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## Comments on Terra-Gen Monument Ridge Wind Farm DEIR

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Following are comments, made on behalf of Siskiyou Land Conservancy and myself, on the Draft Environmental Impact Report for Terra-Gen's proposed Monument Ridge wind farm.

Thank you,

/s/ Ken Miller, MD

## INTRODUCTION

The Draft Environmental Impact Report for Terra-Gen's proposed wind project on Bear and Monument Ridges, in Humboldt County, relies on what has become known in legal circles as the "Right to Lie." Throughout the DEIR—whether misrepresenting the content of referenced studies, intentionally minimizing and omitting significant impacts or risks, or inventing novel models and clothing them in pseudo-scientific garble buried in relentless verbiage posing as relevant information—we see the company is basing nearly its entire document on this "right to lie."

My submissions to this DEIR are intended to expose how this DEIR deceives, misrepresents, and omits information in ways that pose enormous consequences, and risks. The most immediate of these is the **wildfire threat** posed by this windmill power plant, an issue not even specified in 1.2, 1-2 under Scope. Below I have provided information, as this DEIR has not, about how these windmills can warm and dry large downwind areas of vegetation, and how the turbines themselves as well as the transmission lines pose significant fire hazards.

Just imagine a nacelle malfunction that ignites the hundreds of gallons of lubricating oils required for *each* windmill (amounts that are undisclosed in this DEIR) and other flammable components, at over 3000 feet elevation, at night, and then spreading to surrounding grasslands, forests, and human populations. In recent years California has already seen the unprecedented disasters caused by malfunctioning grid power systems. What Terra-Gen is proposing could foment a disaster of equal or greater proportions.

The so-called Noerr-Pennington immunity from prosecution for lying in these proceedings is not absolute. When deception is intentionally designed to abort or prevent a process from proceeding legally, it is called "extrinsic fraud," and is illegal. If pertinent information is intentionally withheld in order to facilitate the proponents' financial goals at the expense both of due process (recirculation of the DEIR, requirement for an EIS) and the public interest, then this is illegal.

Unfortunately, deceit within the DEIR is protected speech, requiring diligent investigation of all claims, a task beyond most readers' capacity. For instance, using the DEIR's own misrepresented references, I have shown how a reduction in corvids cannot be relied upon to "create" 103 marbled murrelet adults, except in an invented model. And I have called out the proponents' amortization of greenhouse gas (GHG) emissions as deceptive, among many other examples.

My over-riding question is this: Will the County exercise the kind of diligence that I, a concerned and unpaid citizen, have, because I have learned from the prior colonizing exploiter of our precious resources, Maxxam, about the "Right to Lie," and what to look out for?

Fortunately, in this case, it is immediately obvious that this is the worst possible site for industrial windmills, and that to disguise the unmitigable cumulative environmental impacts of this proposal has and will continue to require a Herculean effort on all fronts

by ruthless actors with very deep pockets. At the very least, recirculation of this DEIR to provide the public access to a more complete and accurate document is mandatory considering the scale of the project, the extent of deferred mitigations, the resources at stake, and the fact that this is a first of potentially many other windmill projects in this region. Additionally, and importantly, an EIS should be initiated to ensure consistency with Pacific Lumber's HCP, as Shell Wind did in December 1999 when it applied to create an HCP for a proposed Bear River Ridge project.

(<https://www.fws.gov/policy/library/2009/E9-30340.html>)

As it is, very few members of the public are aware of these issues because there have been only two scoping meetings, one in Scotia, and one in Eureka, in August of 2018. A 54-day review period for this voluminous, incomplete and tortuous document amounts to an abuse of discretion by the Lead Agency. Efforts to thwart public understanding in the interests of the proponents' financial goals are likewise an abuse of discretion.

### **The Legal "Right to Lie" Was Affirmed in These Very Watersheds**

In 2003, the Humboldt County District Attorney sued Maxxam Corporation for fraudulently misrepresenting the extensive mass wasting in Jordan Creek comparable to that found in neighboring Bear Creek. The issue was whether Pacific Lumber's (PL) proposed HCP mass wasting avoidance strategy would protect these same fragile watersheds, Jordan and Bear Creeks, from their projected logging plans. Dr. Leslie Reid, then with the federal Redwood Sciences Lab at HSU, had demonstrated that PL's HCP would not protect Bear Creek.

PL's consultant, Pacific Watershed Associates, then submitted a "draft" geologic report that concluded that the HCP was protective of Jordan Creek. Dr. Reid understood that this was not accurate, as did we all who were acquainted with this relatively small watershed's logging history, aerial photos and geologic reports, similar to Bear Creek. When PL submitted the "final" Jordan Creek Report just days before the deadline for approval of the FEIS/FEIR, they did so in a way that the public could not know or see it.

PL submitted the "real" Jordan Creek report to John Marshall at the old California Department of Forestry (CDF), who, innocently or otherwise, put it in his drawer. Dr. Reid obtained it because she persistently inquired at CDF Fortuna until she finally got the report. As in Bear Creek, and as expected, the PL HCP was not sufficiently protective of mass wasting in Jordan Creek either, but by then it was too late to stop the approval of the FEIS/FEIR, based on what became known as the "False Jordan Creek Report."

Richard Wilson, who was in charge of the Department of Forestry at the time, gave testimony to DAs Gallegos and Stoen that had he known in time, he would have forced re-circulation of the FEIS/FEIR. The Headwaters Forest acquisition rested on signing the deal by March 1, 1999. Re-circulation would have made meeting that deadline impossible, hence the "Jordan Creek Scam."

In court against PL/Maxxam's high-powered lawyers, and with no support from our Supervisors, DA Gallegos lost at the Appellate level on the established legal theory

derived from the US Supreme Court decisions in the Noerr-Pennington cases of 1961 & 1965. This decision has become known as “The Right to Lie” in proceedings such as a DEIS/DEIR, based on our First Amendment Freedom of Speech in petitioning the government. The theory is that the decision-making bodies and concerned public, aware of the potential for misinformation and deceit, will exercise corresponding diligence in ferreting out the truth. Complementary state law is encoded at 47(b).

The proponents are fast-tracking this proposal in order to take advantage of a federal tax loophole that expires on 12/31/2019 in this case (although considerable tax benefits are available through 2021). Such fast-tracking is similar to the Maxxam deadlines around the Headwater’s Deal. It is striking, and critical to consider, that both issues involve habitat impacts in the same watersheds namely Jordan and Bear Creeks.

### **The DEIR was not Prepared by the County**

The cover page of the DEIR attributes the preparation of the document to Humboldt County Planning and Building Department, but refers interested parties to Petra Unger at AECOM in Sacramento. That’s because this DEIR was prepared by a team of professionals paid by Terra-Gen and their partners who are skilled at disguising impacts and inventing mitigations which appear scientifically sound until investigated.

This union of government and petitioner in an administrative process that falls somewhere on the spectrum from quasi-legislative to quasi-judicial poses serious conflict of interest questions. Government is supposed to “ferret out” the relevant discrepancies in the DEIR relying on public and government agency comments, as well other sources, in order to protect the publics’ interests.

### **Summary**

1. The Purpose & need-Objectives- is too narrowly defined.
2. Environmentally superior alternatives exist, both in Humboldt County and elsewhere, but are not included.
3. Re-powering older WTGs elsewhere accomplishes the admirable goal of providing renewable energy to the grid.
4. Tax benefits, not concern for the County’s overall welfare, are truncating the DEIR process.
5. The identity of Stantec, Terra-Gen and Energy Capital Partners is hidden behind “mom and pop” inferences.
6. Stantec has a history of dishonest dealings.
7. Marbled Murrelet surveys should be two years, not one.
8. Stantec’s murrelet survey protocols are designed for timber sales, not WTG’s.
9. Terra-Gen (TG) monitored for wind sites since 2017, but not wildlife.
10. The lack of murrelet population data makes detection rates indecipherable with respect to impacts.
11. Zone 4 marine surveys are due in 2019 and should be included in TG’s evaluation of this site.

12. Multiple daily flights of breeding pairs were never detected or considered.
13. The contribution of this project to the extinction risk of the murrelet is not defined.
14. The interference with HRC's HCP protections and guarantees is not defined.
15. Climate change impacts to the murrelets are inadequately defined.
16. The collision risk models require impossibly precise inputs and are therefore unreliable.
17. All modeling is hypothetical/theoretical because there has never been a wind factory in murrelet habitat.
18. The Marbled Murrelet Mitigation Plan is deferred, but what is presented is seriously flawed.
19. Modeling in the compensatory mitigations is novel, untested, and without peer review.
20. References in the murrelet section are misrepresented, any effect on corvid predations will be negated by reptiles and mammals.
21. Secondary mitigations (thinning on public lands) relies on third parties, takes centuries.
22. Effects of extracting energy from wind are absent.
23. WildFire risks and consequences are inadequately portrayed and omitted, and the financing plan deferred.
24. GHG emission benefits are exaggerated by amortization and confusing calculations.
25. GHG emissions and carbon sequestration losses from logging, ground disturbance, and clearing are absent.
26. Financial responsibility for the Bridgeville to PGE tie-in is never explicit, but the clear intention is for ratepayers to foot the bill.
27. Decay of energy production from ageing WGTs is never discussed.
28. Human health effects are never discussed, and visual impacts played down.
29. Shadow flickering absent from discussion.
30. Conclusion: Wrong site.

## **ES.2 Project Objectives**

The Project is so narrow as to preclude any other alternative, besides moving wind-generating turbines around, the "Titanic" maneuver. This leaves only the "No Project Alternative," when there are other potential Alternative sites in Humboldt County and elsewhere that could attain most of the Objectives but with far fewer impacts to the human and non-human environment.

### **The Environmentally Superior Alternative:**

Kevin Martin of Terra-Gen announced publicly in Ferndale that TG re-powers old worn-out turbines, often substituting a few more efficient turbines for many older ones.

**Have you analyzed the potential for meeting your primary Objectives by re-powering derelict turbines with modern turbines in windmill complexes where the infrastructure is already in place, and the customers are nearby?**

## **Have you mapped availability of transmission capacity in these complexes that can accommodate updated turbines?**

Since HumWind electricity serves the grid, Humboldt County can buy wind-generated power from anywhere, and any increased transmission and electricity costs would be offset by the absence of impacts to this ecosystem.

This alternative meets the substantial goals of the Objectives, except the following two, and avoids all the impacts:

"► Develop a wind energy project that can meet the criteria to achieve the maximum federal tax credit requiring placement into operation by December 30, 2020, which is intended to decrease the cost of renewable energy generation and delivery, promote the diversity of energy supply, and decrease the dependence of the United States on foreign energy supplies."

*Their maximum federal tax credit (but not most of the tax benefits) and our increased tax revenue would be lost, but the DEIR does not evaluate the tax benefits accruing to re-powering old turbine sites, and the benefits to the County of not enduring the impacts from the project.*

"► Develop a wind energy facility in Humboldt County that supports the economy by creating short- and long- term employment opportunities and increasing tax revenue."

*The 15 permanent jobs will be imported specialists, and the short-term jobs would be primarily associated with creating all the adverse impacts establishing the infrastructure.*

### **Re-Powering**

See attached list of current and proposed Terra Gen wind power projects. They list 447MW of WTG capacity that ranges from 34-11 years old, and 198MW 30 years or older. (Building a Sustainable Tomorrow, <https://www.terra-gen.com/wind>)

### **Ramifications of the Tax Benefits**

The tax benefits to the proponent are most generous, but levy a monstrous toll on our environment, rush what should be a deliberative project, and extract "by far the most expensive energy subsidy under current tax law." "The U.S. Treasury estimates that the PTC will cost taxpayers \$40.12 billion in the period from 2018 to 2027." (MasterResource, A Free Market Energy Blog)

Terra-Gen's company rep Vajdos said earlier last year that: "The project needs to move quickly in order to work financially." Hence, they are attempting to shoehorn one-years' worth of wildlife surveys, including of marbled murrelets (see below) into one year, even though they would still be eligible for the Investment Tax Credit until 2020, and accelerated ("bonus") depreciation until 2021. (Marbled murrelets are protected under the state and federal Endangered Species Act.) This would assure Terra-Gen and its owner,

Energy Capital Partners, a hefty and speedy return on their investment within five years, irrespective of the performance of the power plant.

Without these tax breaks, no company would consider this rich habitat as a windmill site: "...the concept of optimizing energy sources to physiographic regions really gets trashed when tax laws and State (and County) mandates bully their way into the mix." James Conca, "Wind Energy Of No Use In The Pacific Northwest," Forbes 2014

### **Stantec And Energy Capital Partners, Owners Of Terra-Gen, Are Global Fossil Fuel Developers**

Another ploy to gain entrance to our county, aside from our cultural history of colonizing exploiters of our resources (eg Maxxam), has been to characterize Stantec, the company charged with wildlife surveys, as a "science company," (Ferndale meeting), when in fact it is a multinational corporation involved in all aspects of the fossil fuel market, include tar sands and shale oil (fracking), pipelines, and transmission lines, with a problematic history of distorting wildlife surveying to benefit their clients over the wildlife.

- Excerpts regarding the integrity of Stantec from the testimony of an expert reviewer of the Atlantic Wind LLC for Construction of the North Ridge Wind Energy Project in the Towns of Parishville and Hopkinton, St. Lawrence County, James Wiegand June 2017 (the project was denied), attached as "NY Wind Project":

- "The studies proposed by Stantec are flawed and will never be able to fairly evaluate or analyze the potential environmental impacts from this project." (p17)

- "Stantec has a history of conducting nonscientific research." (p18)

- "I have yet to read a single wind industry related study or survey conducted by Stantec, that I consider credible."(p35)

Terra-Gen is owned by Energy Capital partners, a venture capitalist, mega-conglomerate corporation also involved in everything from coal mining to fracking, liquefied natural gas, as well as the barging and hauling equipment unique to giant WGT installations.

Terra-Gen's Chief Financial Officer, John O'Connor, was an auditor for the discredited Arthur Andersen firm during the Enron scandal. <https://www.terra-gen.com/team>

"Prior to joining Terra-Gen in 2009, Mr. O'Connor worked for the audit division of Arthur Andersen. ... Andersen auditors reviewed and approved of transactions by Enron-related partnerships that contributed to the company's collapse."

"AA consulted with its senior technical experts in its Chicago office regarding the technical accounting treatment" involving deals with the partnerships.

<https://www.nytimes.com/2002/01/16/business/enron-s-collapse-overview-arthur-andersen-fires-executive-for-enron-orders.html>

## **MARBLED MURRELET SURVEYS, POPULATION, MODELING & MITIGATIONS**

In a hearing before the State Of New Hampshire Site Evaluation Committee, November 1, 2012, Adam Gravel, Managing Leader of Stantec's Topsham, Maine office testified, in pertinent part:

“Because, having the experience that I have that you just so noted, you can't, and I've said this for the past three projects as well, ***that you can't correlate pre-construction surveys with post-construction mortality.***” (pg 21, lines 17-21)

( <https://www.nhsec.nh.gov/projects/2012-01/documents/121101minutes201201am.pdf>)

### **Inadequate Marbled Murrelet Surveys**

Stantec, Terra-Gen and HT Harvey murrelet surveys and data analyses are inadequate for the following reasons:

- Despite all the verbiage designed to distract from the glaring deficiencies, especially the two-year survey recommendation (“*It is important to note that the data from this first breeding season exceeds the quantity of effort for other CRMs for murrelets.*” see Appx O, 4.O-17), these one season surveys and their analyses violate the consensus on best practices.
- Stantec’s surveys correspond to those for timber sales. There has never been a wind power facility in the range of the marbled murrelet, or this type of habitat. Surveys designed for timber sales are not appropriate to determine windmill siting. There are no peer-reviewed protocols for such siting in this type habitat.
- Ironically, the proponents engaged in monitoring to determine best sites for their windmills since 2017, but only monitored for murrelets beginning in 2018: “Long-term monitoring by ground-based equipment—meteorological towers, sonic detectors, and remote sensing units—has occurred at the project site since 2017 to identify the areas best suited for wind energy generation.” (fn 1, 2-4)
- According to their survey data, Stantec only surveyed one murrelet breeding season, 2-5X per month, averaging about 3x/month over 6 months, approximately 10 morning and evening surveys, with only 5 mid-day surveys, and no April surveys on the important Bear River Ridge flyway. (4.2 Table 2)
- Stantec conducted very few total surveys for very limited times, and consequently detected very few murrelets.
- Tables 3,4,5,6 of Appendix N reveals that over six months, surveys were conducted only on average three times a month, with a range of two-five times. Perhaps their use of



generators to power the radar stations repelled all but the paid operators: “The stationary systems were powered by a 1000-watt generator.” AppxN pg 6

- In any case, despite padding the DEIR with exaggerated comparisons to prior surveys, which themselves were deficient, their results cannot be considered reliable given that there is no population data to quantify the pool of potential birds (see below), and current observations of murrelet feeding and chick-rearing behavior establish multiple trips daily, not confined to morning and evenings. Five mid-day surveys turned up no birds.

- Underscoring the clear bankruptcy of their entire survey efforts is this admission: “We recorded two visual confirmations of murrelets during the radar sampling; one of two murrelets and the other of a single murrelet.” Appx N 5.2-10

Two visual siting’s over 6 months of surveys!

- In 2017, the last marine population survey date, our Zone 4 N Ca population was estimated at 8574 total murrelets, 6111 birds (Stratum 1), (1863 in Stratum 2) (McIver et al 2018 Northwest Forest Plan Interagency Regional Monitoring Program Summary Report Table 3, page 15).

- Marine surveys for our Zone 4 are due in 2019, after which re-circulation of an updated DEIR containing this vital data would be the most protective process.

- Stantec documented 136 murrelets (Table 4, Appendix A) total during their one season of surveying, approximately 7% of the 2017 estimated population of stratum 2, or 1.6% of Zone 4 murrelet population.

These documented flights would include those breeding pairs making up to eight flights daily. The DEIR is silent on this dismal ratio of probable flights compared to detected ones. This omission alone should disqualify their entire effort from serious consideration.

- Inaccurate assumptions play a role in their scant survey results: “During incubation, each adult murrelet alternates between nest attendance, and making a single transit between land and sea each morning around sunrise (45 minutes prior to and 75 minutes following sunrise) (Evans Mack et al. 2003).” N, 3.0-3

As reported by Dr Kim Nelson: “In addition, murrelets visit inland sites at all time of year except during fall molt (Naslund 1993, Nelson 1997). Some fall and winter surveys should be conducted to determine the accurate number of possible fatalities/per turbine. Murrelets also visit their nests and nesting stands at night and up to nine times per day during chick provisioning (Nelson 1997, P. Jones, unpublished data). Although visits are limited at night compared to at dawn, different weather, temperature and other factors may affect murrelet flight patterns and height at night. Surveys should be conducted at night and during the day to get an accurate count of the number of murrelets that pass through the development area each day.” pg2

(S. Kim Nelson to Gary Falxa U.S. Fish and Wildlife Service (USFWS) Arcata Fish and Wildlife Office 1655 Heindon Road Arcata, CA 95521, 6 May 2011)

•The DEIR continues to rely on murrelet observations that have long been refuted or corrected, in a report authored by a paid consultant to this Terra-Gen project (Golightly): “After the chick hatches, murrelets continue to make this early morning transit each day to deliver a fish to their chick and they often embark on an additional flight to feed chicks in the evening around sunset (with the average flight occurring 23 minutes before sunset)” (*Hébert and Golightly 2006*).Appx N 3.0-3

Contradicting this from “Feeding Frequency, Behavior, and Prey Species:”

“Adults return to feed young up to eight times daily ( $x = 3.2$ ,  $s.e. = 0.4$ ,  $n = 10$  nests) (Hamer and Cummins 1991; Hirsch and others 1981; P. Jones, pers. comm.; Kerns, pers. comm.; Nelson and Peck, in press; Simons 1980; S.W. Singer, pers. comm.) (*table 5*). Ecology & Conservation of MaMU, Nelson & Hamer, “Nesting Biology and Behavior, Ch 5, pg 61, USDA Forest Service Gen. Tech. Rep. PSW-152. 1995.”

•The DEIR mistakenly shortens the outer limit of murrelet gestation: “In Oregon and northern California egg laying generally begins between mid-April and June, depending on variation in ocean conditions, and incubation lasts for 28 to 30 days.” N, 3.0, pg 3

However, we have long known differently:

“Data from radio-telemetry demonstrates that murrelets provision chicks for 28-40 days, not just 28 days.”

(Hébert and Golightly 2006, Nelson et al. 2010). S. Kim Nelson to Gary Falxa U.S. Fish and Wildlife Service (USFWS) Arcata Fish and Wildlife Office 1655 Heindon Road Arcata, CA 95521

•Dr. Nelson’s criticism of the Shell Wind protocols remains applicable here: “The methods in the PSG survey protocol (Evans-Mack et al. 2003) call for surveying birds from 45 minutes before to 75 minutes after official sunrise. Many murrelets are detected after official sunrise flying into and out of inland sites, and murrelets feed their chicks at all times of the day, making multiple trips to and from the ocean (Nelson 1997, McShane et al. 2004). Non-breeders also visit occupied sites at various times during the morning and evening.” pg3, (Letter 6 May 2011)

And: “Surveys were not conducted throughout the breeding season, throughout the year, at night, during variable weather conditions, and enough times per year to be sufficient to accurately, reliably, and precisely gauge the number of possible fatalities/per turbine/year. It appears that the authors followed the general Pacific Seabird Group (PSG) survey protocol for timber sales (Evans-Mack et al. 2003), which is not applicable to wind energy developments.” Pg 1 (6 May 2011 Nelson)

••Dr Nelson’s 2011 critique continues to be relevant to this Project: “All weather conditions should be surveyed and assessed to determine the likelihood of murrelets flying at the heights of the proposed turbines.” 2 (2011 Nelson)

And Dr. Nelson categorically refutes Stanec's primary basis underlying their surveying protocols: "However, I disagree with the statement that "nearly all murrelets fly into nesting stands well before sunrise". This is simply not true."<sup>3</sup> (ibid 2011)

Dr Nelson's concerns are as applicable to Stantec's methodology as it was to Shell Wind's: "A minimal amount of time was spent in the field to collect the data used in the model and there appeared to be no effort expended to attempt to address the many unknowns about murrelets and wind turbine interactions. Instead, a lot of effort was expended to create adjustment factors and discussion of other factors that could have been addressed in the model, when Shell Wind energy should have paid for the appropriate, thorough surveys to be conducted in the first place. (5 ibid)

**•Two-year surveys are the minimal standard:**

•"Thus, intensive surveys should be conducted for at least two consecutive years."  
(Methods for surveying marbled murrelets in forests: a revised protocol for land management and research)

•The DEIR itself acknowledges that two years of murrelet surveys are the minimum to establish reliable data: "Generally, for marbled murrelet CRMs, only two years of information is used to assess variation in passage rate."  
"A statistical analysis will await a better sample of transiting birds next year." •4.1-18

•Dr Nelson notes that: "Data on the number of murrelets passing through the project area are easily collected over a two year time frame given appropriate intensive surveys, which should be required at each wind turbine development site."<sup>3</sup> (2011 Nelson to Falxa)

•The USFWS recommends two years of surveys:" We also recommended a minimum of 2 years of radar surveys for marbled murrelets (*Brachyramphus marmoratus*; murrelet)...” page 2 AFWO-18B0029-18TA011

•In their comments to this project, the USFWS agrees:  
"We recommend a minimum of 2 years of site-specific radar data to determine whether murrelets use or traverse the proposed project sites. “ pg 3

•And citing Sanzenbacher, et al, Marine Ornithology 42:169-174: "The 2-year timeline for construction and operation of the wind project seems optimistic because of the number of years needed for surveys, the species impact modeling effort that will need to be completed post-survey, the uncertainty around a Federal nexus for turbine operation, and need for National Environmental Policy Act/California Environmental Quality Act compliance." 5-6

•CDFW also stipulates two years of surveys (Curt Babcock, HCP Program manager, page 2, CDFW 2/9/18, Pre-consultation comments)

- The only conclusion that can be reached from these radar surveys is that they are inadequate, inconclusive, and certainly should not, as warned by Dr Kim Nelson, of the PSG and NWF monitoring group, establish them as accepted protocols to determine murrelet passage rate data: “Is this setting a precedent for how modeling efforts associated with wind energy will be conducted? Will everyone continue to use speculation and assumptions to create models?” Pg 5 (Nelson 2011)

### **Murrelet Population**

- As noted in Survey discussion, there is no murrelet population information in this DEIR, so the public is deprived of this vital context within which to judge the impacts to a California listed endangered species that is at extreme risk of extirpation.

- However the DEIR offers a qualitative narrative that reflects the tenuous existence of the murrelet: “The marbled murrelet is federally listed as threatened and state listed as endangered because of population declines caused by loss of old-growth habitat from timber harvest, fires, and windthrow throughout the Pacific Northwest (USFWS 1997).

- ”The marbled murrelet’s highly specific habitat nesting requirements and life history strategy, the vulnerability of nests to predators in highly fragmented landscapes, and low fecundity result in slow population growth. The marbled murrelet population’s growth rate is sensitive to changes in adult survivorship (USFWS 1997), so the potential for the loss of up to 20.86 or more marbled murrelets over the 30-year life of the project could have population-level effects. This impact would be **potentially significant.**” 3.5-77

- Since 1993, there’s been a 20% decline mostly due to logging on private lands. (PSG)

- 90% of their original population is gone, with a 30% decline from 2000-2010, which continues at 4-7% annually. HRC’s HCP detections into Headwaters Forest have declined between 2002 and 2015 (HCP).

- California’s populations were federally listed as endangered in 1991, and Oregon just up-listed their populations to endangered recently. (see ODFW)

- At this rate, Murrelets are heading toward extinction within 30-50 years.

- We taxpayers paid over a half billion 1999 dollars to protect the murrelets’ OG habitat with HRC’s inherited HCP, which is now jeopardized by this Project. Federal consistency is required here to ensure a worried public that these protections are not jeopardized by this project, which should require an Environmental Impact Statement.

- Although Humboldt Redwood Co. is a principal beneficiary of this windmill project, opening the HCP’s effectiveness at stemming the decline of special status species to scrutiny may prove too risky, and would therefore likely be opposed by the proponents and beneficiaries.

- There is consensus that marine, and not terrestrial surveys, approximate population levels, although land-sea surveys are recommended, since marine occupation appears, understandably, to reflect the obligatory association with inland nesting habitat.

- Radar surveys alone are inadequate to estimate murrelet population: “There was no significant relationship between radar accounts and at-sea counts or productivity of murrelets in the nearby San Juan Islands during the study.” (Abstract)(Burger, A. E., et al, 2004. “Application of radar surveys in the management of nesting habitat of Marbled Murrelets” *Brachyramphus marmoratus*. Marine Ornithology. 32: 1-11. )

- Zone 4 surveys will not be conducted until 2019, at which time our local population will be quantified. The County should delay issuing a FEIR until our local murrelet population has been surveyed at sea. (Marbled Murrelet Effectiveness Monitoring, Northwest Forest Plan 2018 Summary Report Northwest Forest Plan Interagency Regional Monitoring Program, April 2019, pg 3)

- “Marine surveys remain the only method for estimating the size of Marbled Murrelet populations.” Ecology and Conservation of the MaMu 2/95 pg 4

- “Population monitoring is based on estimates of the at-sea murrelet population, for the coastal waters adjacent to the area included in the Plan.” (pg 1 DRAFT Northwest Forest Plan Interagency Regional Monitoring, 20 Year Report Status and Trend of Marbled Murrelet Populations and Habitat )

- HRC’s HCP reiterates this important disconnect between terrestrial and ocean surveys with respect to population estimates:

*“At this point, inland surveys are not, by themselves, thought to monitor marbled murrelet numbers effectively enough to allow estimates of population trends (Madsen et al. 1997).” (P29)*

- Population is declining and at risk of near-term extinction**

- “Given the status of murrelets (USFWS 1992) and known population declines (McShane et al. 2004, Falxa et al. 2010)”

- “We document here a decline of nearly 30% in the Marbled Murrelet (*Brachyramphus marmoratus*) population of Washington, Oregon, and northern California between 2000 and 2010.” (Recent population decline of the Marbled Murrelet in the Pacific Northwest **Sherri L. Miller**; et al 2012)Abstract

- The Center for Biological Diversity summarizes the dire history and projected future of the endangered marbled murrelet:

“POPULATION TREND: Historical estimates indicate that at least 60,000 marbled murrelets were once found along the coast of California. With the decimation and fragmentation of coastal old-growth forests, these birds have likely suffered a 90-percent reduction in numbers. In 1997, the U.S. Fish and Wildlife Service estimated that the

marbled murrelet population in the Pacific Northwest was declining by 4 to 7 percent each year. More recent demographic models indicate that populations in Washington, Oregon, and California could be extinct within the next 50 years. Populations in British Columbia and Alaska, while more numerous, have declined by at least 70 percent over the past 25 years.” ([https://www.biologicaldiversity.org/species/birds/marbled\\_murrelet/](https://www.biologicaldiversity.org/species/birds/marbled_murrelet/))

### **Climate Change Effects on Terrestrial and Marine Habitat**

- The Oregon Department of Fish and Wildlife uplisting of the marbled murrelet from threatened to endangered identified multiple stressors:
  - “While natural disturbances have always shaped Oregon forests, climate change is expected to increase potential for habitat loss from catastrophic wildfires, insect infestations, disease outbreaks, and severe storms, and to exacerbate conditions unfavorable to murrelets in the marine environment.” iii, Marbled Murrelet Status Review, Jan 2018
  - “While there will undoubtedly be species “winners” and “losers” in the context of climate change, there are currently few indications that Marbled Murrelets south of Canada will see benefits from a warming climate (USFWS 2009).”
  - “Rather, best available information signals increasing stressors and threats unfavorable to the species. “...Marbled Murrelets may not be as resilient as some other species to changing conditions. A recent assessment by Case (2014) described the Marbled Murrelet as highly sensitive to climate change; *of the 114 Pacific Northwest bird species analyzed, the Marbled Murrelet had the highest climate-sensitivity score.*” 60 (“Status Review of the Marbled Murrelet (*Brachyramphus marmoratus*) in Oregon and Evaluation of Criteria to Reclassify the Species from Threatened to Endangered under the Oregon Endangered Species Act,” Jan 2018)
  - “In addition, large-scale ecosystem drivers like the recent Pacific marine heatwave (Di Lorenzo and Mantua 2016) can result in severe disruption of energy transfer from lower trophic levels to predators (Biela *et al.* 2019) and can result in population level effects to seabirds (Jones *et al.* 2018).” PSG
- The US FWS marbled Murrelet recovery plan, September 1997, sounded the alarm over 20 years ago:

“Finally in considering the biological profile of the marbled murrelet that summarized above we have concluded that the next 50 years will be the most critical for marbled murrelet conservation efforts. Most younger forest habitat will not become available for nesting marble murrelets until after the year 2040” (USDA et al 1993)10
- ”The key method to stop population decline and encourage future increase in population growth is to stabilize and increase habitat quality and quantity on land and sea.”p112

•“It is necessary to produce and maintain well distributed populations in these zones because of the murrelet’s vulnerability to environmental fluctuations and catastrophes and because of the species slow reproductive rate which inhibits its ability to rebound from adverse impacts.”p116

**•Dr. Nelson warns: “We can not afford to lose any birds, especially breeding adults, as populations are already stressed by a variety of anthropogenic factors including habitat loss, predation, disturbance, and lack of high quality prey (USFWS 1997, McShane et al. 2004, Lynch et al. 2009). Adding possible fatalities by wind turbines, especially given the extensive pressure to develop this industry quickly and across the range of the murrelet, could jeopardize the chances for survival and recovery of this unique species.” p5 (Nelson to Falxa 2011)**

The Migratory Bird Treaty Act 16USC 703 et seq does not protect critical habitat, but the HRC HCP supposedly does.

•Local terrestrial surveys conducted by the Project’s major landowner, HRC, as part of compliance with their HCP, which was born out of the murrelet listing under CESA and ESA, reflects a decline in murrelet visits to headwaters Forest, the largest intact block of privately owned murrelet habitat within the scope of this project:

•“Preliminary analysis of the data indicates that after 13 years of monitoring, trends in radar counts of murrelets in the MMCAs and Reserves have differed during the study period; there has been a decline in radar counts in the Reserves but not in the MMCAs since the 2002 baseline.”

•Unfortunately, updated current survey data was available only by FOIA from USFWS, so access to this data was limited by time constraints.

•The HCP reinforces the seminal significance of the murrelet in HRC’s management under the HCP:

“Marbled murrelet (*Brachyramphus marmoratus*) and northern spotted owl (*Strix occidentalis caurina*) are the focus species for the terrestrial strategy, and the measures for these two birds are designed to benefit a broad range of other species in PALCO’s managed forests.

•Clearly, 17 miles of new roads in the fragile landscape of Jordan Creek, affecting multiple watersheds, and 25 miles of transmission line corridor with 100 foot buffers coursing through forestland supposedly managed to “maintain a mix of seral types across the landscape and retaining structural components of wildlife habitat,” fragments rather than sustains the larger ecosystem.

•There’s only 15% of murrelet original nesting habitat remaining, but the DEIR employs a telescopic tactic to reduce the significance of their project on the forestry habitat impacted by their proposed Project:

“There are 1.9 million acres of forestland in Humboldt County, 35 percent of which are publicly held (Humboldt County 2017b). Construction of the wind turbine generators, meteorological towers, gen-tie, substation, and access roads would temporarily affect up to 836 acres of forestland. Trees that meet the definition of “merchantable timber” under the Forest Practice Rules and fall within forestland as defined by PRC Section 12220[g] would be cut, hauled from the site, and processed in local mills. Following the removal of merchantable timber, temporary impact areas would be revegetated with trees at a 1:1 ratio; however, up to 91 acres of project features would remain permanently, thereby reducing the total amount of timberland available. Removal of up to 91 acres of timber would result in a reduction of less than 0.00007 percent of the total private timberlands in Humboldt County.”3.3-12

### **Modeling**

- DEIR: “There are no murrelet-specific studies of avoidance. Appx O, pg 11
- No operational wind energy facilities exist within the range of marbled murrelet, therefore, absent any empirical data, all risk assessments are a modeling game, which this DEIR engages in with far more certainty than reproducible reliability.

DEIR:

“A collision risk assessment was conducted by H. T. Harvey & Associates (2018a) to estimate the number of marbled murrelets expected to collide with WTGs during the life of the project. 3.5-76

“Small changes in the collision avoidance rate were found to affect the collision estimate more strongly than any other modeling parameter (H. T. Harvey & Associates 2018a). The sensitivity analysis conducted for the model demonstrated that reducing the collision avoidance rate by 0.01 increased the predicted collision rate by 46.56 percent.” 3.5.3 Environmental Impacts And Mitigation Measures 3.5-77

- The marbled murrelet is one of the most elusive birds in the world. It’s nesting habitat was only revealed in 1974 after a century of searching. It flies in semi-darkness, in the fog and rain, at varying altitudes and speeds of 70km/hr, through forested terrain. It would be hard to find a situation with more variables, small and large, than this.
- Consequently, this model is highly dependent on very accurate data inputs, not extrapolated assumptions based on terrestrial surveys that detect some unknown, but presumably tiny percent of our local marbled murrelet population.

### **Mitigations**

- The Marbled Murrelet Mitigation Plan has been deferred (3.5-2c), although what is presented is seriously flawed.

DEIR:



“Operation of the project could result in injury to and mortality of marbled murrelet as a result of collisions with WTGs or other project components. **No operational wind energy facilities exist within the range of marbled murrelet, so no information is available regarding the birds’ ability to avoid colliding with moving WTGs.**

- The results of the assessment indicated that the project would take approximately one marbled murrelet every 3 years, or 10.43 marbled murrelets over the 30-year life of the project.”3.5-76

- Impact 3.5-2 considers this risk “potentially significant,” a typical understatement in this DEIR. 3.5-76

- Their own model predicts a range of 10.43-20.86 collisions over 30-years, but their model is exquisitely sensitive to tiny changes in inputs, and therefore could vary considerably from these numbers of blended birds (see above).

- Harm to murrelets will also certainly come from the unavoidable proximity of occupied habitat to construction activities that the murrelets have never encountered in their entire existence, and cannot be reliably mitigated.

- The DEIR acknowledges that their construction operations will occur within 0.25 miles of occupied murrelet habitat, or 1/4<sup>th</sup> the buffer distance recommended by the PSG.

- Because there has never been such an installation or industrial activity in the habitat or range of the marbled murrelet, their assumptions are all just that, guesswork by a company committed to their project, not to protecting these birds.**

- It is hard to imagine that such major construction activity will not harass the marbled murrelet (“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 that include but are not limited to breathing feeding or sheltering.) (US FWS marbled Murrelet Recovery Plan September 1997, pg\_99)

DEIR:

“A habitat assessment conducted by Stantec (2018h) identified 74.88 acres of old-growth or mature conifer forest of adequate stand size and suitable characteristics for marbled murrelets within 0.25 mile of the project area.” 3.5-72

“Nesting habitat for murrelets occurs within three stands (Stands 63, 64, and 76) in the study area. Additionally, two recently fragmented stands (Stands 66 and 68) provide marginal habitat and have a low probability of being currently occupied by murrelet. Only three stands (Stands 64, 66, and 76) occur within 100 m of the project area, while all five (Stands 63, 64, 66, 68, and 76) are within 150 m of the project area.” 5.3

“Indirect impacts on nesting marbled murrelets from project construction could occur in the 74.88 acres of suitable nesting habitat located in or within 0.25 mile of the project

area. Indirect impacts could occur if construction activities were to create visual or audible disturbance that would affect adult behavior in a way that would reduce their ability to successfully reproduce. For example, marbled murrelets may avoid visiting their nests and tending to eggs or young if there is human activity or excessive noise in the area, leading to a reduction in productivity. The degree to which construction activities would affect murrelet nesting success depends on whether the habitat is occupied during the nesting season (March 24–September 15; Evans Mack et al. 2003), but also on the nature of the construction-related work, the distance of the work from occupied habitat, presence of topography or vegetation that blocks or screens the nest site, and the ambient conditions present in those locations.” 3.5-72

“Each of these was evaluated conservatively against a “very low” ambient sound level (51–60 dB), which resulted in estimated auditory harassment distances of nesting marbled murrelet of 100 meters, 250 meters, and 400 meters for general construction, blasting, and helicopter overflights, respectively. 3.2-72

- These buffers might correspond to USFWS auditory guidelines, but all fall within 0.25 miles: 100 meters=.06 miles; 250 meters=.16 miles; 400 meters=.25 miles: all well below the recommended PSG one mile buffer.

- The DEIR purports to protect sensitive receptors from decibel ranges of 81-110, despite these type findings: “Turbines placed on ridge lines above rolling terrain where significant topographic sound shadowing can occur have the potential to significantly elevate sound levels above ambient conditions. Declines in densities of woodland and grassland bird species have been shown to occur at thresholds between 45 and 48 dB, respectively; while the most sensitive woodland and grassland species showed declines between 35 and 43 dB, respectively.” (van den Berg 2004, J. Barber Colorado State Univ.; and K. Fristrap National Park Service)

- And these inadequate buffers are supposed to protect murrelets from blasting, overflying helicopters, and lots of human activity, not just a few hikers, as envisioned in the USFWS guidance. The DEIR conflates such casual activity with their industrial construction activity, as well as their ongoing maintenance activities, including truck traffic and frequent human presence. None of this has ever been experienced by these secretive birds.

- “For visual disturbance, USFWS (2006) guidelines suggest that human foot traffic within 40 meters of a nest has the potential to affect nest success and should be avoided; however, they also note that nests are high in trees and some activities may have no effect. Specific tests of human trail use (Hebert and Golightly 2006) indicate that marbled murrelets do not appear to be affected by humans using trails below their nests, and the birds have neither flushed nor experienced detrimental effects on their nesting.” 3.5-72

- The references cited by this DEIR, namely USFWS 2006 and Hebert & Golightly 2006, refer to activities within parks **that involve trail hikers and some local traffic.**

•“While owls and murrelets may be disturbed by many human activities, we anticipate that such disturbance rises to the level of harassment *under a limited range of conditions.*” USFWS2 8-14-2006-2887 July 2006

•These conditions never anticipated this level of activity.

•The cited study “Movements, Nesting, and Response to Anthropogenic Disturbance of Marbled Murrelets (*Brachyramphus marmoratus*) in Redwood National and State Parks, California, Hébert and Golightly, May 2006, also examined park activities, not major construction: “In addition to proximity to a trail, potential disturbance may be a function of the amount of activity on a trail.” p11

•And: “It is important to note that road density was relatively low within the study area. Highway 101 was the only contiguous north-south route and carried a variety of traffic, including logging trucks and tourist vehicles. Traffic volume was greatest coincidental with murrelet nesting. Results were probably representative of roads in and around RNSP, but should be applied cautiously in areas with differing terrain or traffic volume.” p33

The DEIR failed to report the most ominous finding in this study:

“Adult murrelets exposed to the sound of an operating chainsaw altered their behavior, usually extending their necks and raising their heads. Although hatching success was relatively high (71.4%) compared to control nests (40%), many adult murrelets exposed to an operating chainsaw ultimately experienced complete nest failure.

•”Marbled Murrelet chicks exposed to the sound of an operating chainsaw also altered their behavior, in a manner similar to that of adult murrelets. Based on these results, we recommend avoiding extended disturbance to incubating (see Chapter 2 on chronology of nesting) Marbled Murrelet adults and any disturbance to chicks at the time of food delivery, either early morning or late evening when feeding is most likely” (P. N. Hébert and R. T. Golightly, unpublished data; Nelson 1997). p40

•Exposures to mid-day feeding flights, up to 8-9x daily are unaccounted for in this DEIR, and not mentioned in the study.(May 2011 K Nelson letter to G Falxa, page 2)

•The proposed Project’s activities such as blasting, helicopters, heavy machinery and a constant flow of heavy trucks, from 10000-14,500 over the course of construction, are orders of magnitude greater than a single experimental chainsaw exposed to a nest.

•The DEIR acknowledges that over 136 acres of occupied murrelet nesting habitat will be exposed to high-very high noise, all within .25 miles or less, and much greater than a single chainsaw running for a few minutes.(Table 35-10).

•Over 88 of those acres will be exposed to very high noise levels, for extended periods.

- The DEIR never evaluates the enhancement of corvid predation associated with the massive influx of humans, irrespective of their training, but this study by Hebert & Golightly is alarming in that context:

“However, given the established link between human use of trails and campgrounds, increases in campground use or trail use might affect corvid densities.” p39

## **COMPENSATORY MITIGATION**

### **“Mitigation Measure 3.5-2c: Implement Compensatory Mitigation to Offset Operational Impacts on Marbled Murrelets.”**

- The DEIR relies primarily on the untested “compensatory mitigation” of corvid management in the very small Van Duzen County Park: “...retrofitting of [Van Duzen County Park] with effective hardware, infrastructure, and visitor outreach...”

“Most of the remaining marbled murrelet nesting habitat in California has been protected in parks and preserves (Golightly and Gabriel 2009). Corvid management at recreational sites in California that include nesting habitat for murrelets has been a major management initiative over the last 20 years with the goal of improving murrelet nesting success. Corvids, particularly Steller’s jays, have been implicated as the primary predator of murrelet nests (Luginbuhl et al. 2001; Marzluff and Neatherlin 2006; Hebert and Golightly 2007; Golightly and Schneider 2009, 2011; Malt and Lank 2009; Peery and Henry 2010).

“Thus, elevated corvid numbers constitute a loss of murrelet reproductive output. It has been estimated that a 40 percent reduction in jay predation could potentially change nesting success of murrelets in central California parks enough to create a positive population trajectory.” (Peery and Henry 2010).” 3.5.3: 3.5-78

“The project applicant shall prepare and implement a marbled murrelet mitigation plan to offset the anticipated level of marbled murrelet take over the operational life of the project. The anticipated level of take is set conservatively at 20.86 marbled murrelets over 30 years of project operation. Implementing the marbled murrelet mitigation plan *must create at least one individual marbled murrelet for each marbled murrelet taken as a result of the project.*”

The DEIR claims that “This particular kind of restoration effort (corvid control in parks) was the most consistent and coordinated action taken by the Trustee Councils overseeing the restoration funds to replace murrelets lost in the oil spills.” 3.5-78

- Contrary to this assertion, the *major* effective action taken to address the Kure and Stuyvesant oil spills’ combined killing of an estimated 265 marbled murrelets was the acquisition of permanent conservation easements from Green Diamond Company:

#### *“Preservation/Management of Marbled Murrelet Habitat”*

The responsible parties in the *Kure* settlement purchased a Conservation Easement for the Big Mynot and E.F. Hunter parcels, containing approximately 77 acres of old-growth

forest and approximately 222 acres of surrounding buffer areas. For the *Stuyvesant* settlement, the responsible parties purchased an easement for the Miracle Mile complex of parcels containing approximately 135 acres of old-growth forest and approximately 489 acres of surrounding buffer areas.” (KURE/STUYVESANT TRUSTEE COUNCIL Restoration Projects Update, January 2013, <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=72495&inline=true>)

- The oil spill funding from the Kure and Stuyvesant spills reported in the January 13 update (see above), entitled “**Corvid Management for Marbled Murrelets**,” provides no quantifiable data on the success or outcomes of their scavenger-proof trashcans, or public education efforts.

- The DEIR corvid management mitigation relies on a completely new and untested modeling game:

“To assess the benefits to murrelets of implementing a corvid management program in Van Duzen County Park, H. T. Harvey & Associates (2019) developed a deterministic model to specifically calculate the number of new breeding-capable adult murrelets that could be added to the population if corvid management characteristic of other parks is implemented at Van Duzen County Park.”3.5-79

“The proposed compensatory mitigation is likely to produce 10 times more breeding adults (103 individuals) than the anticipated take after 30 years of the project; the proposed mitigation is likely to fully compensate the 30-year take of individual murrelets as soon as 9 years after initiation of the compensatory mitigation actions.”3.5-80

- There is no peer review of this model.

- There is simply no supporting evidence or documentation in this DEIR that such a plan or strategy would have any discernible or material impact on murrelet replacement.

- Furthermore, the basis for this mitigation is questionable, despite the DEIR assertion that: “Corvids, particularly Steller’s jays, have been implicated as the primary predator of murrelet nests”3.5-78

**Three of the seven cited studies were conducted in Washington or British Columbia, and employed artificial nests with fake eggs and or chicks. And other predators besides corvids, such as reptiles and mammals, were responsible for over 50% of predation in the Luginbuhl et al 2001 and Marzluff and Neatherlin 2006 studies.**

- Van Duzen County Park (VDCP) is a small 14 hectare park. Corvids travel in packs, and the potential increase in population associated with human activity from the proponents’ project in the vicinity of the VDCP could result in in-migration to fill any Park vacancies.

- Because of significant predation by non-aviary predators such as reptiles and mammals, reducing corvid populations creates more prey opportunities for these very competent predators. The vaunted HT Harvey model is silent on this**

**“compensatory predation,” which very likely would fill the void left by the reduced population of corvids, if such a reduction actually occurred. The net loss of murrelet eggs and nestlings may actually increase under this scenario. There is no evidence in this DEIR that addresses this significant issue.**

•CEQA requires measurable performance standards for mitigation measures. The DEIR claims: “the boost in production of marbled murrelets would achieve the performance standard of creating at least one marbled murrelet for every individual taken as a result of the project.” Monitoring of “occupied behavior detection rates” as proposed in the DEIR does not measure recruitment rates. Occupied behavior detections vary from year to year and with the weather and other factors, which is one reason two-year surveys are recommended by PSG.

**•The DEIR secondary mitigations involve centuries-long development of nesting habitat:**

“Habitat enhancements in buffer forest. The California Department of Parks and Recreation has proposed and is seeking funding to thin and release approximately 125 acres of second-growth forest immediately adjacent to Founders Grove to accelerate the progress of these buffers toward old-growth conditions (McAllister, pers. comm., 2019). To further increase benefits to murrelets, canopy manipulation is proposed for these old-growth buffers to further expedite the process of generating murrelet nesting habitat. Such canopy manipulation work has already been successfully completed elsewhere in the park. Approximately 20,000 acres of formerly harvested stands in Humboldt Redwoods State Park adjacent to occupied murrelet habitat are in need of intervention to help promote the buffering of occupied stands and ultimately provide additional murrelet habitat.” ES 24

•It is unnecessary to document the speculative nature of this mitigation, since it is beyond the control or influence of the Project proponents, and the time scale that this mitigation requires far exceeds that of the likely impact on the murrelet population.

•The Northwest Forest Plan Interagency Regional Monitoring, 20 Year Report Status and Trend of Marbled Murrelet Populations and Habitat recognizes this temporal disconnect and emphasizes habitat protection:

“Given the current value of higher-suitability nesting habitat, which takes so long to replace, protection of those habitats by managing risk of fire and other disturbances would likely help achieve management objectives for murrelet.”p 2

### **EXTRACTING ENERGY FROM WIND**

•The DEIR is silent on what happens to wind currents that “fuel” windmill blade rotation, but the literature, fortunately, is not.

•As kinetic energy converts mechanical into electrical energy, and creates turbulence, a very different climatic regime downwind from the rotor blades results.

- This phenomenon is well-known, even if not entirely understood or quantified, but the DEIR is silent on the topic despite potentially serious consequences.
- This silence is disturbing, because the terrestrial and aerial habitat will be affected over a wide range of area, in ways that the public cannot evaluate, but could have significant consequences.
- For example, if the downwind hydrometeorology is affected such that downwind vegetation is exposed to drier air due to the complex interactions of fog, humidity, turbine-induced turbulence, warming, and micro-pressures, as studies show, then the risk of wildfires could increase substantially.
- Such climactic changes also affect all species in the surrounding habitat as vegetation that provides shelter, food, and protection adapts to entirely new conditions.
- PGE recently sent a letter warning residents here of potential power outages in the event of extreme weather. This letter refers to the wildfires ignited by transmission lines, a warning that applies to this Project's transmission lines as well. PGE considers the combination of high winds, low humidity, and dry vegetation as a dangerous triad. (PGE 5/21/19)
- All these incendiary conditions have been reported downwind of windmills:

Impacts of wind farms on land surface temperature, [Liming Zhou, \*Nature Climate Change\* volume 2, pages 539–543 \(2012\)](#)

#### **Abstract**

**The wind industry in the United States has experienced a remarkably rapid expansion of capacity in recent years and this fast growth is expected to continue in the future<sup>1,2,3</sup>. While converting wind's kinetic energy into electricity, wind turbines modify surface–atmosphere exchanges and the transfer of energy, momentum, mass and moisture within the atmosphere<sup>4,5,6</sup>. These changes, if spatially large enough, may have noticeable impacts on local to regional weather and climate. Here we present observational evidence for such impacts based on analyses of satellite data for the period of 2003–2011 over a region in west-central Texas, where four of the world's largest wind farms are located<sup>7</sup>. Our results show a significant warming trend of up to 0.72°C per decade, particularly at night-time, over wind farms relative to nearby non-wind-farm regions. We attribute this warming primarily to wind farms as its spatial pattern and magnitude couples very well with the geographic distribution of wind turbines.**

And:

“EXTRACTING ENERGY FROM WIND: Simulating impacts of wind farms on local hydrometeorology,” Somnath Baidya Roy, J. of Wind Engineering and Industrial Aerodynamics journal homepage: [www.elsevier.com/locate/jweia](http://www.elsevier.com/locate/jweia)

“This study explores the possible impacts of such wind farms on local hydrometeorology using a mesoscale model equipped with a rotor parameterization based on data from a commercial wind turbine. Results show that wind farms significantly affect near-surface air temperature and humidity as well as surface sensible and latent heat fluxes.

The signs of the impacts, i.e., increase or decrease, depend on the static stability and total water mixing ratio lapse rates of the atmosphere. The magnitudes of these impacts are not only constrained by the hub-height wind speed but also depend to some extent on the size of the wind farms. *Wind farms also affect the hydrometeorology of an area up to 18–23 km downwind.* More work is required to conclusively estimate the length-scale of wind farm wakes. This study is one of the first few to provide realistic estimates of possible impacts of wind farms.”

(“Local and Mesoscale Impacts of Wind Farms as Parameterized in a Mesoscale NWP Model,” ANNA C. FITCH, et al 2012)

A new wind farm parameterization has been developed for the mesoscale numerical weather prediction model, the Weather Research and Forecasting model (WRF). In addition, the source of TKE varies with wind speed, reflecting the amount of energy extracted from the atmosphere by the turbines that does not produce electrical energy.

Within the farm the wind speed deficit reached a maximum reduction of 16%. A maximum increase of TKE, by nearly a factor of 7, was located within the farm. The increase in TKE extended to the top of the BL above the farm due to vertical transport and wind shear, significantly enhancing turbulent momentum fluxes. The TKE increased by a factor of 2 near the surface within the farm. Near-surface winds accelerated by up to 11%. These results are consistent with the few results available from observations and large-eddy simulations, indicating this parameterization provides a reasonable means of exploring potential downwind impacts of large wind farms.

## **FIRE**

- The risk of uncontrolled and uncontrollable wildfires is and should be prominently featured and explained in this DEIR in such a way that the public comprehends what we are inviting into our community when extreme weather events and associated wildfires have become commonplace especially in California.
- Unfortunately, the proponents have chosen instead to dance around this most crucial issue, and defer their fire financing mitigation plan beyond public review. (3.13-1a)



- The DEIR warns that the project area is prone to fire: “Fire Hazard Severity Zones=very high to high.” (3.13-2, 3.13-7)

Impact 3.13-2 sets the stage for mitigating the potentially significant impact of wildland fires:

**“Increased Risk of Wildland Fires.** *The project area is located on land considered to be a State Responsibility Area with a high fire hazard severity rating. Project construction and operation would include activities that may create sparks or flames, representing a potential hazard that would exacerbate the risk of wildfire. This impact would be **potentially significant.**”*

- And then proclaims that: The proposed project would not contribute to any potential significant cumulative impacts related to wildfire risks. 4-17 **“Cumulative Impacts** 4.42 4-5

- The explanation for this astounding misrepresentation of risk is simply reliance on proponent, local, county, state and federal fire-fighting assets, as if a wildfire on the ridges or along the transmission corridor could be contained, especially occurring at night.

- Ironically, the DEIR at 3.13.3 acknowledges some of the very factors that exacerbate wildland fires, such as the topography ranging from steep ridges to valleys to forested and grassland vegetation. Winds fan flames, and windiness is the reason d’être of this project’s location, aside from those created by the power plant itself.

- Relevant to the discussion of downwind effects as well as to ambient conditions, the DEIR simply states that: “Wind, temperature, and relative humidity are the variables used to predict fire behavior (Husari et al. 2006).” 3.13-5

- The DEIR summarizes the potential causes of fire from the project’s operation in a way that minimizes the danger, and deprives the public of understanding the risks: “During project operation, up to 60 wind turbine generators and an on-site electrical substation would be maintained on-site. The presence of these facilities would increase the potential for accidental ignition of a wildland fire caused by a malfunction or mechanical failure, such as turbine overload or overheating of moving parts, or a structure fire associated with the substation. Sparks could be fueled by oils, lubricants, and other combustible materials, resulting in a fire.”3.13-17

- Transmission line ignition of wildfires figured prominently in the most recent Santa Rosa and Paradise fires, yet this DEIR implies that its compliance with 2006 standards established by NERC puts this issue to rest:

“To improve the reliability of regional electric transmission systems, NERC developed a transmission vegetation management program, applicable to all transmission lines operated at 200 kilovolts and above, and to lower voltage lines designated by the Regional Reliability Organization as critical to the reliability of the regional electrical

system. The plan, which became effective on April 7, 2006, establishes requirements for the formal transmission vegetation management program.”

- There is no attempt to explain how worst case scenarios such as a transmission line or supporting structure failure might happen, instead we get glib reassurances that vegetation management and fire-fighting assets should calm our concerns. (3.13-13)
- The wind power literature is replete with lengthy discussions of how these giant complicated machines fail, as towers collapse, blades shear off, gears wear out, nacelles explode from burning lubricants, fuels on-site feed fires, and transmission lines ignite fires. The 15 permanent employees are trained to respond to emergencies, 24/7, for exactly that reason: constant maintenance, vehicular traffic and human activity are critical in managing liability with these risky machines in entirely untested terrain.
- Yet the DEIR offers no detailed explanation of any of these commonplace occurrences, nor does it provide any statistics regarding the incidence of fire-related mishaps, or even any information about inherent fire suppressive mechanisms within the nacelles, aside from this generic advisory: **“Remote Monitoring:** Remote monitoring of WTG operations through the SCADA system provides a tool for the operator to assess the health of the power system including the WTGs, substation, and gen-tie equipment. Operators can use SCADA to remotely shut down one or more WTGs or completely disconnect from the grid in the event of an emergency.” (2.4.2, 2-40)
- The DEIR spends all of its lengthy verbiage on fire-fighting assets without realistic portrayals of the complexities of fires originating over 500 feet up, in inaccessible locations. I could find no information about the quantities of oils and other flammables associated with the Project components, particularly the nacelles, only Table 3.9-1, which tabulates fuels stored in Scotia and Bridgeville. The Project Description briefly describes the components of the WTG’s, but fails to disclose critical information such as how much oil is in the nacelles. (2-9)
- Due to the lack of information in the DEIR, the public is forced to research the fire risk of windmill power plants outside this DEIR, and the findings are ominous:

“You need three things to start a fire: fuel, ignition and oxygen. And you can find all three of them in ample quantities within the nacelle of a wind turbine. A 1.5MW machine, on the small side by today's standards, can still contain up to 900 litres of lubricating and cooling oil. The nacelle itself, probably made with flammable fibre-reinforced plastic (FRP), will house acoustic insulation materials, which are also flammable. Ignition can be provided by faulty electrical and electronic components and connections, or overheating mechanical parts. And high winds, the reason the turbine is there in the first place, can be guaranteed to feed the spark and fan the flames.

Once a fire takes hold there is practically nothing that can be done to prevent the turbine's complete destruction. The remote location of many wind projects means that fire-fighting services are often slow to arrive the scene, while the nacelle's height rules out any meaningful action to douse the fire. The best that can be expected is that burning debris is prevented from starting ground fires.” (Minimising fire risk in wind turbines

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<https://www.windpowermonthly.com/article/1361476/minimising-fire-risk-wind-turbines>)

•The proponents windmills have nameplate outputs of 2-5MW, so the figure of 900 liters may well understate by a factor of 2-3 how much flammable oil is contained within their nacelles: "...up to 60 WTGs (capable of generating 2–5 MW of electricity each)", 2-4

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•One article on Fire Risk in Wind Turbines estimates that "0.3-0.5 fire incidents occur per 1000 power stations (onshore and offshore) every year," explaining that: "Potential ignition sources are mainly inside the nacelle where there is fast moving machinery (generators, gearboxes e.t.c) which creates heat and combustible oil and solid material in the. Even with the incredible engineering and safety measures in place, a fire can ignite and develop, leading to the possible complete destruction of the turbine. A study conducted by SP Safety at the Technical Research Institute of Sweden showed that 10-30% of all loss-of-power-generation incidents in wind power plants are due to fire." (<https://www.firesafetysearch.com/fire-risk-in-wind-turbines/>)

•Experts cited in that article estimate "that worldwide 120 wind turbines suffer fire damage (not necessarily causing total loss) annually."

Credible sources explain further: "The output from a wind turbine can change rapidly and unpredictably depending on the strength and direction of the wind. There are also constant mechanical and climatic stresses, in particular changing wind loads, low-frequency vibrations and differences in temperature... Equally, the frequent connection and disconnection of the wind turbine can result in the thermal loading of live components."

([https://www.lowvoltage.siemens.com/infocenter/doc/02\\_ds\\_Safetyandprotectionforwindturbines\\_EN\\_2951.pdf](https://www.lowvoltage.siemens.com/infocenter/doc/02_ds_Safetyandprotectionforwindturbines_EN_2951.pdf))

This project sets up a perfect storm for catastrophic wildfires that could devastate local communities, especially Scotia and Rio Dell, and spread far and wide in uncontained fury through pristine forested habitat to the west, and into Humboldt State Redwoods Park and other recreational and populated towns and areas in the Eel River Valley.

## **GHG's**

•A fundamental argument for this wind facility is that it would reduce the GHG emissions compared to that produced by a PGE plant fueled with natural gas generating equivalent electrical energy.

In order to prevail in that comparison, the DEIR engages in at least three misrepresentations:

### **1. GHG Amortization**

- It amortizes the GHG emissions from the construction of the Project over 25 years, instead of accounting for their impacts when they occur, which are immediately and in the short term. In a climate emergency, it is most important to be able to evaluate impacts from the addition of GHG emissions in the temporal and spatial realms within which they occur, not diluted, on paper, over 25 years. So instead of the impacts from 3920 MTC02e emitted over 18 months or less, the DEIR uses 156 (3920/25), giving the impression of a far lower level of impacts and also comparing far more favorably in the race against PGE. (3.8-1 "Total Construction Emissions (over the entire 18-month construction period) =3920).

- It is noteworthy that this amortization allows the DEIR to characterize their emissions as “small ”: “The proposed project would not necessarily immediately replace electricity generated by fossil-fuel plants at the same quantity, and the project would generate a *small* amount of GHG emissions." 3.8-18

## 2. Carbon Sequestration

- The DEIR never accounts for the loss in carbon sequestration, and logging-related GHG emissions, from logging and vegetation clearing associated directly with the project. 284 acres of grassland cleared, 555 acres of logging, 20 acres of “shrub,” (Table 3.5-9), 25 miles of 100 foot cleared gen-tie transmission corridors, and road cuts from 24-200 feet in width along 17 miles of fragile Franciscan geology, (Table 2-1), (In areas with steep slopes, the total width of the disturbance area along access roads could be up to 200 feet. 2-12), plus all the compaction of ground from the massive machinery and vehicle traffic. Some of the 10,000-14,500 truck trips anticipated during construction will weigh up to 110 tons and be 90 feet long (2.3.14). 11000 cu yds of concrete will be poured (2.3.13), requiring massive transfers of water by truck for the concrete batch plant, soil compaction and dust control (2.3).

- In addition to all of this loss of carbon sequestering substrate, “approximately 3 million cubic feet of earth would be excavated on-site to construct the proposed project.” (2.3; 2-19).

- Whereas 90 acres of forest clearing is allocated to transmission line corridors in the DEIR, 25 miles of 100 foot wide buffers results in 303 acres:  
100ftx 5280ft/mix25mi=13,200,000 sq ft  
13,200,000 sq ft/43,560 sq ft/ac=303 ac.

- Undisturbed soils and grasslands have become dominant carbon storage sites in wildfire California, according to a UC Davis study funded by the National Science Foundation: “**Grasslands More Reliable Carbon Sink Than Trees In Wildfire-Prone California, Grasslands a Less Vulnerable Carbon Offset Than Forests**” (July 9, 2018) (<https://www.ucdavis.edu/climate-science/news/grasslands-more-reliable-carbon-sink-trees>)

- The authors warn: “Unlike forests, grasslands sequester most of their carbon underground, while forests store it mostly in woody biomass and leaves. When wildfires

cause trees to go up in flames, the burned carbon they formerly stored is released back to the atmosphere. When fire burns grasslands, however, the carbon fixed underground tends to stay in the roots and soil, making them more adaptive to climate change.

“But in a vulnerable, warming, drought-likely future, we could lose some of the most productive carbon sinks on the planet. California is on the frontlines of the extreme weather changes that are beginning to occur all over the world. We really need to start thinking about the vulnerability of ecosystem carbon, and use this information to de-risk our carbon investment and conservation strategies in the 21st century.”

- Once again, the DEIR is silent on this extensive impact, forcing a concerned public to seek information elsewhere.

- The Congressional Research Service 2009 report, “Carbon Sequestration in Forests” includes grasslands and wetlands. According to this report, approximately 67,000 metric tons of sequestered carbon could be released upon the destruction of the forest, shrub lands, grasslands, and wetlands on the project site as well as 21,604 metric tons along the transmission lines corridor. (<https://fas.org/sgp/crs/misc/RL31432.pdf>)

- Locally, the Arcata Community Forest sequesters 4-7 tons CO<sub>2</sub> per acre over 782 acres, and the Van Eck Forest sequesters 2-4 tons CO<sub>2</sub> per acre over 2200 acres.

### **3. Exaggerated CO<sub>2</sub> “savings” (see 3.8-18 for assumptions)**

- The DEIR claims of 4,342,500 CO<sub>2</sub> “saved” over 25 years compared to assumed PGE emissions overstate the calculated total of 1,348,256CO<sub>2</sub> by over 100%.

Project: 407340MWh/yr x 25 yr= 10183500MWh/25 yr

PGE:

10183500MWh/25 x 0.133MTCO<sub>2</sub>e/MWh=1,354,406MTCO<sub>2</sub>/25

Predicted CO<sub>2</sub> savings=173700x25=4,342,500MTCO<sub>2</sub>e/25y

Project: 246MTCO<sub>2</sub>/yr x 25=6150MTCO<sub>2</sub>e/25y

Net: 1,354,406MTCO<sub>2</sub>/25-6150=1348256MTCO<sub>2</sub> saved in 25y

***Calculated/DEIR Claim: 1348256/4342500=0.31***

### **2.2.5 BRIDGEVILLE SUBSTATION UPGRADES**

- When asked how much we ratepayers will have to pay for the proponent’s project, Terra-Gen’s local representative boasted that “Tg will cut PGE a check.”

- Well, not exactly, it appears from the DEIR:

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Ken Miller/SLC

“As part of the project, PG&E would expand the Bridgeville Substation to allow the project to connect to the 115 kV side of the substation. To do so, PG&E would extend the existing gravel pad to the north and east, add two new circuit breakers to the existing 115 kV bus, upgrade relays to accept the project’s power, install a 115 kV breaker to electrically isolate the project from the Bridgeville Substation, and install a telecommunications link between the project substation and Bridgeville (Figure 2-9).

- Two new intermediate transmission structures may be needed to connect the gen-tie to the 115 kV bus. In addition, the lines entering and exiting the Bridgeville Substation may require modifications to interconnect the project with the PG&E transmission grid. During construction, PG&E may need to construct a temporary transmission line, known as a “shoefly,” to maintain electrical service while project-related work is conducted at Bridgeville.”

- Although not specified in the DEIR, the strong inference is that PGE foots that bill, and no financial information is to be found in the DEIR for the public to form asny opinion as to the value of said “upgrade.”

### **Decay of WTGs**

- Another omission from the DEIR is any discussion of the decay of ageing WTGs, as explained, once again, by referencing outside sources:

“The report concludes that a wind turbine will typically generate more than twice as much electricity in its first year than when it is 15 years old.

- The report’s author, Prof Gordon Hughes, an economist at Edinburgh University and a former energy adviser to the World Bank, discovered that the “load factor” — the efficiency rating of a turbine based on the percentage of electricity it actually produces compared with its theoretical maximum — is reduced from 24 per cent in the first 12 months of operation to just 11 per cent after 15 years.

"British turbines have got bigger and wind farms have got bigger and they are creating turbulence which puts more stress on them. It is this stress that causes the breakdowns and maintenance requirements that is underlying the problem in performance that I have been seeing.”

(<https://www.telegraph.co.uk/news/earth/energy/windpower/9770837/Wind-farm-turbines-wear-sooner-than-expected-says-study.html>)

### **Human & wildlife Health Effects**

- The DEIR ignores all but the visual impacts, which are downplayed as much as possible. Monument Ridge was established as the survey “Initial Point” for NW California in 1853 by Henry Washington because of its nearly 360° visibility. Bear River Ridge is also visible from much of the Eel River Valley. Somehow, like Harry Potters cloak, or more pertinently, as “legally photographed” by the proponents, erecting 500-600 foot turbine towers with lights disappears their majestic visage.

- In “Project Location And Components,” Rio Dell is not even included. (ES.3.1, 2.2.1)

“The project site is about 20 miles south of Eureka, roughly 12 miles southeast of the city of Fortuna, and 22 miles north of the community of Garberville, and is bisected by U.S. Highway 101 (U.S. 101). The community of Scotia is adjacent to the northern edge of the project site.”

### **Infrasound and Vibrations**

- Infrasound and low frequency vibration are also ignored, although these effects have been reported as far as 20km from windmill sites, and vibratory dislodgement of heavy metals adsorbed to soils has contaminated wells in Massachusetts.

### **Shadow Flickering**

- Shadow flickering is “the effect of rotating turbine blades causing brightness levels to vary periodically at locations where they obstruct the Sun’s rays.”

- The proponents’ windmills will certainly cause shadow flicker at various times of the year and day as the sun rises from the east and sets behind the WGTs to the west. However, as with so much in this inflated but deficient DEIR, the concerned reader must seek guidance elsewhere, as readers of this DEIR are in the dark as to shadow flicker.

- Shadow flicker has impacts to nearby residences, and also to wildlife. It’s impacts here are unknown, despite clear guidelines from the wind power industry: “The good news is that shadow flicker effects can be readily predicted. Modeling needs to consider the path of the sun at the turbine location, the receptor locations and the terrain data for the area. The best approach is to quantify the effects and understand the impacts. It is advisable to consider shadow flicker effects sooner rather than later. This allows the issues to be understood ahead of time and also maximises potential mitigation options at the design phase.

*It is recommended that detailed modeling is carried out for any proposed turbines and for the results to be evaluated comprehensively.”* (PagerPower <https://www.pagerpower.com/news/shadow-flicker/>)

### **Conclusion**

- This sacred and habitat-rich site, already impacted by acceptably regulated activities such as TPZ and grazing, would be irreparably and adversely transformed by this industrial power plant as an unmitigated cumulatively significant impact, to say the very least. The Sierra Club position on siting wind facilities is on point:

- The Sierra Club opposes development in *...critical habitat and designated habitat recovery areas for wildlife, and areas of cultural significance, sacred lands, and other areas that have special scenic, natural or environmental value. In these areas, it is*

*inappropriate to build wind turbines, roads, transmission lines, or any other structure related to wind development .*

**MOST APPROPRIATE SITES** The Sierra Club will usually support wind development in places that are Most Appropriate:

- Agricultural land - farms, ranches, grazing lands (considering impacts on rare grassland birds, if any)
- **Land that has been substantially disturbed, or where transmission lines exist already**

**MORE APPROPRIATE SITES** The Sierra Club should support wind development with appropriate mitigation techniques in places that are More Appropriate:

- **Sites near population and electricity consumption centers.**
- Sites where credible environmental review concludes siting will result in acceptable wildlife/habitat impacts. Sites with extremely good wind potential, without strong negative concerns

**LESS APPROPRIATE SITES** The Sierra Club may oppose wind development in places that are Less Appropriate, unless mitigation techniques can adequately minimize environmental impacts:

- **Natural areas where damaging road and/or transmission capacity must be installed**
- **Projects located so as to significantly impair important scenic values**

**NOT APPROPRIATE SITES** The Sierra Club will usually oppose wind development in areas that are Not Appropriate (all the categories below include prior-designated or prior-proposed areas):

- **Critical habitat for Rare, Threatened or Endangered Species or habitat for indigenous species critical to a region or state's biodiversity**
  - <https://www.sierraclub.org/policy/energy/wind-siting-advisory>
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**A Partial List of References (Submitted as separate attachments):**

- McIver et al 2019
- 20-year Murrelet Monitoring Report NWF
  
- 2015 Annual Murrelet Report NWF
  
- Adam Canter Wiyot LoCo OpEd
- Adam Gravel, Stantec Deposition
- Atlantic Wind denied
  
- Bonus Depreciation
  
- Compensatory Mitigation, Davis
  
- Congressional Report on Grasslands
  
- Energy Capital Partners: Power Generation
  
- Fire references
  
- Greentech Doug Karpa
  
- Heat Flux Downwind of WGTs
- Humboldt County DA Complaint vs PALCO
  
- Humboldt Meridian
  
- John O'Connor, Terra-Gen CFO, formerly A A Auditor
  
- Jordan Creek mass Wasting Photo
  
- Marbled Murrelet ecology
- Marbled Murrelet Natural History
- NY Wind Project: James Wiegand deposition
  
- ODFW Final Murrelet Uplisting
- Pacific Lumber HCP
  
- Oil Spill Funds for M. Murrelets (Kur-Stuy Jan 2013)
  
- PGE Letter
  
- Recent Population Decline of Marbled Murrelet
- Renewable Energy PTC
  
- S. Kim Nelson letter to Falxa, et al 6 May 2011
- Scotland Wind Farms and Water Pollution
  
- Sensitive Plants in the Project  
HumWind DEIR Comments  
Ken Miller/SLC

- Shell Wind Federal Reg EIS/HCP, 2009
- Sierra Club Wind Siting Advisory
- Simulating Downwind Impacts of Wind Farms
- Terra-Gen's other Wind Power Plants by age
- USFWS Marbled Murrelet Recovery Plan
- USFWS Wind Advisory (WEG)
- Wind Farm and Water Pollution
- Wind Kinetic to Electric