



State of California – Natural Resources Agency
 DEPARTMENT OF FISH AND WILDLIFE
 South Coast Region
 3883 Ruffin Road
 San Diego, CA 92123
 (858) 467-4201
 www.wildlife.ca.gov

GAVIN NEWSOM, Governor
 CHARLTON H. BONHAM, Director



2020 JAN 27 PM 1:32

COUNTY OF SANTA BARBARA
 CLERK OF THE
 BOARD OF SUPERVISORS



January 23, 2020

Santa Barbara County Board of Supervisors
 Clerk of the Board County Administration Building
 105 E. Anapamu Street, Suite 407
 Santa Barbara, CA 93101
 sbcob@co.santa-barbara.ca.us.

Subject: January 28, 2020, Appeals Hearing - Response to Comments on the Draft Supplement Environmental Impact Report for the Proposed Strauss Wind Energy Project (SCH#2018071002; 16CUP-00000-00031; 18CDP-00000-00001; 18VAR-00000-00002; 18EIR-00000-00001), County of Santa Barbara

Dear Board of Supervisors:

The California Department of Fish and Wildlife (CDFW) has reviewed the County’s responses to our June 14, 2019, comment letter that are included in the final Supplemental Environmental Impact Report (SEIR) for the Strauss Wind Energy Project (Project). We believe it is important to comment on the County’s final SEIR responses for the appeal hearing scheduled for January 28, 2020.

CDFW is still in the process of completing our analysis for the Incidental Take Permit (ITP) under the California Endangered Species Act (CESA; Fish and Game code section 2081 *et seq.*) for the Project to permit impacts to Gaviota tarplant (*Deinandra increscens ssp. villosa*). At this juncture in the process, we believe it is essential to reiterate the need for the final SEIR and County permit to include: 1) Project alternatives to reduce the magnitude and extent of impacts to tarplant; 2) additional analysis to address impacts beyond the immediate graded footprint; and, 3) mitigation in the form of an adaptive management plan for tarplant that contains measurable standards and monitoring for areas outside the grading footprint. Our comments for your consideration are as follows:

1. Reasonable Alternatives

CDFW strongly recommends the County consider alternatives that avoid tarplant locations while also achieving most of the Project objectives. Such alternatives may include relocating turbines to other high wind yield areas onsite that avoid/reduce impacts to tarplant. CDFW finds it unfortunate that the proposed Project in the final SEIR appears to result in impacts to tarplant to avoid other non-listed species that are found in sufficient numbers elsewhere onsite and have a history of being able to achieve mitigation success (e.g., oak woodlands, scrub habitats).

2. Long Term Monitoring of On-Site Mitigation

Response 4.7 through 4.9 - Direct and Indirect Impacts to Gaviota Tarplant

Response 4.7 provides that “[t]hese impacts cannot be quantified in terms of acreage but are far less important than direct impacts even immediately adjacent to the Project footprint and decline in importance over short distances. The great majority of Gaviota

tarplant habitat on the site would be subject to little or no indirect Project disturbance” and that “[h]abitat isolation, fragmentation, or degradation on the scale of the cited literature would not occur, and these potential indirect impacts would not cause significant effects to Gaviota tarplant beyond those evaluated in the SEIR.”

Response 4.8 provides that “*Mitigation Measures BIO-5a (Construction Impacts to Gaviota Tarplant) and BIO-5b (O&M Impacts to Gaviota Tarplant) would reduce the proposed Project’s impacts to Gaviota tarplant below a level of significance.*”

Response 4.9 provides that “*...the CDFW’s effort to do so (in Comments 4.7 and 4.8) largely overstates the extent and severity of indirect impacts (please refer to the discussion of indirect impacts throughout responses to Comments 4.7, 4.8, and 4.9).*”

It appears that the final SEIR does not include a mitigation element to monitor and assess the long-term and cumulative impacts from project effects outside the immediate grading footprint. Although the final SEIR provides some qualitative analysis of what potential impacts may be, it does not provide any measures to monitor such affects over the life of the project.

As part of our ITP analysis, CDFW compiled a list of over 70 references that were used in the process of evaluating impacts to Gaviota tarplant at this location. CDFW considers published scientific literature in the evaluation of impacts to the species and does not believe we have overestimated impacts or mislead the public or decision makers on the extent of impacts. Rather, CDFW believes it is important to undertake an effort to quantify impacts beyond the grading footprint as a good faith effort at disclosing the full range of impacts from project construction and operation that is supported by the scientific research. The lack of such mitigation is problematic when available scientific information indicates that there would be project activities that could result in adverse effects to Gaviota tarplant outside of the project grading footprint. Furthermore, CDFW does not support the conclusion in the final SEIR that MM BIO-15a (Siting), which requires micro-siting to avoid or minimize impacts to other biological resources including Gaviota tarplant, is sufficient to reduce impacts to a level of less than significant. CDFW recommends the County consider the attached list of references and include mitigation for an adaptive management plan for tarplant that contains measurable standards and monitoring for areas outside the grading footprint.

3. On-site Mitigation for Impacts to Gaviota Tarplant

- a. The location of mitigation proposed to meet County, state, federal, and other (non tarplant) requirements should not be situated in locations that could result in direct or indirect impacts to tarplant. For example, MM BIO-3 (Site Restoration and Revegetation Plan) and MM BIO-8 (Native Grassland Restoration) provide for restoration and revegetation in areas occupied by tarplant. Areas needed for oak, El Segundo blue butterfly and other mitigation should be located away from tarplant areas. CDFW believes there are sufficient areas within the nearly 3,000 acre-property limits that can accommodate all mitigation needs and are not near tarplant areas. CDFW recommends that all mitigation-derived impacts including the need for irrigation (non-hand-watering), potential for hybridization, competition and other effects associated with restoration that could result from implementation of MM BIO-3 and MM BIO-8 should be evaluated and included in the analysis of impacts to tarplant.

- b. It is our understanding that the project will have a County requirement prior to zoning clearance to record conservation easements over the areas intended to count as mitigation (MM BIO-3, Site Restoration and Revegetation Plan). This measure will ensure that tarplant areas are conserved prior to grading and is appreciated and supported by CDFW. The conservation easement should be consistent with CDFW requirements.

The final SEIR in MM BIO-6 (Gaviota Tarplant Disturbance on page 4.5-69) provides that “[t]he Project owner/operator shall retain a qualified botanist approved by the County, USFWS, and CDFW to prepare a Gaviota Tarplant Mitigation Plan and shall obtain an ITP (CDFW) and Biological Opinion (USFWS) for impacts to Gaviota Tarplant. Temporary impacts to Gaviota tarplant habitat will be mitigated as permanent impacts unless monitoring over at least a 15-year period demonstrates full recovery of self-sustaining Gaviota tarplant occurrences (plant density and extent of occupied area) in the temporarily impacted areas. CDFW appreciates MM-BIO 6 identifying the need for securing an ITP from CDFW prior to impacts to tarplant and concurs that monitoring over an extended period (e.g., 15 or more years) is needed for the tarplant.

4. Impacts to Avian Species

CDFW remains concerned with impacts to avian species from the Project and believes that additional measures and monitoring to address golden eagle, burrowing owl and other species is needed to bring the impact to below a level of significance. We believe the alternatives to minimize impacts to tarplant to an acceptable level under CESA could also substantially reduce the risk to avian species and would be environmentally superior to the Project identified in the final SEIR. We find Response 4.19 problematic and unreasonable that the SEIR concludes that impacts to golden eagle cannot be avoided or feasibly mitigated to less than significant (Class I) without due consideration of such alternatives.

5. Construction and Operation/Maintenance (O&M) Impacts

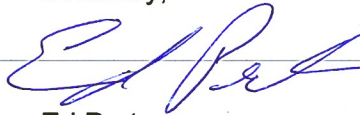
- a. The final SEIR in issue BIO-5a (Construction Impacts to Gaviota Tarplant on page 4.5-68) concludes that “[i]ndirect impacts (including but not limited to isolation, habitat fragmentation, pollinator impacts; see LWEF EIR) would occur in occupied habitat near the project activities. By their nature, indirect impacts tend to be more substantial immediately adjacent to a work site or facility, and their importance declines with increasing distance. The land uses surrounding occupied Gaviota tarplant habitat will be largely unchanged. Other than the SWEP itself, there will be no new urbanization, or related disturbances. These indirect impacts cannot be quantified in terms of acreage but are far less important than direct impacts even immediately adjacent to the Project footprint and decline in importance over relatively short distances. The majority of Gaviota tarplant habitat on the site would be subject to little or no indirect disturbance.” The final SEIR then concludes that implementation of measures MMs BIO-1 through BIO-3, BIO-5, BIO-6, BIO-11c, and BIO-11d are necessary to reduce or avoid impacts to Gaviota tarplant and its habitat. These measures require that workers undergo environmental awareness training, ground disturbance is minimized, the site is restored following construction, Gaviota tarplant mitigation is implemented, and monitoring and reporting occur. These measures would ensure construction impacts to Gaviota tarplant

remain less than significant (Class II). As set forth in Section B (Long Term Monitoring of On-Site Mitigation), CDFW believes that there is substantial evidence in the literature to develop a more robust analysis of impacts to and mitigation for Gaviota tarplant beyond the grading footprint.

- b. The final SEIR in issue BIO-5b (O&M Impacts to Gaviota Tarplant on page 4.5-71) concludes that “[i]mplementation of MMs BIO-1 through BIO-3, BIO-5, BIO-6, BIO-11c, and BIO-11d would ensure that if ground disturbance is conducted in Gaviota tarplant habitat during O&M, workers undergo environmental awareness training, ground disturbance is minimized, the site is restored, Gaviota tarplant mitigation is implemented, and monitoring and reporting occur. O&M impacts, if any, would be comparable to indirect impacts described above, and cannot be quantified in terms of acreage. These measures would ensure impacts to Gaviota tarplant during O&M remain less than significant (Class II).” As set forth in Section B (Long Term Monitoring of On-Site Mitigation), CDFW believes that there is substantial evidence in the literature to develop a more robust analysis of impacts to and mitigation for Gaviota tarplant beyond the grading footprint. MM BIO-1b (Vegetation and Wildlife Habitat Impacts during O&M), BIO-11c (Biological Monitoring), BIO-11d (Monitoring Report) or the other measures provided appear to focus on the construction component of the project and not the longer-term effects from operation and maintenance on tarplant. In contrast, the final SEIR does provide such a measure for avian species in MM BIO-16 (Monitoring and Adaptive Management Plan/Bird and Bat Conservation Strategy) which will provide for monitoring studies to collect information effects caused by wind farm operations with actions to be implemented if specific thresholds are met. CDFW believes that a similar adaptive management measure should be identified in the final SEIR for tarplant and is supported by the best scientific literature available.

CDFW appreciates the opportunity to provide the County with further comments on the final SEIR for the Strauss Wind Energy Project. If you have questions regarding this letter, please contact Erinn Wilson, Environmental Program Manager at (562) 342-7172 or by email at Erinn.Wilson@wildlife.ca.gov.

Sincerely,



Ed Pert
Regional Manager
South Coast Region

Attachment: Compendium of References

CDFW
Ed Pert, San Diego
Erinn Wilson, Los Alamitos
Steve Gibson, Los Alamitos
Randy Rodriguez, Los Alamitos
Malinda Santonil, Los Alamitos
Headquarters CEQA Tracking - CEQA@wildlife.ca.gov

USFWS

Steve Henry, Ventura - steve_henry@fws.gov
Chris Diel, Ventura - christopher_diel@fws.gov
Mark Elvin, Ventura - mark_elvin@fws.gov

Compendium of all References Used for Strauss ITP Analysis

- Adams, A.S.; Keith, D.W. 2018. Wind energy and climate: modeling the atmospheric impacts of wind energy turbines. *Joule* 2, 1-15. Available online: <http://adsabs.harvard.edu/abs/2007AGUFM.B44B..08A>
- Adams, V., Marsh, D., and Knox, J. 2005. Importance of the seed bank for population viability and population monitoring in a threatened wetland herb. *Biological Conservation*. 124. 425-436. 10.1016/j.biocon.2005.02.001.
- Adler, P., Drake, J., Associate Editor: Andrew R. Solow, & Editor: Donald L. DeAngelis. 2008. Environmental Variation, Stochastic Extinction, and Competitive Coexistence. *The American Naturalist*, 172(5), E186-E195. doi:10.1086/591678
- Ågren, J. 1996. Population Size, Pollinator Limitation, and Seed Set in the Self- Incompatible Herb *Lythrum Salicaria*. *Ecology*, 77(6), 1779-1790. doi:10.2307/2265783.
- Aizen, M., Ashworth, L., and Galetto, L. 2002. Reproductive Success in Fragmented Habitats: Do Compatibility Systems and Pollination Specialization Matter? *Journal of Vegetation Science*, 13(6), 885-892. Retrieved from <http://www.jstor.org/stable/3236934>.
- Alberts, A.C., A.D. Richman, D. Tran, R. Sauvajot, C. McCalvin, and D.T. Bolger. 1993. Effects of habitat fragmentation on native and exotic plants in southern California coastal scrub. Pages 103-110 in Proceedings of the symposium: interface between ecology and land development in California, Keeley, J.E., editor. May 1-2, 1992; Occidental College, Los Angeles.
- Alexander, H., Pilson, D., Moody-Weis, J., and Slade, N. 2009. Geographic variation in dynamics of an annual plant with a seed bank. *Journal of Ecology*. 97. 1390 - 1400. 10.1111/j.1365-2745.2009.01581.x.
- Alexander, H., and Schrag, A. 2003. Role of soil seed banks and newly dispersed seeds in population dynamics of the annual sunflower, *Helianthus annuus*. *Journal of Ecology*. 91. 987 - 998. 10.1046/j.1365-2745.2003.00824.x.
- Baldwin, B.G. 2007. A systematic investigation of *Deinandra increscens*, with special reference to subsp. *villosa*.
- Baldwin, B.G. 2009. Morphological and molecular reconsideration of *Deinandra increscens* subsp. *villosa*. 18 pp. + appendices.
- Baldwin, B. G., R. E. Preston, B. L. Wessa, and M. Wetherwax. 2001. A biosystematic and phylogenetic assessment of sympatric taxa in *Blepharizonia* (Compositae-Madiinae). *Systematic Botany* 26:184-194.
- Bannerman, S. 1998. Biodiversity and interior habitats: The need to minimize edge effects. Extension note 21. Ministry of forest Research program, British Columbia Ministry of Forests Research Program. Accessed at: <https://www.for.gov.bc.ca/hfd/pubs/docs/en/en21.pdf>
- Bauder, E.T., and Truesdale, D. 2000. A Comparison of *Hemizonia conjugens* (Oat tarplant) with two closely related tarplant species using enzyme electrophoresis and soil textural analysis. Final Report. Prepared for California Department of Fish and Game, Region 5.

Bogaert, J., Van Hecke, P., Salvador-Van Eysenrode, D., & Impens, I. 1998. QUANTIFYING HABITAT EDGE FOR NATURE RESERVE DESIGN. *Coenoses*, 13(3), 131-136. Retrieved from <http://www.jstor.org/stable/43461225>.

Bolger, D. T. 2007. Spatial and temporal variation in the Argentine ant edge effect: implications for the mechanism of edge limitation. *Biological Conservation* 136:295–305.

Bond, W.J. 1995. Assessing the risk of plant extinction due to pollinator and disperser failure. Pages 122-128 in *Extinction rates*, Lawton, J.G. and R.M. May, editors. Oxford, UK: Oxford University Press.

Boughton, D. and U. Malvadkar. 2002. Extinction risk in successional landscapes subject to catastrophic disturbances. *Conservation Ecology* 6(2): 2. [online] URL: <http://www.consecol.org/vol6/iss2/art2/>

Brooks, M.L. 1995. Benefits of protective fencing to plant and rodent communities of the western Mojave Desert, California. *Environmental Management* 19(1):65-74.

Burgess, S. TM Bleby. 2006. Redistribution of soil water by lateral roots mediated by stem tissues, *Journal of Experimental Botany*, Volume 57, Issue 12, September 2006, Pages 3283–3291, <https://doi.org/10.1093/jxb/erl085>

California Department of Fish and Game. 2005. California Department of Fish and Game Guidelines for Conservation of Sensitive Native Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations. Accessed at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=116396&inline>.

[CNDDB] California Natural Diversity Database. 2019. Rarefind: A database application for the California Department of Fish and Game, Natural Heritage Division, Sacramento, California.

Campbell, Lesley & Husband, Brian. 2007. Small populations are mate-poor but pollinator-rich in a rare, self-incompatible plant, *Hymenoxys herbacea* (Asteraceae). *The New phytologist*. 174. 915-25. 10.1111/j.1469-8137.2007.02045.x.

Cause H., Ida Naughton, Christina Boser, Ruben Alarcón, Keng-Lou James Hung, David Holway. (2015). Floral visitation by the Argentine ant reduces bee visitation and plant seed set. *Ecology*. 2015 Jan; 96(1): 222–230.

Cervarich, M.C.; Baidya Roy, S.; Zhou, L. 2013. Spatiotemporal structure of wind farm-atmospheric boundary layer interactions. *Energy Proced.* 2013, 40, 530–536.

Collar, N., Gaston, K., Hilton-Taylor, C., Akcakaya, H. R., Leader-Williams, N., Milner-Gulland, E., and Stuart, S. 2008. Quantification of Extinction Risk: IUCN's System for Classifying Threatened Species. *Conservation biology* : the journal of the Society for Conservation Biology. 22. 1424-42. 10.1111/j.1523-1739.2008.01044.x.

Colling, G., and Matthies, D. 2006. Effects of habitat deterioration on population dynamics and extinction risk of an endangered, long-lived perennial herb (*Scorzonera humilis*). *Journal of Ecology*. 94. 959 - 972. 10.1111/j.1365-2745.2006.01147.x.

Conservation Biology Institute. 2000. Review of potential edge effects on the San Fernando Valley Spineflower (*Chorizanthe parryi* var. *Fernandina*).

Conservation Biology, Volume 24, No. 5, 1239–1248 Journal compilation C 2010 Society for Conservation Biology.

Crawford, T. T. 1965 Frost protection with wind machines and heaters Meteorol. Monogr. 6 81–7.

Cunningham, S. 2000. Depressed Pollination in Habitat Fragments Causes Low Fruit Set. *Proceedings: Biological Sciences*, 267(1448), 1149-1152. Retrieved from <http://www.jstor.org/stable/2665737>.

Cushman, Samuel. 2006. Effects of habitat loss and fragmentation on amphibians: A review and prospectus. *Biological Conservation*. 128. 231-240. 10.1016/j.biocon.2005.09.031.

Cushman, Samuel & McGarigal, Kevin. 2008. Landscape Metrics, Scales of Resolution. 10.1007/978-1-4020-6759-4_2.

Damschen, E., Haddad, N., Orrock, J., Tewksbury, J., and Levey, D. 2006. Corridors Increase Plant Species Richness at Large Scales. *Science (New York, N.Y.)*. 313. 1284-6. 10.1126/science.1130098.

Del Castillo, R.F. 1994. Factors influencing the genetic structure of *Phacelia dubia*, a species with a seed bank and large fluctuations in population size. *Heredity* 72:446-458.

Ellstrand, N. and Elam, D. (2003). Population Genetic Consequences of Small Population Size: Implications for Plant Conservation. *Annual Review of Ecology and Systematics*. 24. 217-242. 10.1146/annurev.es.24.110193.001245.

Fahselt, D. 2007. Is transplanting an effective means of preserving vegetation? *Canadian Journal of Botany*, 2007. 85(10): 1007-1017, <https://doi.org/10.1139/B07-087>.

Faist, A., Neale, J., Mines, B., and Collinge, S. 2015. Maintenance of Pollinator Function in Restored Vernal Pools: Gnats Filling the Role of Solitary Bees. *Ecological Restoration*. 33. 10.3368/er.33.1.51.

Fiedler, P. 1991. Mitigation related transplanted, translocation and reintroduction projects involving endangered and threatened and rare plant species in California. California Department of Fish and Game, Sacramento, CA. 82 pp.

Fitch, A.C.; Lundquist, J.K.; Olson, J.B. 2013. Mesoscale influences of wind farms throughout a diurnal cycle. *Mon. Weather Rev.* 2013, 141, 2173–2198.

Fitzgerald, K., & Gordon, D. (2012). Effects of Vegetation Cover, Presence of a Native Ant Species, and Human Disturbance on Colonization by Argentine Ants. *Conservation Biology*, 26(3), 525-538. Retrieved January 9, 2020, from www.jstor.org/stable/23256404

Forcella, F. and S.J. Harvey. 1983. Eurasian weed infestation in western Montana in relation to vegetation and disturbance. *Madroño* 30(2):102-109.

Franklin J.F. 1992. Scientific Basis for New Perspectives in Forests and Streams. In: Naiman R.J. (eds) *Watershed Management*. Springer, New York, NY.

Gordon, D.M., Heller, N. 2014. The Invasive Argentine Ant (*Linepithema humile*) in Northern California Reserves: from foraging behavior to local spread. *Myrmecological News*. 19. 103-110.

- Groom, M.J. 1998. Allee effects limit population viability of an annual plant. *The American Naturalist* 151(6):487-496.
- Habel, J. and Zachos, F. 2012. Habitat fragmentation versus fragmented habitats. *Biodiversity and Conservation*. 21. 10.1007/s10531-012-0349-4.
- Hall, Maurice, Christina Babbitt, Anthony M. Saracino, and Stanley A. Leake. 2018. Addressing Regional Surface Water Depletions in California. Environmental Defense Fund, CA.
- Harris, R.A.; Zhou, L.; Xia, G. 2014. Satellite observations of wind farm impacts on nocturnal land surface temperature in Iowa. *Remote Sens*. 2014, 6, 12234–12246.
- Hasager, C., Nygaard, N., & Volker, P., & Karagali, I. Andersen, S. and Badger, J. 2017. Wind farm wake: The 2016 Horns Rev photo case. *Energies*. 10. 317. 10.3390/en10030317.
- Hendrickson, Elizabeth C. 2017. Pollinator Response to Patch Distribution and Reproductive Consequences in *Lasthenia californica*. University Honors Theses. Paper 386. Accessed at <https://pdfs.semanticscholar.org/c035/7243d431bdaa72d8f9eb7d99df36cf19d418.pdf>
- Higgins, S. and Richardson, D. 1999. Predicting Plant Migration Rates in a Changing World: The Role of Long-Distance Dispersal. *The American Naturalist*. 153. 464-475. 10.1086/303193.
- Howald, A.M. 1989. Report to the Fish and Game Commission on the status of *Gaviota tarplant* (*Hemizonia increscens* ssp. *villosa*). August 1989. 14 pp. + executive summaries.
- Jennersten, Ola. 1984. Flower visits and pollination efficiency of some North European butterflies. *Oecologia*. 63. 80-89. 10.1007/BF00379789.
- Jorgensen, S.E., Fath B. eds. 2008. Oxford, UK Edge Effect.
- Kaffine, D.T. Good Neighbors? Microclimate Effects of Wind Farms on Local Crop Yields. Department of Economics, University of Colorado Boulder. Accessed at: <https://www.econ.ucdavis.edu/events/papers/1018Kaffine.pdf>
- Kalish, S. and McPeck, M.A. *Oecologia*. 1993. 95: 314. <https://doi.org/10.1007/BF00320982>.
- Keith, David & DeCarolis, Joseph & Denkenberger, David & Lenschow, Donald & Malyshev, Sergey & Pacala, Stephen & Rasch, P. 2004. The influence of large-scale wind power on global climate, *Proc Natl Acad Sci (USA)* 101, 16115-16120. Proceedings of the National Academy of Sciences of the United States of America. 101. 16115-20. 10.1073/pnas.0406930101.
- Kelly, P.A. and J.T. Rotenberry. 1993. Buffer zones for ecological reserves in California: replacing guesswork with science. Pages 85-92 in Proceedings of the symposium: interface between ecology and land development in California, Keeley, J.E., editor. May 1-2, 1992; Occidental College, Los Angeles.
- Lach, L. 2007. Argentine ants displace floral arthropods in a biodiversity hotspot. *Journal of Conservation Biogeography*, Volume 14, Issue 2 March 2008, Pages 281–290.
- Lamont, B.B., P.G.L. Klinkhamer, and E.T.F. Witkowski. 1993. Population fragmentation may reduce fertility to zero in *Banksia goodii* – a demonstration of the Allee effect. *Oecologia* 94:446-450.
- Lande, R. *Res Popul Ecol* (1998) 40: 259. <https://doi.org/10.1007/BF02763457>.

LeVan, Katherine & Hung, Keng-Lou & McCann, Kyle & Ludka, John & Holway, David. (2013). Floral visitation by the Argentine ant reduces pollinator visitation and seed set in the coast barrel cactus, *Ferocactus viridescens*. *Oecologia*. 174. 10.1007/s00442-013-2739-z.

Lindborg, R., & Ehrlén, J. 2002. Evaluating the Extinction Risk of a Perennial Herb: Demographic Data versus Historical Records. *Conservation Biology*, 16(3), 683-690. Retrieved from <http://www.jstor.org/stable/3061215>

- Grazing is positively correlated with population persistence. Decreased grazing intensity has a clear negative effect. Populations initially increase after cessation of grazing, but after 10-20 years of cessation population numbers decreased.

Lundquist, Julie K., Eugene S. Takle, Matthieu Boquet, Branko Kosović, Michael E. Rhodes, Daniel Rajewski, Russell Doorenbos, Samantha Irvin, Matthew L. Aitken, Katja Friedrich, Paul T. Quelet, Jiwan Rana, Clara St. Martin, Brian Vanderwende, and Rochelle Worsnop. 2014. Lidar observations of interacting wind turbine wakes in an onshore wind farm. *The Science of Making Torque From Wind*, 2014.

Martin, Laura & Blossey, Bernd. 2012. Invasive plant cover impacts the desirability of lands for conservation acquisition. *Biodiversity and Conservation*. 21. 10.1007/s10531-012-0290-6.

McEvoy, P.B. and C.S. Cox. 1987. Wind dispersal distances in dimorphic achenes of ragwort *Senecio jacobaea*. *Ecology* 68(6):2,006-2,015.

McGuire, J. L., J. J. Lawler, B. H. McRae, T. A. Nuñez, and D. M. Theobald. 2016. [Achieving climate connectivity in a fragmented landscape](#). *Proceedings of the National Academy of Sciences* 113 (26): 7195-7200.

McIntyre, S. and S. Lavorel. 1994. Predicting richness of native, rare, and exotic plants in response to habitat and disturbance variables across a variegated landscape. *Conservation Biology* 8(2):521-531.

Meyer, Susan E.; Quinney, Dana; Weaver, Jay. 2006. A stochastic population model for *Lepidium papilliferum* (Brassicaceae), a rare desert ephemeral with a persistent seed bank. *American Journal of Botany*. 93(6): 891-902.

Mitchell, R.M., Bakker, J.D., Vincent, J.B., & Davies, G. 2017. Relative importance of abiotic, biotic, and disturbance drivers of plant community structure in the sagebrush steppe. *Ecological applications : a publication of the Ecological Society of America*, 27 3, 756-768 .

Mitrovich, M.J., Matsuda, T., Pease, K.H., & Fisher, R.N. 2010. Ants as a measure of effectiveness of habitat conservation planning in southern California. *Conservation biology : the journal of the Society for Conservation Biology*, 24 5, 1239-48 .

Morin DJ, Fuller AK, Royle JA, Sutherland C. 2008. Model-based estimators of density and connectivity to inform conservation of spatially structured populations. *Ecosphere*. 2017;8: e01623.

M.S. Fonseca, in *Encyclopedia of Ecology*, 2008.

MacArthur, R. H. & Wilson, E. O. 2016. *The Theory of Island Biogeography*. Princeton: Princeton University Press.

Matthies, D., Bräuer, I., Maibom, W., & Tschardt, T. 2004. Population Size and the Risk of Local Extinction: Empirical Evidence from Rare Plants. *Oikos*, 105(3), 481-488. Retrieved from <http://www.jstor.org/stable/3548284>.

Meinzer, FC, Brooks, JR, Bucci, S, Goldstein, G, Scholz, FG, Warren, JM. 2004. Converging patterns of uptake and hydraulic redistribution of soil water in contrasting woody vegetation types. *Tree Physiology* 24: 919– 928.

Menke, S. B., R. N. Fisher, W. Jetz, and D. A. Holway 2007. BIOTIC AND ABIOTIC CONTROLS OF ARGENTINE ANT INVASION SUCCESS AT LOCAL AND LANDSCAPE SCALES. *Ecology* 88:3164–3173.

Moody-Weis, J., and Alexander, H. (2007). Mechanisms and consequences of seed bank formation in wild sunflowers (*Helianthus annuus*). *Journal of Ecology*. 95. 851 - 864. 10.1111/j.1365-2745.2007.01254.x.

National Research Council. 1995. *Science and the Endangered Species Act*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/4978>.

Neel M, Tumas HR, Marsden BW. 2014. Representing connectivity: quantifying effective habitat availability based on area and connectivity for conservation status assessment and recovery. *PeerJ* 2:e622 <https://doi.org/10.7717/peerj.622>.

Neubert, M. and Parker, I. (2004). Projecting Rates of Spread for Invasive Species. *Risk analysis : an official publication of the Society for Risk Analysis*. 24. 817-31. 10.1111/j.0272-4332.2004.00481.x.

Niehaus, T.F. 1971. "A Biosystematic Study of the Genus *Brodiaea* (Amaryllidaceae)." *University of California Publications in Botany* 60: 1-66.

Noss, R., O'Connell, M. and Murphy, D. 2000. *The Science of Conservation Planning: Habitat Conservation Under The Endangered Species Act*. Bibliovault OAI Repository, the University of Chicago Press. 64. 10.2307/3802762.

O'Grady, J., Reed, D., Brook, B., and Frankham, R. 2004. What Are the Best Correlates of Predicted Extinction Risk?. *Biological Conservation*. 118. 513-520. 10.1016/j.biocon.2003.10.002.

Oostermeijer, J. & Luijten, Sheila & Ellis-Adam, A.C. & Nijs, J.C.M. 2002. Future prospects for the rare, late-flowering *Gentianella germanica* and *Gentianopsis ciliata* in Dutch nutrient-poor calcareous grasslands. *Biological Conservation*. 104. 339-350. 10.1016/S0006-3207(01)00199-9.

Pavlik, B. 1997. Perspectives, Tools, and Institutions for Conserving Rare Plants. *The Southwestern Naturalist*, 42(4), 375-383. Retrieved from <http://www.jstor.org/stable/30055302>.

Pavlovic N.B. Disturbance-dependent persistence of rare plants: anthropogenic impacts and restoration implications. In: Bowles M.L., Whelan C.J., editors. 1994. *Restoration of Endangered*

Species: Conceptual Issues, Planning and Implementation. Cambridge University Press; New York: 1994. pp. 159–193.

Petersen, E.L.; Mortensen, N.G.; Landberg, L.; Højstrup, J.; Frank, H.P. 1998. Wind power meteorology. Part I: Climate and turbulence. *Wind Energy* 1998, 1, 25–45.

Primack, D.P., C. Imbres, R.B. Primack, A.J. Miller-Rushing, and P. Del Tredici. 2004. Herbarium specimens 514 demonstrate earlier flowering times in response to warming in Boston. *American Journal of Botany* 91: 515–523.

Quantifying Landscape Pattern. 2001. In: *Landscape Ecology in Theory and Practice*. Springer, New York, NY.

Ragheb, M. Safety of Wind Systems. 8/27/2019

<https://mragheb.com/NPRE%20475%20Wind%20Power%20Systems/Safety%20of%20Wind%20Systems.pdf>. Accessed on Sept. 2, 2019.

Rajewski, D. A., E. S. Takle, J. H. Prueger, and R. K. Doorenbos. 2016. Toward understanding the physical link between turbines and microclimate impacts from in situ measurements in a large wind farm, *J. Geophys. Res. Atmos.*, 121, 13,392–13,414, doi:10.1002/2016JD025297.

Rajewski, D. A., Eugene S. Takle, Julie K. Lundquist, Steven Oncley, John H. Prueger, Thomas W. Horst, Michael E. Rhodes, Richard Pfeiffer, Jerry L. Hatfield, Kristopher K. Spoth, and Russell K. Doorenbos. 2013. CWEX: Crop/Wind-energy Experiment: Observations of surface-layer, boundary-layer and mesoscale interactions with a wind farm. *Bull. Amer. Meteor. Soc.*, 94, 655-672. doi: [10.1175/BAMS-D-11-00240](https://doi.org/10.1175/BAMS-D-11-00240)

Rajewski, D.A., Takle, E.A., Lundquist, J.K., Prueger, J.H., Rhodes, M.E., Pfeiffer, R., Hatfield, J.L., Spoth, K.K., and R. K. Doorenbos. 2014. Changes in fluxes of heat, H₂O, and CO₂ caused by a large wind farm. *Agric. and For. Meteorol.*, 194, 175-187. DOI: [10.1016/j.agrformet.2014.03.023](https://doi.org/10.1016/j.agrformet.2014.03.023).

Rajewski, D. A., Takle, E.S., Prueger, J.H., and R.K. Doorenbos, 2016: Toward understanding the physical link between turbines and microclimate impacts from in situ measurements in a large wind farm. *J. Geophys. Res. Atmos.*, 121, doi:10.1002/2016JD025297. <https://agupubs.onlinelibrary.wiley.com/doi/10.1002/2016JD025297>

Rathcke, B., and Jules, E. 1993. Habitat fragmentation and plant–pollinator interactions. *Current Science*, 65(3), 273-277. Retrieved from <http://www.jstor.org/stable/24095130>.

Rodrigues, D. M., Turchetto, C., Callegari-Jacques, S. M., and Freitas, L. B. (2018). Can the reproductive system of a rare and narrowly endemic plant species explain its high genetic diversity? *Acta Botanica Brasilica*, 32(2), 180-187. Epub January 08, 2018. <https://dx.doi.org/10.1590/0102-33062017abb0296>

Roy, S.B. 2004. Can large wind farms affect local meteorology? *Journal of Geophysical Research*, Vol. 109, Issue D19. Oct. 16, 2004.

Roy, S.B., and Traiteur, J.J. 2010. Impacts of wind farms on surface air temperatures. *Proceedings of the National Academy of Sciences of the United States of America*, 107 42, 17899-904.

Rytwinski, T., Soanes, K., Jaeger, J.A.G., Fahrig, L., Findlay, C. S., Houlahan, J., van der Ree, R., and van der Grift, E.A. 2016. *How effective is road mitigation at reducing road-kill? A meta-analysis*. PLoS ONE, 11 (11). pp. 1-25. ISSN 1932-6203.

Sahli, Heather F.; Krushelnycky, Paul D.; Drake, Donald R.; Taylor, Andrew D. (Jul 2016). "Patterns of floral visitation to native Hawaiian plants in presence and absence of invasive Argentine ants". *Pacific Science*. 70 (3): 309–322. doi:10.2984/70.3.3. ISSN 0030-8870

Sartain, A.R., and Alberts, A.C. 2008. Habitat Fragmentation and Scrub-Specialist Birds: San Diego Fragments Revisited. *Western Birds*, Vol. 39, Issue 2, pages 82-93.

Schulke, B., & Waser, N. 2001. Long-Distance Pollinator Flights and Pollen Dispersal between Populations of *Delphinium nuttallianum*. *Oecologia*, 127(2), 239-245. Retrieved from <http://www.jstor.org/stable/4222922>.

Shaffer, M.L. 1981. Minimum Population Sizes for Species Conservation. *BioScience*, Volume 31, Issue 2, February 1981, Pages 131–134, <https://doi.org/10.2307/1308256>.

Shaffer, M., & Samson, F. 1985. Population Size and Extinction: A Note on Determining Critical Population Sizes. *The American Naturalist*, 125(1), 144-152. Retrieved from <http://www.jstor.org/stable/2461612>.

Slawsky, L.M., Zhou, L., Roy, S.B., Xia, G., Vuille, M., and Harris, R. 2015. Observed Thermal Impacts of Wind Farms Over Northern Illinois. *Sensors* 2015, 15, 14981-15005.

Smith, C.M.; Barthelmie, R.J. 2013. Pryor, S.C. In situ observations of the influence of large onshore wind farm on near-surface temperature, turbulence intensity, and wind speed profiles. *Environ. Res. Lett.* 2013, 8, doi:10.1088/1748-9326/8/3/034006.

Soulé, Michael E., et al. 1992. The Effects of Habitat Fragmentation on Chaparral Plants and Vertebrates. *Oikos*, vol. 63, no. 1, 1992, pp. 39–47. JSTOR, www.jstor.org/stable/3545514.

Stamps, J.A., M. Buechner, and V.V. Krishnan. 1987. The effects of edge permeability and habitat geometry on emigration from patches of habitat. *American Naturalist* 129(4):533-552.

Steffan-Dewenter, I., & Tscharrntke, T. 1999. Effects of Habitat Isolation on Pollinator Communities and Seed Set. *Oecologia*, 121(3), 432-440. Retrieved from <http://www.jstor.org/stable/4222487>.

Stull, R.B. 1988. *An Introduction to Boundary Layer Meteorology*; Kluwer Academic Publishers: Boston, MA, USA.

Suarez, A.V., D.T. Bolger, and T.J. Case. 1998. Effects of fragmentation and invasion on native ant communities in coastal southern California. *Ecology* 79(6):2,041- 2,056.

Takle, E. S., 2017: Climate. In M. Perrow, ed., 2017: *Wildlife and Wind Farms – Conflicts and Solutions*. Volume I. Onshore Potential Effects. Pelagic Publishing. 298 pp. ISBN 9781784271190.

Takle, E. S., D. A Rajewski, and S. I. Purdy, 2017: The Iowa Atmospheric Observatory: Revealing the unique boundary-layer characteristics of a wind farm. *Earth Interactions* published 2019. <https://journals.ametsoc.org/doi/full/10.1175/EI-D-17-0024.1>

- Tanowitz, B. D. 1982. Taxonomy of *Hemizonia* sect. *Madiomeris* (Asteraceae: Madiinae). *Syst. Bot.* 7(3):314-339.
- Tanowitz, B., Salopek, P., & Mahall, B. (1987). Differential Germination of Ray and Disc Achenes in *Hemizonia increscens* (Asteraceae). *American Journal of Botany*, 74(3), 303-312. Retrieved from <http://www.jstor.org/stable/2443806>
- Trieb, F. 2018. Interference of Flying insects and Wind Parks. *Department of Systems Analysis and Technology Assessment, Institute of Engineering Thermodynamics, Stuttgart, Germany*, 30.10.2018
- Trieb, F. 2018. Interferences of Flying Insects and Wind Parks (FliWip) – Study Report, October 2018. Institute of Engineering Thermodynamics Department of Systems Analysis and Technology Assessment.
- USFWS. U.S. Fish and Wildlife Service Ventura Fish and Wildlife Office Ventura, California. 2006. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Astragalus brauntonii* and *Pentachaeta lyonii*; Final Rule.
- USFWS. U.S. Fish and Wildlife Service Ventura Fish and Wildlife Office Ventura, California. 2011. *Deinandra increscens* ssp. *villosa* (Gaviota tarplant) 5-Year Review: Summary and Evaluation.
- Villamil, N., Boege, K., and Stone, G. 2018. Ant-Pollinator Conflict Results in Pollinator Deterrence but no Nectar Trade-Offs. *Frontiers in Plant Science*, 2018; 9: 1093.
- Volis S., Ormanbekova D., and Shulgina I. 2016. Role of selection and gene flow in population differentiation at the edge vs. interior of the species range differing in climatic conditions. *Mol Ecol.* 2016 Apr;25(7):1449-64.
- Walsh-Thomas, J.M.; Cervone, G.; Manca, G.; Agouris, P.2012. Further evidence of impacts of large-scale wind farms on land surface temperature. *Renew. Sustain. Energy Rev.* Vol. 16, 6432–6437.
- Waser, N., Price, M., Casco, G., Diaz, M., Morales, A., and Solverson, J. (2016). Effects of Road Dust on the Pollination and Reproduction of Wildflowers. *International Journal of Plant Sciences.* 178. 000-000. 10.1086/689282.
- Yahner, R.H. 1988. Changes in wildlife communities near edges. *Conservation Biology* 2:33-339.
- Zedler, P., Guehlstorff, K., Scheidlinger, C., & Gautier, C. 1983. The Population Ecology of a Dune Thistle, *Cirsium rothophilum* (Asteraceae). *American Journal of Botany*, 70(10), 1516-1527. Retrieved from <http://www.jstor.org/stable/2443350>.
- Zhou, L.; Chen, H.; Dai, Y. 2015. Stronger warming amplification over drier ecoregions observed since 1979. *Environ. Res. Lett.* 2015, 10, doi:10.1088/1748-9326/10/6/064012.
- Zhou, L.; Tian, Y.; Chen, H.; Dai, Y.; Harris, R.A. 2013. Effects of topography on assessing wind farm impacts using MODIS data. *Earth Interact.* 2013, 17, 1–18.

Zhou, L., Tian, Y., Roy, S.B., Dai, Y., and Chen, H. 2013. Diurnal and seasonal variations of wind farm impacts on land surface temperature over western Texas. *Clim. Dyn.* 2013, 41, 307–326.

Zhou, L., Tian, Y., Roy, S.B., Thorncroft, C., Bosart, L. and, Hu, Y. 2012. Impacts of wind farms on land surface temperature. *Nature Climate Change*. 2. 539-543. 10.1038/nclimate1505.