island Institute, Berkeley, CA; Chief Scientist, current

Executive Experience (2006-present)

Experienced in all aspects of running and representing organizations

- Office management, media and government relations, board relations, staffing, multi-disciplinary projects, diverse coalitions, budget tracking, grant and contract management.
- Diverse fundraising portfolio - foundations, universities, donors from $1,000 to $1 million, including multi-year gifts.
- Diversity, equity, and inclusivity training and application.

[1]Profiles on LinkedIn and Research Gate; blogs at www.ipfieldnotes.org/author/dominickdellasala/; www.scitechconnect.elsevier.com/author/dominick-dellasala/

Boards, Coalitions, Committees (1998-present)

Committees

- White House Office Science and Technology Policy (1998, appointed by president Clinton)
- International Forest Conservation Chair (WWF, 1995-2000);
- Northern Spotted Owl recovery team (2006-2008, US Fish Wildlife Service)
- Alaska Coastal Rainforest Center (affiliate scientist, 2011-14)
- North Pacific Landscape Conservation Cooperative (Fish & Wildlife Service; 2012-2014)
- Technical reviewer for IPCC (2016)
- Oregon Global Warming Commission Task Force on Forest Carbon (selected by the governor, 2016-2018); Oregon Forest Carbon Stakeholder Group (selected by the governor, 2018-2019).

NGO Boards and Coalitions

- Geos Institute (2006-2020)
- Society for Conservation Biology (elected board president 2004-2012; two-terms)
- *IntAct*: international action for the world's primary forests (current), Forest Carbon Coalition (national/regional conservation groups, science advisor, current).

Editorial boards

- *Imperiled* (2021; co-chief editor, Elsevier); *Encyclopedia of World's Biomes* (2019; co-chief editor, Elsevier); *Encyclopedia of the Anthropocene* (2018; co-chief editor, Elsevier); *Earth Systems and Environmental Sciences* (2017, Elsevier); *Natural Areas Journal* (2008-present); *Conservation Biology* (2012-16); *Diversity* (2015-present).

Leadership, Training, Fellowships (2000-present)

- *Certified as a conservation leader skilled in organization management, financial tracking, diversity/equity/inclusivity training, fundraising, and board relations.*

- *Conservation Leadership Awards*: Wilburforce Foundation and World Wildlife Fund (twice) for national leadership on roadless areas and new national monuments.

- *Choice Magazine Book Publication Award* – Temperate and boreal rainforests of the world (the only award given to an Island Press that year).

- *Fulbright Specialist*. U.S. State Department academic specialist.

- *Griffith University fellowship (delayed by Covid) and University of Melbourne fellowship (delayed by Covid)* for global research on primary forests and postfire landscapes.

- *Training Resources for the Environmental Community and Management Skills for the New Supervisor including Diversity/Equity/Inclusivity (Padgett Thompson).*

- *Certificates in Wetland Delineation (Wetland Training Institute), and US Fish & Wildlife Service Habitat Evaluation Procedures. Previously a registered bird bander.*

Media and Communications (1993-present)

Solid media relations with extensive press (sometimes weekly), including CNN; MSNBC (debates); BBC; High Country News; LA, NY and Seattle Times; Reuters; Science magazine and Science Digest; National Geographic; National Audubon and National Wildlife; NPR and PBS; Jim Lehrer News Hour; local TV, radio; numerous op-eds, blogs, and even Fox News!

Government and International Relations (1993-present)

Expert witness at congressional and State hearings on climate change, forests, wildfire, endangered species, and scientific integrity; legislative briefings on climate change; President Clinton's historic White House roadless signing ceremony; President Clinton and President Obama national monument designations; and several national and state committee appointments. Biodiversity research teams in Australia, Russia, Europe, tropics, North America. Technical reviewer for IPCC.

Science Publications (select 2000-present)

Peer-Reviewed

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EXHIBIT 2

Exhibit 2A. Location of NSO detections and NSO activity centers (yellow) and logging units. Note – level of logging east and west of the river corridor (marked in red).

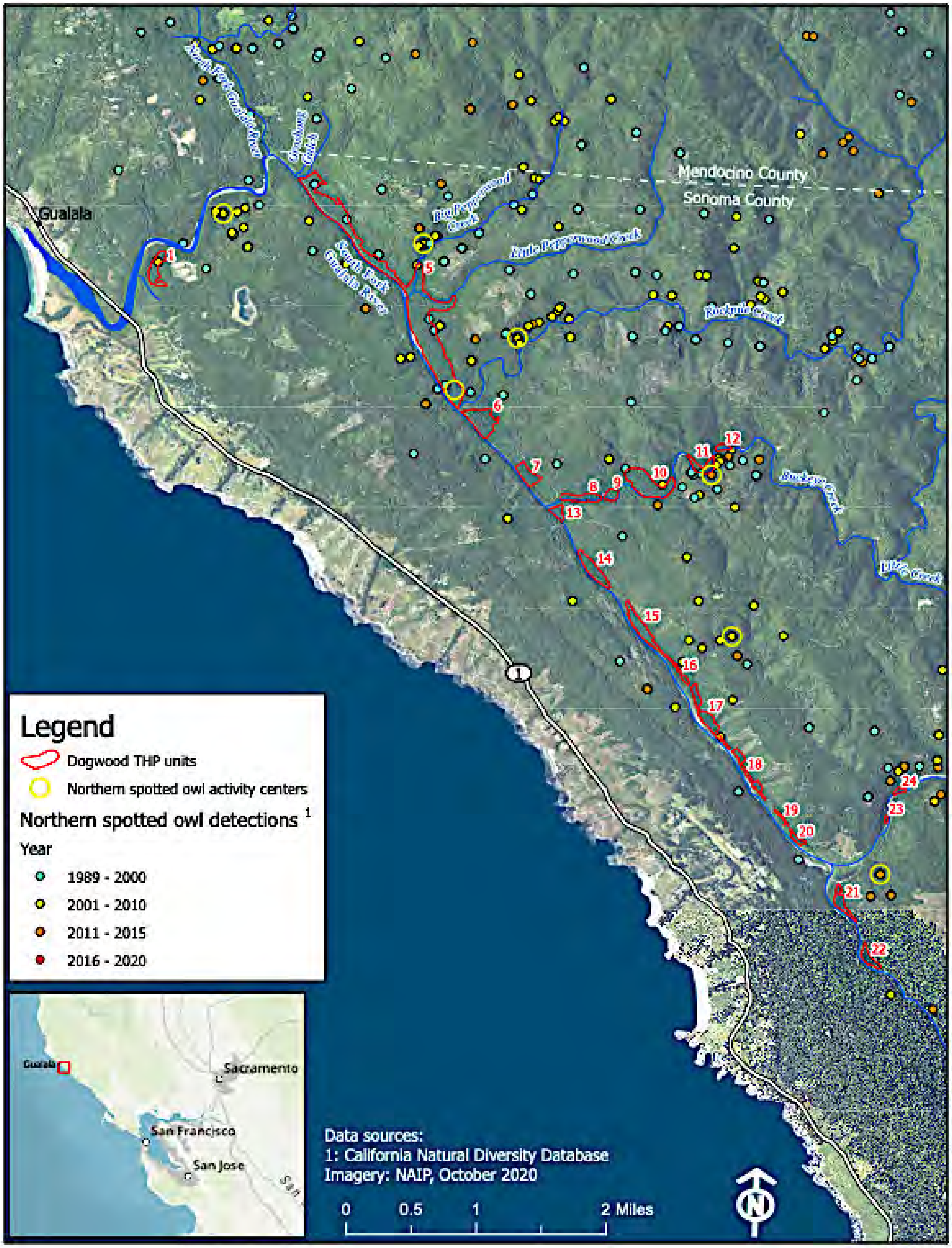

Exhibit 2B. LiDAR canopy cover for the Dogwood Project Area and surroundings. Note the Gualala River Corridor is the only relatively contiguous canopy area remaining.

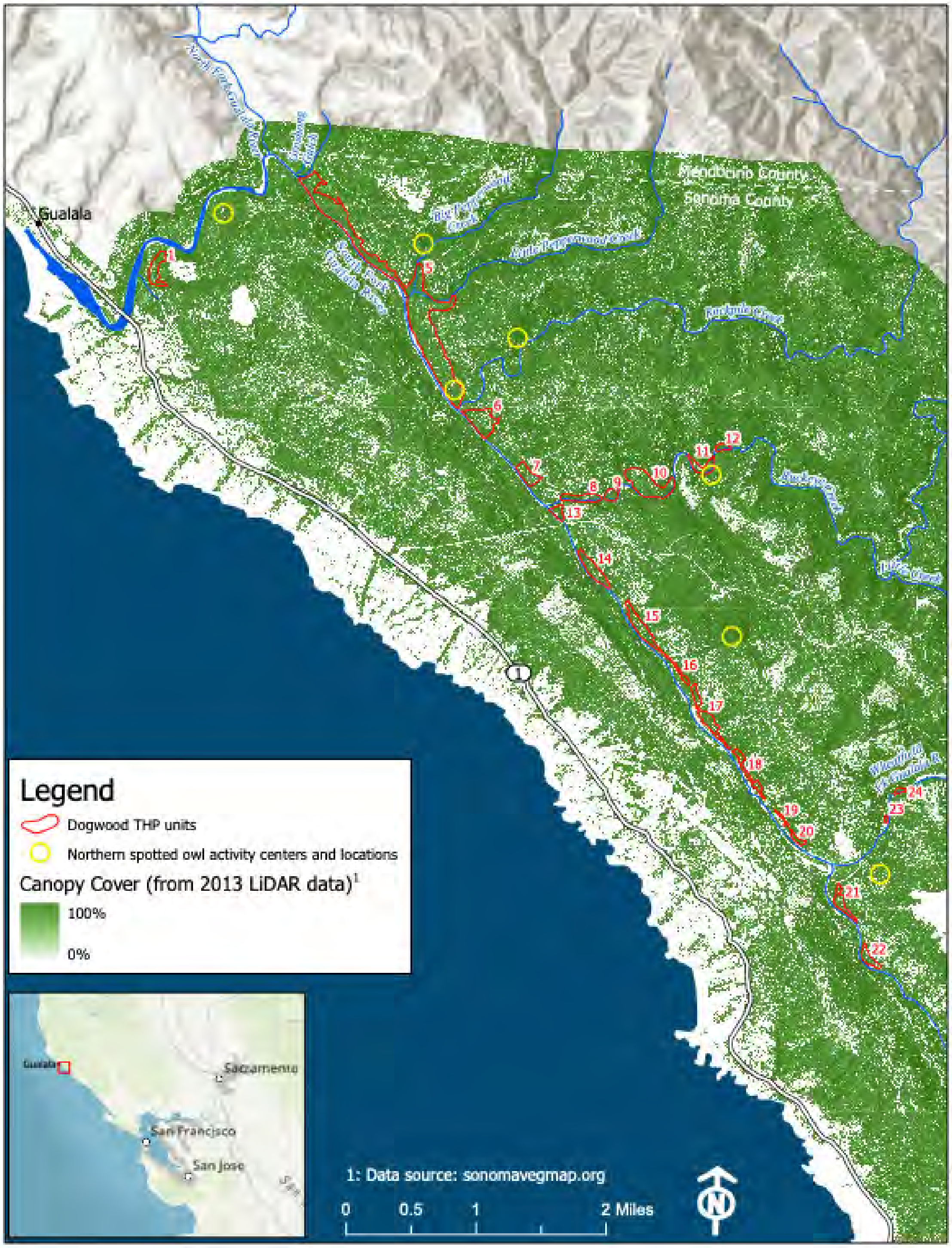

EXHIBIT 3

Methods Used to Calculate Canopy Coverage from Photographs

5/14/2021

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I am a Senior Scientist and Geographic Information Systems ("GIS") specialist at the Center for Biological Diversity, where I have worked for the past 20 years. I hold a Bachelor of Sciences in mechanical engineering and a Master of Sciences in watershed management, both from the University of Arizona. I have training in several GIS software applications and over 22 years of experience in GIS analysis and cartography.

1. Photographic-based Canopy Cover Methods

Dr. Dominick DellaSala provided me with a series of canopy photos from the transects he walked during our April 23rd field visit of the proposed logging units. I was asked to calculate the amount of canopy coverage that was present in each photo. Under the direction of Dr. Chris Frissell, who has experience with this type of classification, and was on the field trip, I performed this task as described herein.

Each of the photos was converted from Adobe Acrobat to .jpg format and the white border was removed using the crop tool in the Windows photo viewer application. I then used the cv2.cvtColor method within the Python Open CV library to convert each of the photographs to greyscale. Python is a programming language commonly used in GIS applications.

Greyscale images consist of individual pixels, each having a value ranging from 0 – 255. The lower the value, the darker the pixel. The objective was to determine the cutoff value between 0 and 255 that classified the darker pixels as vegetation and the lighter pixels as sky. I chose 3 different cutoff values of 175, 200, and 225 to apply to the photographs in Unit 1 as a proof of concept experiment. I applied these values to the greyscale images using the cv2.threshold method in the Python Open CV library to produce a series of photos where all pixels were either black or white with black pixels representing vegetation and white pixels representing sky. I sent these classified images to Dr. Frissell and his opinion was that the 200 cutoff value was the most optimal to use in this effort.

I classified the images from the 6 units that Dr. DellaSala transected using the 200-cutoff value. I automated the process using Python and, after revieing the classified images, I found that there were 13 that were not classified correctly due to sun directly hitting the camera or clouds causing a sharp contrast in the sky. For these images, I applied lower threshold values of either 150 or 175 to correct.

I then calculated the percent canopy coverage for each classified image by determining the number of black pixels and dividing by the total number of pixels using the NumPy library in Python. The mean, minimum, and maximum of these values was reported for each transect.

2. LiDAR-based Canopy Cover Methods

I downloaded the "LiDAR Derived Rasters" datasets for the watersheds in the Project area from Sonoma County's website (http://sonomavegmap.org/data-downloads/). LiDAR data collected in late 2013 and provided by the University of Maryland and the Sonoma County Vegetation Mapping and LiDAR Program under grant from NASA's Carbon Monitoring System are available for unrestricted public use.

The Canopy Density datasets were clipped to the logging unit boundaries. Each 3-foot x 3-foot pixel within the logging units represented a value (0 – 1) of canopy cover. I calculated the mean value of all the cells within each logging unit and reported them in a table of average canopy cover per unit. Several of these units indicate canopy coverage before logging operations because these data were collected in 2013.

Averages	n	Photo Mean % CC	Photo Min % CC	Photo Max % CC	LiDAR (2013) Mean % CC	Photo - LiDAR		
Unit1	28	80.72	65.34	93.81	81.97	-1.26	ave photo-lidar lo	-10.67
Unit8	25	75.08	67.07	81.32	87.19	-12.11	ave photo-lidar ur	-0.29
Unit9	41	72.28	60.13	80.39	86.18	-13.90	Difference	-10.38
Unit10	32	74.41	62.01	94.29	80.41	-6.00		
Unit17	29	82.15	73.42	93.02	80.96	1.19		
Unit21	10	79.59	74.41	89.96	80.41	-0.81		

EXHIBIT 4

Exhibit 4 – Large trees within the Dogwood Project Area during site visit of April 23, 2021 (D. DellaSala).

EXHIBIT 5

Exhibit 5. Photos of large trees (panels a-d) marked for logging in Unit 1 of the Gualala THP project area. Note – retaining trees up to the 13th largest one on site is a misleading take-avoidance guideline given that some of the units like this one have very large trees so retaining up to the 13th largest and removing other large trees will degrade habitat structure and lower canopy coverage. Photo: D. DellaSala, April 23, 2021.

5A

5B

5C

5D

EXHIBIT 6

Exhibit 6. Large tree removals proposed for Unit 17 (a) and Unit 21 (b). As noted, removing these large trees will degrade habitat structure and open forest canopies.

6A

6B