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Mitigating the Impacts of the Renewable Energy Gold Rush

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INTRODUCTION

Solar energy developers have turned their sights on California's deserts. The California desert has high insolation (i.e., it is very sunny). In addition, much of the California desert is publicly owned, and leasing federal lands may be easier for solar developers than piecing together multiple appropriate private parcels.[1] Until a few years ago there were no large-scale solar projects on federal public land in

1. Patrick Donnelly-Shores & Dustin Mulvaney, Solar Energy Development on Public Lands: Policy-Making Process in California's New Gold Rush 10 (2012) (unpublished manuscript) (on file with authors); *see also* D. Richard Cameron et al., *An Approach to Enhance the Conservation-Compatibility of Solar Energy Development*, PLOS ONE, June 2012, at 1, 2, *available at* http://www.plosone.org/article/fetchObject.action?uri=info%3Adoi%2F10.1371%2Fjournal.pone.0038437&representation=PDF; Robert L. Glicksman, *Solar Energy Development on the Federal Public Lands: Environmental Trade-Offs on the Road to a Low-Carbon Future*, 3 SAN DIEGO J. CLIMATE & ENERGY L. 107, 151 (2011). However, some developers may prefer to avoid the additional permitting hurdles involved in siting projects on federal land. Julie Cart, *Land Speculators See Silver Lining in Solar Projects*, L.A. TIMES, Feb. 18, 2012, http://articles.latimes.com/2012/feb/18/local/la-me-solar-land-20120218 (providing examples of developers purchasing privately-owned land to be resold for development of solar energy projects).

California, and there were very few on non-federal land.[2] Since 2010, local, state, and federal agencies have approved nearly 9000 megawatts (MW) of solar energy projects in the California desert, including more than 3000 MW on public lands.[3] The 9000 MW of approved projects (if all are developed) would require approximately 63,000 acres of total desert land with 21,000 federal acres.[4] The Bureau of Land Management, the agency in charge of the federal lands at issue, is currently reviewing applications that would cover an additional 117,000 acres.[5]

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2. Ilene Anderson & Jeff Childers, Presentation at Farella, Braun, and Martell LLP in San Francisco, CA., Is the Fast Track Too Fast? (Jan. 25, 2012) (on file with authors). "Large-scale" here is a synonym of "utility-scale," meaning projects large enough to sell power to utilities (usually 20 MW or more). Large-scale project developers enter power purchase agreements with utilities. *See generally* JASON BURWEN & YULIA SHMIDT, DIV. OF RATEPAYER ADVOCATES, GREEN RUSH: INVESTOR-OWNED UTILITIES' COMPLIANCE WITH RENEWABLES PORTFOLIO STANDARD (2011). These agreements guarantee markets for the generated electricity. Renewable energy producers have been securing agreements with rates above market. *Id.* at 8. There have been controversies over the approval of above-market-rate power purchase agreements for utility-scale solar projects. Todd Woody, *California Approves High-Priced Mojave Solar Project over Objections*, FORBES (Nov. 10, 2011, 2:49 PM), http://www.forbes.com/sites/toddwoody/2011/11/10/california-approves-high-priced-mojave-solar-project-over-objections/.

3. DESERT RENEWABLE ENERGY CONSERVATION PLAN, DESCRIPTION AND COMPARATIVE EVALUATION OF DRAFT DRECP ALTERNATIVES 3.5-7, at tbl.3.5-1 (2012) [hereinafter DRECP PROJECTS TABLE].

4. *See* SEAN ONG ET AL., NAT'L RENEWABLE ENERGY LAB., LAND-USE REQUIREMENTS FOR SOLAR POWER PLANTS IN THE UNITED STATES 17 (2013), *available at* http://www.nrel.gov/docs/fy13osti/56290.pdf (finding that large-scale solar energy installations take up an average of 7.3 acres per MW of energy produced). *See generally* John D. Leshy, *Federal Lands in the Twenty-First Century*, 50 NAT. RESOURCES J. 111, 117 (2010) ("Large-scale efforts to develop renewable energy sources will inevitably use federal lands, perhaps in vast amounts, because they contain solar, wind, and geothermal resources in some abundance. Many millions of federal acres have already been identified as having solar and wind energy potential, and such developments, especially generating stations using concentrated solar power, tend to make more extensive and intensive use of more lands than coal mines, oil and gas fields, and fossil-fueled power plants." (citations omitted)).

5. BUREAU OF LAND MGMT., BLM CALIFORNIA SOLAR APPLICATIONS (2013), *available at* http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/pa/energy/solar.Par.84447.File.dat/BLM%20Solar%20Apps%20and%20Auths; *see also* Press Release, U.S. Dep't of the Interior, Secretary Salazar Announces Milestone on McCoy Solar Energy Project, Caps Strong Year for Renewable Energy Development on Public Lands (Dec. 20, 2012), *available at* http://www.doi.gov/news/pressreleases/secretary-salazar-announces-milestone-on-mccoy-solar-energy-project-caps-strong-year-for-renewable-energy-development-on-public-lands.cfm (describing approval of the 750 MW McCoy

The scale of proposed landscape change is unprecedented, and opponents of utility-scale renewables characterize these projects as "energy sprawl."[6] Solar energy facilities can be more land-intensive than other forms of energy generation.[7] Current solar technologies require approximately seven acres per MW,[8] whereas a large gas-fired power plant would require 0.06 acres per MW. One MW of solar energy can power an average of almost 220 homes.[9]

Fossil fuel emissions are a major contributor to climate change and have been characterized as "a runaway train, hurtling the world's citizens toward a stone wall."[10] Renewable energy development is critical to reducing greenhouse gas emissions. In 2002, the California legislature passed a Renewable Portfolio Standard (RPS), requiring utilities to steadily increase the percentage of energy they obtain from renewable energy sources.[11] Together with the American

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Solar Energy Project in Riverside County California as the thirty-fourth approved project).

6. Todd Woody, *Concerns as Solar Installations Join a Desert Ecosystem*, N.Y. TIMES, Nov. 16, 2010, at F7 ("'If wildlife issues are not at the top of a developer's list, they should be,' said Karen Douglas, the chairwoman of the California Energy Commission, which licenses large solar thermal power plants. 'The footprint of these solar projects is unprecedented, and obviously they can impact a range of species.'"). *See generally* Sara C. Bronin, *Curbing Energy Sprawl with Microgrids*, 43 CONN. L. REV. 547, 549 (2010) ("Energy sprawl—the phenomenon of the ever-increasing consumption of land, particularly in rural areas, required to site energy generation facilities—is a real and growing problem" (citation omitted)); *Welcome*, BASIN & RANGE WATCH, http://www.basinandrangewatch.org/ (last visited Oct. 27, 2013) (describing a group of volunteers in Nevada and California fighting against "energy sprawl").

7. Glicksman, *supra* note 1, at 110 ("Renewable projects generally require more land than conventional sources for the production of an equivalent amount of power.").

8. CAL. ENERGY COMM'N, SOLAR CALCULATOR FOR PHOTOVOLTAICS AND CONCENTRATED SOLAR POWER, app. L, at L-6 tbl.2 (2012), *available at* http://www.drecp.org/documents/docs/alternatives_eval/Appendices/Appendix_L_Estimating_Future_Generation_Capacity.pdf; *see* ONG ET AL., *supra* note 4, at 17.

9. *What's in a Megawatt?*, SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/policy/solar-technology/photovoltaic-solar-electric/whats-megawatt (last visited Jan. 26, 2013).

10. Justin Gillis, *A Scientist, His Work and a Climate Reckoning*, N.Y. TIMES, Dec. 22, 2010, at A1.

11. *RPS Program Overview*, CAL. PUB. UTIL. COMMISSION, http://www.cpuc.ca.gov/PUC/energy/Renewables/overview.htm (last updated Mar. 1, 2013).

Recovery and Reinvestment Act (ARRA or the Recovery Act)[12] funding, the RPS has spurred a renewable energy "gold rush."[13] Studies demonstrate that solar resources in California's deserts could easily meet the state's RPS goals.[14] California enacted its RPS rules largely because renewable energy development is seen as critical to reducing greenhouse gas emissions.[15]

Because of concern about the potentially devastating impacts of climate change, most major environmental groups have expressed general support for expansion of renewable energy.[16] However, many of these groups are also concerned about the impacts of proposed projects on desert species and

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12. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat 115 (codified as amended at scattered portions of 1, 12, 15, 19, 26, and 42 U.S.C.).

13. Dana Hull, *Clean Energy 'Gold Rush' in Mojave Spurs Backlash*, CHRISTIAN SCI. MONITOR (Oct. 31, 2011), http://www.csmonitor.com/Innovation/2011/1031/Clean-energy-gold-rush-in-Mojave-spurs-backlash; Eric Lipton & Clifford Krauss, *Gold Rush of Subsidies in the Search for Clean Energy*, N.Y. TIMES, Nov. 11, 2011, http://www.nytimes.com/2011/11/12/business/energy-environment/a-cornucopia-of-help-for-renewable-energy.html; Herman K. Trabish, *Is This the New California Gold Rush?*, GREENTECHMEDIA (July 1, 2011) http://www.greentechmedia.com/articles/read/is-this-the-new-california-gold-rush/; *see also* Ken Zweibel, James Mason & Vasilis Fthenakis, *A Solar Grand Plan*, SCI. AM. MAG. (Dec. 16, 2007), http://www.scientificamerican.com/article.cfm?id=a-solar-grand-plan ("[W]e present a grant plan that could provide 69 percent of the U.S.'s electricity and 35 percent of its total energy . . . with solar power by 2050.").

14. Autumn Petros-Good, Optimization in the Golden Desert: Finding Optimal Configurations of Solar Installations that Maximize Output and Minimize Land Use 19 (2011) (unpublished M.S. thesis, University of California, Berkeley) (on file with University of California libraries); *see also* Cameron, *supra* note 1, at 3 (discussing the small average parcel size of private lands in the Mojave desert); Press Release, Dep't of the Interior, Bureau of Land Mgmt., Secretary Salazar, Governor Brown Expand Partnership to Expedite Renewable Energy Projects in California (Jan. 13, 2012), *available at* http://www.blm.gov/wo/st/en/info/newsroom/2012/january/NR_01_13A_2012.html.

15. Press Release, Cal. Pub. Utils. Comm'n, CPUC Applauds Renewable Energy Bill Signing (Apr. 12, 2011), *available at* http://docs.cpuc.ca.gov/PUBLISHED/NEWS_RELEASE/133440.htm ("We applaud the Governor's signing of this important bill, which will decrease California's use of fossil fuel generation and improve our environment . . . ." (quoting CPUC President Michael R. Peevey) (internal quotation marks omitted)).

16. Felicity Barringer, *A Soft Spot of Public Lands*, N.Y. TIMES GREEN BLOG (Oct. 6, 2010), http://green.blogs.nytimes.com/2010/10/06/a-soft-spot-for-public-lands. While environmental groups generally support renewable energy, both national and local organizations have challenged the siting of renewable energy projects. *See* John Copeland Nagle, *Green Harms of Green Projects*, 27 NOTRE DAME J.L. ETHICS & PUB. POL'Y 59, 74–86 (2013) (describing challenges to the siting of solar and wind facilities).

ecosystems as well as on scenic and recreational value.[17] Approved and proposed solar projects in the California desert will affect imperiled species including the desert tortoise, Mojave ground squirrel, Mojave fringe-toed lizard, and flat-tailed horned lizard, as well as unique desert habitats.[18] The consequences of desert development are particularly troubling because of limited scientific understanding of these ecosystems.[19] Deserts are slow to recover from disturbance, and damaging desert soils limits their ability to act as carbon sinks.[20] Debates over the competing environmental priorities represented by solar energy development in the California desert have been characterized as a "Green Civil War."[21]

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17. Glicksman, *supra* note 1, at 111–12, 117; Nagle, *supra* note 16, at 74–86. *See generally* Jeffrey E. Lovich & Joshua R. Ennen, *Wildlife Conservation and Solar Energy Development in the Desert Southwest, United States,* 61 BIOSCIENCE 982 (2011) (discussing the effects on wildlife of utility-scale solar energy development).

18. Nagle, *supra* note 16, at 74–86; s*ee, e.g.*, Lovich & Ennen, *supra* note 17, at 982 ("The potential effects of the construction and the eventual decommissioning of solar energy facilities include the direct mortality of wildlife; environmental impacts of fugitive dust and dust suppressants; destruction and modification of habitat, including the impacts of roads; and off-site impacts related to construction material acquisition, processing, and transportation. The potential effects of the operation and maintenance of the facilities include habitat fragmentation and barriers to gene flow, increased noise, electromagnetic field generation, microclimate alteration, pollution, water consumption, and fire. Facility design effects, the efficacy of site-selection criteria, and the cumulative effects of USSED on regional wildlife populations are unknown."); *see also* ERIN LIEBERMAN ET AL., DEFENDERS OF WILDLIFE, MAKING RENEWABLE ENERGY WILDLIFE-FRIENDLY, *available at* http://www.defenders.org/sites/default/files/publications/making_renewable_energy_wildlife_friendly.pdf (last visited Jan. 27, 2013).

19. DRECP INDEP. SCI. PANEL, FINAL REPORT: INDEPENDENT SCIENCE REVIEW FOR THE CALIFORNIA DESERT RENEWABLE ENERGY CONSERVATION PLAN (DRECP) 28 (2012) [hereinafter ISA FINAL REPORT], *available at* http://www.drecp.org/documents/docs/independent_science_2012/Independent_Science_Panel_2012_Final_Report.pdf ("Desert ecosystems are less well studied than other biomes, elevating uncertainties and the importance of adaptive management."); *see also* Leshy, *supra* note 4, at 126.

20. Cameron, *supra* note 1, at 2. *See generally* DAVID A. BAINBRIDGE, A GUIDE FOR DESERT AND DRYLAND RESTORATION (2007) (proposing solutions for dryland restoration and desert recovery).

21. Ed Humes, *Solar Flare Ups: A Fight Over the Future of Clean Energy Is Pitting Environmentalists Against one Another*, CAL. LAW., Nov. 9, 2009, at 22; The Editors, *Green Civil War: Projects vs. Preservation*, N.Y. TIMES ROOM FOR DEBATE BLOG (Jan. 12, 2010, 8:01 PM), http://roomfordebate.blogs.nytimes.com/2010/01/12/green-civil-war-projects-vs-preservation/; Sarah McBride, *Special Report: With Solar Power, It's Green vs. Green*, REUTERS (Jan. 5, 2011, 4:36 PM), http://www.reuters.com/article/2011/01/05/us-solar-wars-idUSTRE7042ZR20110105; Todd Woody, *Desert*

Large-scale solar developments must go through several levels of environmental review and permitting before construction or operation begins.[22] Many of the projects approved in the past several years have been "fast tracked" through various permitting processes to meet funding deadlines and policy goals.[23] Fast-tracking has occurred despite limited environmental data on the possible impacts of the proposed developments.[24] Large expanses of the desert have never been extensively surveyed for sensitive plants and wildlife, and the long-term impacts of enormous solar facilities on migrating birds and other wildlife are not yet clear.[25] In the meantime, state and federal agencies have been collaborating on a large-scale plan to facilitate renewable energy development in the California desert and streamline permitting and conservation requirements—the Desert Renewable Energy Conservation Plan (DRECP).[26] A panel of independent scientists characterized the interim version of the DRECP, as a "huge environmental experiment with many uncertain outcomes."[27]

Vistas vs. Solar Power, N.Y. TIMES, Dec. 21, 2009, http://www.nytimes.com/2009/12/22/business/energy-environment/22solar.html. *See generally* Alexandra B. Klass, *Renewable Energy and the Public Trust Doctrine,* 45 U.C. DAVIS L. REV. 1021 (2012) (discussing the competing public trust values represented by renewable energy development).

22. *See* Derek Hawkins, *DOI Approves Solar Development Fast-Track Plan,* LAW360 (Oct. 12, 2012, 5:21 PM), http://www.law360.com/articles/386339/doi-approves-solar-development-fast-track-plan.

23. *Id.* (reporting that the U.S. Department of the Interior was creating seventeen solar energy development zones designed to reduce associated permitting problems).

24. *See* Complaint for Declaratory and Injunctive Relief ¶ 2, Western Watersheds Project v. Salazar, No. CV 11-00492-DMG (C.D. Cal. Jan. 12, 2011) (arguing that the Ivanpah solar project was flawed due to an "unduly hasty" environmental review).

25. DRECP INDEP. SCI. ADVISORS, RECOMMENDATIONS OF INDEPENDENT SCIENCE ADVISORS FOR THE CALIFORNIA DESERT RENEWABLE ENERGY CONSERVATION PLAN 3 (2010) [hereinafter ISA RECOMMENDATIONS], *available at* http://www.energy.ca.gov/2010publications/DRECP-1000-2010-008/DRECP-1000-2010-008-F.PDF. Recently, a Yuma clapper rail (a federally listed endangered bird) was found dead at the Desert Sunlight Solar Farm near Joshua Tree National Park in Riverside County. *See* Chris Clarke, *Endangered Bird Found Dead at Desert Solar Power Facility*, KCET (July 10, 2013, 2:50 PM), http://www.kcet.org/news/rewire/solar/photovoltaic-pv/endangered-bird-dead-at-desert-solar-facility.html. Impacts on this species were not anticipated in the project's environmental review documents or federal ESA permit. *Id.*

26. ISA RECOMMENDATIONS, *supra* note 25, at 3.

27. *Id.*

Because of the desert location of these proposed projects, nearly all of them have the potential to impact endangered and threatened species. State and federal law allows project developers to site projects on endangered species habitat if the projects go through an environmental review process and obtain permits for incidental take of endangered species.[28] As part of the Endangered Species Act permitting process, project proponents must develop a plan that mitigates potential harm to endangered species resulting from construction or operation of the solar power facilities.[29] One of the most common forms of mitigation is to require project proponents to pay to permanently preserve endangered species habitat at another site.[30]

This Article questions where the push for utility-scale solar energy development in the California desert leaves endangered species preservation. We begin in Part I by providing some general context for the boom in renewable energy projects and outlining the main mechanisms for expediting endangered species permitting. Part II details offsite mitigation requirements for recently approved projects. Finally, in Part III, we draw some conclusions about the challenges posed by the current strategies for balancing renewable energy development and endangered species protection, and we make recommendations for strengthening mitigation outcomes.

Our research highlights general concerns with perpetual off-site mitigation and the lack of oversight and information about mitigation projects. Through examining the development of two specific solar power facilities in the California desert (Ivanpah and Genesis), we demonstrate the mitigation choices, the time lag between project approval and developed mitigation plans, and the roles scientific uncertainty plays in making project decisions. Overall, the picture we paint is a disturbing one where decisions regarding desert development are made without full consideration or understanding of the mitigation measures. The urge to approve projects and get them operational quickly increases this problem. In such an

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28. *Endangered Species, Permits*, U.S. FISH & WILDLIFE SERVICE, http://www.fws.gov/ENDANGERED/permits/index.html (last visited Oct. 18, 2013).

29. *See* 16 U.S.C. § 1539(a) (2012).

30. *See* Jessica Owley Lippmann, *Exacted Conservation Easements: The Hard Case of Endangered Species Protection*, 19 J. ENVTL. L. & LITIG. 293, 293 (2004).

uncertain realm, infusing concepts of reevaluation and adaptive management can provide routes to incorporate new information and alter mitigation or development plans as necessary. Current efforts at consolidated landscape-level planning may help ameliorate some of these concerns, but a better solution may be to slow down the pace of project approval to enable better understanding of the desert ecosystem and full evaluation of mitigation prior to plant construction.

I. SOLAR ENERGY BASICS

A. SOLAR TECHNOLOGIES

Solar energy currently makes up less than one percent of the electric power generated in the United States.[31] However, it has enormous potential to expand.[32] Between 2000 and 2010, solar power generation in the United States increased more than fivefold.[33] Solar energy development was previously limited by several factors, including available technology and an entrenched subsidy-receiving fossil fuel industry.[34] Improved technologies, available land, and increased fossil fuel costs make solar power attractive. Combined with subsidies and RPS requirements, the push for solar is on.[35]

There are two primary solar technologies: solar photovoltaics (PV) and concentrating solar power (CSP). Semiconductor cells in PV panels generate electricity when exposed

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31. FED. ENERGY REGULATORY COMM'N, OFFICE OF ENERGY PROJECTS ENERGY INFRASTRUCTURE UPDATE FOR SEPTEMBER 4 (2012), http://www.ferc.gov/legal/staff-reports/sep-2012-energy-infrastructure.pdf; Klass, *supra* note 21, at 1058.

32. NAT'L RENEWABLE ENERGY LAB. (NREL), U.S. RENEWABLE ENERGY TECHNICAL POTENTIALS: A GIS-BASED ANALYSIS 8 (2012) [hereinafter NREL ENERGY POTENTIALS], *available at* http://www.nrel.gov/docs/fy12osti/51946.pdf.

33. NREL, 2010 RENEWABLE ENERGY DATA BOOK 67 (2011), *available at* http://www.nrel.gov/analysis/pdfs/51680.pdf.

34. HERMANN SCHEER, THE SOLAR ECONOMY: RENEWABLE ENERGY FOR A SUSTAINABLE GLOBAL FUTURE 28 (2002) ("[T]here is one notorious clinching argument which is always raised against the comprehensive and thoroughgoing realization of [large-scale introduction of solar energy]: conventional energy sources are assumed to have an economic advantage . . . .").

35. Al Senia, *Utility Scale Solar Energy Projects Coming on Line,* ENERGYBIZ (Apr. 16, 2013), http://www.energybiz.com/article/13/04/utility-scale-solar-energy-projects-coming-line.

to the sun.[36] PV panels have been used most commonly for residential and commercial use,[37] but are being scaled up now for utility-scale projects.[38] CSP systems use mirrors and collectors to convert solar energy to electricity indirectly by heating a fluid to a high temperature (from 300°F to more than 1000°F); heat from the fluid is then used to generate electricity.[39] CSP power plants may use several different technologies for harvesting solar energy including power towers and solar troughs.[40] Solar power plants that are large enough to sell power to utilities through a power purchase agreement and feed into the electricity transmission grid (usually at least 20 MW) are considered "utility-scale."[41]

The price for PV panels in particular has dropped dramatically as a result of increasing Chinese production.[42] As PV prices have dropped, many project developers are moving

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36. NAT'L RENEWABLE ENERGY LAB. (NREL), LEARNING ABOUT RENEWABLE ENERGY: SOLAR PHOTOVOLTAIC TECHNOLOGY BASICS (2012), *available at* http://www.nrel.gov/learning/re_photovoltaics.html.

37. Klass, *supra* note 21, at 1059.

38. *See* NREL ENERGY POTENTIALS, *supra* note 32, at 8 (finding that rural utility-scale photovoltaic solar energy production "leads all other technologies in technical potential").

39. SOLAR ENERGY INDUS. ASS'N, CONCENTRATING SOLAR POWER 1 (2012), *available at* http://www.seia.org/sites/default/files/cspfactsheet-120223144940-phpapp01.pdf.

40. *Id.* (noting several different CSP technologies).

41. *Utility-Scale Solar Energy*, SOLAR ENERGY DEV. PROGRAMMATIC EIS INFO. CENTER, http://solareis.anl.gov/guide/solar/index.cfm (last visited July 10, 2013); *see also* CAL. ENERGY COMM'N, DISTRIBUTED GENERATION AND COGENERATION POLICY ROADMAP FOR CALIFORNIA 8 (2007), *available at* http://www.energy.ca.gov/2007publications/CEC-500-2007-021/CEC-500-2007-021.PDF (describing how "clean" distributed generation is eligible for exemptions and low-interest loans).

42. EXEC. OFFICE OF THE PRESIDENT & EXEC. OFFICE OF THE VICE PRESIDENT, THE RECOVERY ACT: TRANSFORMING THE AMERICAN ECONOMY THROUGH INNOVATION 21 (2010), *available at* http://www.whitehouse.gov/sites/default/files/uploads/Recovery_Act_Innovation.pdf ("Near-term improvements will be able to cut the cost of solar power in half as second generation thin-film solar panels such as the rapidly emerging CIGS and Cd-Te technologies compete with ever improving traditional silicon-based panels. Beyond that, breakthrough technologies could make solar as cheap as new fossil fuel plants without government incentives."). The high-profile bankruptcy of Solyndra was largely a consequence of rapidly decreasing PV prices. Tor Valenza, *Hooray! A Solar PV Brand is Finally a Household Name! Except the Brand is Solyndra. Bummer.*, RENEWABLE ENERGY WORLD (Oct. 4, 2011), http://www.renewableenergyworld.com/rea/blog/post/2011/10/hooray-a-solar-pv-brand-is-finally-a-household-name-except-the-brand-is-solyndra-bummer.

away from CSP.[43] Although solar technology costs are decreasing, it is still expensive for developers to finance utility-scale projects.[44] The recent Ivanpah solar project, which is halfway through construction, will cost over two billion dollars to build.[45]

B. CALIFORNIA DESERTS AND THE DOWNSIDE OF SOLAR

California includes the Mojave, Sonoran, and Colorado Desert ecoregions.[46] These deserts are unique and beautiful. Congress explicitly recognized the beauty and importance of California's deserts when it passed the Federal Land Policy Management Act of 1976, which noted that "the California desert environment is a total ecosystem that is extremely fragile, easily scarred, and slowly healed."[47] These deserts house creosote bush, Joshua trees, mesquite, salt brush, ocotillo, and microphyll woodlands.[48] They are also home to the desert tortoise, desert bighorn sheep, desert kit fox, Mojave ground squirrel, golden eagle, chuckwalla, Mojave fringe-toed lizard, flat-tailed horned lizard, and burrowing owl.[49] All of

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43. Nichola Groom, *Solar Developers Scrapping Thermal for Photovoltaic,* REUTERS (June 30, 2011, 3:30 PM), http://af.reuters.com/article/energyOilNews/idAFN1E75T17920110630; Jennifer Runyon, *Solar Shakeout Continues: Sterling Energy Systems Files for Chapter 7 Bankruptcy,* RENEWABLE ENERGY WORLD (Sept. 28, 2011), http://www.renewableenergyworld.com/rea/news/article/2011/09/solar-shakeout-continues-stirling-energy-systems-files-for-chapter-7-bankruptcy ("A source familiar with the project indicated that no more than two CSP projects would ever be completed (in Calif.) because the cost of the technology is just too high when compared with PV.").

44. Robert Glennon & Andrew M. Reeves, *Solar Energy's Cloudy Future,* 1 ARIZ. J. ENVTL. L. & POL'Y 91, 105 (2010) ("[M]ost PV systems are not economically viable at utility scale when compared with other low-cost fuel options.").

45. Lindsay Morris, *Bechtel President of Renewables Discusses Ivanpah,* RENEWABLE ENERGY WORLD (Sept. 20, 2012), http://www.renewableenergyworld.com/rea/news/article/2012/09/bechtel-president-of-renewables-discusses-ivanpah (putting the cost of the project at $2.2 billion).

46. *See* TAYLOR H. RICKETTS, TERRESTRIAL ECOREGIONS OF NORTH AMERICA: A CONSERVATION ASSESSMENT 8–9 (1999) (showing a map of California desert ecoregions).

47. 43 U.S.C. § 1781(a)(2) (1976).

48. CAL. DEP'T OF FISH & GAME, INTERIM MITIGATION STRATEGY AS REQUIRED BY SB X8 34, at 6–7 (2010) [hereinafter IMS], *available at* http://www.energy.ca.gov/2010publications/DRECP-1000-2010-006/DRECP-1000-2010-006-F.PDF.

49. *Id.*

these species and habitats are at risk with large-scale solar developments.

While solar projects can provide a great deal of energy with low emission of greenhouse gases, they can also have significant environmental impacts.[50] As noted earlier, solar facilities in California require approximately seven acres of relatively flat land per MW of power.[51] Considering the high numbers of MW being developed, this can eliminate or severely degrade large amounts of habitat for special-status plants and wildlife.[52] Other impacts occur during construction and operation of the facilities. Solar power plants require water during construction for dust control and during operation for washing mirrors or PV panels.[53] Grading and facility layout may require major changes to site hydrology.[54] CSP projects, especially wet-cooled projects, require huge amounts of water, a very constrained resource in the desert.[55] Wildlife may be killed by construction vehicles or collide with solar facilities and transmission lines.[56] CSP facilities in particular may pose major risks to migrating birds.[57]

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50. Donnelly-Shores & Mulvaney, *supra* note 1, at 19.

51. CAL. ENERGY COMM'N, *supra* note 8, app. L, at L-6 tbl.2. A study of Arizona's new facilities presented even starker numbers with nearly 23 acres to 1 MW for CSP facilities. Glennon & Reeves, *supra* note 44, at 104–05.

52. Louis Sahagun, *Environmental Concerns Delay Solar Projects in California Desert*, L.A. TIMES, Oct. 19, 2009, http://articles.latimes.com/2009/oct/19/local/me-solar19.

53. CAL. ENERGY COMM'N, RENEWABLE POWER IN CALIFORNIA: STATUS AND ISSUES LEAD COMMISSIONER REPORT 58 (2011) [hereinafter RENEWABLE POWER STAFF REPORT], *available at* http://www.energy.ca.gov/2011publications/CEC-150-2011-002/CEC-150-2011-002-LCF-REV1.pdf; Glennon & Reeves, *supra* note 44, at 98–100.

54. *See, e.g.*, MARATHON SOLAR, LLC, MARATHON SOLAR SITE PRELIMINARY HYDROLOGIC ANALYSIS 4 (2013), *available at* http://www.sbcounty.gov/Uploads/lus/Environmental/Marathon/MarathonSolarHydroRev.pdf (providing that a proposed solar power plant would require site grading for hydrology purposes).

55. Robert Glennon, *Is Solar Power Dead in the Water?*, WASH. POST, June 7, 2009, http://articles.washingtonpost.com/2009-06-07/opinions/36862659_1_solar-power-csp-plants-thermal-power-plant.

56. *See* Lovich & Ennen, *supra* note 17, at 985–86.

57. Hadassah M. Reimer & Sandra A. Snodgrass, *Tortoises, Bats, and Birds, Oh My: Protected-Species Implications for Renewable Energy Projects*, 46 IDAHO L. REV. 545, 575–76 (2010); *see* Chris Clarke, *Water Birds Turing Up Dead at Solar Projects in the Desert*, KCET (July 17, 2013), http://www.kcet.org/news/rewire/solar/water-birds-turning-up-dead-at-solar-projects-in-desert.html.

Impacts to desert tortoises are a particular concern for wildlife advocates and have been a major hot-button issue in controversies over solar projects in the California desert.[58] The population of desert tortoises west of the Colorado River is listed as federally threatened.[59] According to the California Department of Fish and Wildlife, this population of desert tortoises has declined up to ninety percent over the past fifty years.[60] Government agencies spent $93 million on desert tortoise conservation from 1996–2006 (more than was spent on the grey wolf, grizzly bear, or bald eagle).[61] Desert tortoise mitigation has received particular scrutiny in recent years because more than half of the desert tortoises that were relocated to accommodate the expansion of Fort Irwin in 2008 died.[62]

Tribal concerns also abound. The California desert has been occupied by Native American groups for over 10,000 years. The deserts contain Native American cultural resources and sacred sites, including geoglyphs and petroglyphs.[63] It is

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58. Reimer & Snodgrass, *supra* note 57, at 573; Kalyani Robbins, *Responsible, Renewable, and Redesigned: How the Renewable Energy Movement Can Make Peace with the Endangered Species Act*, 15 MINN. J. L. SCI. & TECH. 555 (2014); Emily Green, *Can We Save Mojave Desert Tortoises by Moving Them out of Harm's Way?*, HIGH COUNTRY NEWS (Aug. 5, 2013), http://www.hcn.org/issues/45.13/can-we-save-mojave-desert-tortoises-by-moving-them-out-of-harms-way/article_view?b_start:int=0.

59. *Threatened and Endangered Species: Desert Tortoise (Gopherus Agassizii)—Mojave Population*, U.S. FISH & WILDLIFE SERVICE (Mar. 27, 2013), http://www.fws.gov/carlsbad/Tespecies/DETO.htm.

60. CAL. DEP'T OF FISH & GAME, REPTILE SPECIES ACCOUNTS 1 (2004).

61. Mike Stark, *Agencies Shell out to Save Mojave Desert Tortoise from Extinction,* DESERT NEWS (Jan. 25, 2009, 12:00 AM), http://www.deseretnews.com/article/705280078/Agencies-shell-out-to-save-Mojave-desert-tortoise-from-extinction.html.

62. KRISTIN H. BERRY, ASHLEY EMERSON & TIMOTHY GOWAN, THE STATUS OF 158 DESERT TORTOISES 33 MONTHS AFTER TRANSLOCATION FROM FT. IRWIN 7 (2011), *available at* http://www.deserttortoise.org/abstracts/2011DTCSymposiumAbstracts.pdf; Press Release, Ctr. for Biological Diversity, Disastrous Desert Tortoise Translocation Suspended (Oct. 10, 2008), *available at* http://www.biologicaldiversity.org/news/press_releases/2008/desert-tortoise-10-10-2008.html.

63. Phil Willon & Tiffany Hsu, *Lawsuit Alleges Solar Projects Would Harm Sacred Native American Sites,* L.A. TIMES, Feb. 24, 2011, http://articles.latimes.com/2011/feb/24/local/la-me-solar-suit-20110224. Geoglyphs are created by scraping away layers of darker rocks. LIZ WELSH & PETER WELSH, ROCK-ART OF THE SOUTHWEST: A VISITOR'S GUIDE 22 (2000); Dep't of Geography, *Geoglyphs: Ethno-Geographic Enigmas,* U.C. SANTA BARBARA (Jan. 2, 2011), http://www.geog.ucsb.edu/events/department-news/798/geoglyphs-ethno-geographic-enigmas/. The Blythe Intaglios or

hard to determine the exact impacts of solar development on cultural and historic resources because there is a lack of comprehensive information, and most mapping of cultural resources is confidential.[64] The California Energy Commission has noted that "scarce and fragmented information, along with confidentiality requirements limiting access to cultural resource information, can make it difficult for developers to select sites that will avoid significant cultural resources."[65]

The concerns discussed above only lightly touch on the challenges surrounding the large-scale solar projects, which also include concerns about protecting scenic values and recreational opportunities.[66] Policymakers are faced with the challenging task of balancing the competing needs to combat global warming and protect socially and ecologically important sites. Many stakeholders are divided on the issues, feeling the impacts of climate change and seeing the damage already occurring to the desert landscape from solar facilities.[67] There is no question, however, that solar projects in some form will be moving forward.

C. THE PUSH FOR SOLAR

> *This month, in the Mojave Desert, a company called BrightSource plans to break ground on a revolutionary new type of solar power plant. It's going to put about a thousand people to work building a state-of-the-art facility. And when it's complete, it will turn sunlight*

Blythe Geoglyphs near Blythe, California in the Colorado Desert, contain a human figure that is 171 feet long. Kristina, *Government Solar Projects Threaten Sacred Blythe Intaglios,* SACRED-SITES INT'L BLOG (Apr. 28, 2011), http://sacred-sites.org/wordpress/2011/04/28/government-solar-projects-threaten-sacred-blythe-intaglios/.

64. RENEWABLE POWER STAFF REPORT, *supra* note 53, at 60; *see, e.g.*, Genesis Solar Energy Project Grant of Confidentiality, Docket No. 09-AFC-8 (Cal. Energy Comm'n Sept. 11, 2012), *available at* http://docketpublic.energy.ca.gov/PublicDocuments/Compliance/09-AFC-8C/2012/TN%2067072%2009-11-12%20CEC%20Response%20to%20Application%20for%20Confidential%20Regarding%20Cultural%20Resources%20Phase%20I.pdf.

65. RENEWABLE POWER STAFF REPORT, *supra* note 53, at 60.

66. *See* Glennon & Reeves, *supra* note 44, at 117 (describing the National Park Service's concern about visual blight).

67. *See* Judith Lewis Mernit, *Sacrificial Land: Will Renewable Energy Devour the Mojave Desert?* HIGH COUNTRY NEWS (Apr. 15, 2013), http://www.hen.org/issues/45.6/sacrificial-land-will-renewable-energy-devour-the-mojave (describing residents concerned over increasing summer temperatures and decreasing tourism potential).

> *into the energy that will power up to **140,000** homes—the largest such plant in the world. Not in China. Not in India. But in California.*[68]

New energy policies and financial incentives have proved to be powerful forces in accelerating renewable energy development. On the federal level, there have been policies both to promote renewable energy and to fund solar development. The Energy Policy Act of 2005 stated that the Interior Department should approve 10,000 MW of renewable energy projects on public lands by 2015.[69] In addition, the federal ARRA supplied billions of dollars to developers of renewable energy projects.[70] ARRA has funded renewable energy projects through cash grants,[71] loan guarantees,[72] and

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68. *The President's Weekly Address, October 2, 2010*, AM. PRESIDENCY PROJECT, http://www.presidency.ucsb.edu/ws/index.php?pid=88532&st=&st1= (last visited Oct. 20, 2013).

69. Energy Policy Act of 2005, Pub. L. No. 109-58, § 211, 119 Stat. 594, 660. On January 16, 2008, Interior Secretary Kempthorne issued Secretarial Order 3282, aimed at fulfilling the goals of section 211 of the 2005 Energy Policy Act. SEC'Y OF THE INTERIOR, DEP'T OF THE INTERIOR, ORDER NO. 3283, ENHANCING RENEWABLE ENERGY DEVELOPMENT ON THE PUBLIC LANDS (2009), *available at* http://www.blm.gov/pgdata/etc.medialib/blm/wo/Communications_Directorate/public_affairs/news_release_attachments.Par.48600.File.dat/09SecOrderRenewableEnergyOfc0116.pdf.

70. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 (codified as amended at scattered portions of 1, 12, 15, 19, 26, and 42 U.S.C.).

71. *1603 Program: Payments for Specified Energy Property in Lieu of Tax Credits,* U.S. DEP'T TREASURY (Mar. 4, 2013), http://www.treasury.gov/initiatives/recovery/Pages/1603.aspx. The guidelines include a "safe harbor" provision that sets the beginning of construction at the point where the applicant has incurred or paid at least five percent of the total cost of the property, excluding land and certain preliminary planning activities. *Id.*; *see* Lindsay Morris, *Is 2011 Solar's Peak Year?* RENEWABLE ENERGY WORLD (Oct. 19, 2011), http://www.renewableenergyworld.com/rea/news/article/2011/10/is-2011-solars-peak-year ("To qualify as a project that has commenced construction, a developer could do something as simple as putting a single foundation in place. However, construction activity then needs to be continuous . . . ." (quotation marks omitted)).

72. Loan Programs Office, *The Financing Force Behind America's Clean Energy Economy,* U.S. DEP'T ENERGY, https://lpo.energy.gov/?page_id=45 (last visited Oct. 7, 2013); *see* Marc Lifsher, *Unlike Solyndra, Other California Projects Appear on Track*, L.A. TIMES, Oct. 15, 2011, http://articles.latimes.com/2011/oct/15/business/la-fi-1015-solar-loans-20111015 (detailing how loan guarantees been used for many different California solar energy projects).

tax credits.[73] Initially, ARRA funds were available to projects that were "shovel-ready" by the end of 2010, but the Tax Relief, Unemployment Reauthorization, and Job Creation Act of 2010 extended the funding to projects that began construction by the end of 2011.[74] As of July 2013, cash grant funding for solar projects totaled almost $4.9 billion, and California solar projects represented $1.5 billion of that.[75] DOE loans for renewable energy projects totaled $34.4 billion.[76]

In addition to funding proposed projects, the federal government has invested in screening sites for potential renewable energy development. The National Renewable Energy Laboratory maps solar and wind resources.[77] And the U.S. Environmental Protection Agency's (EPA) RE-Powering America's Land Program promotes the use of contaminated sites for renewable energy facilities.[78] The EPA has screened more than 11,000 potential sites and has mapped the feasibility of renewable energy technologies at each site.[79]

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73. JENNA GOODWARD & MARIANA GONZALEZ, WORLD RES. INST., RENEWABLE ENERGY TAX CREDITS (2010), *available at* http://pdf.wri.org/bottom_line_renewable_energy_tax_credits_10-2010.pdf; JESSE JENKINS ET AL., BREAKTHROUGH INST., BEYOND BOOM & BUST: PUTTING CLEAN TECH ON A PATH TO SUBSIDY INDEPENDENCE 17 fig.4 (2012), *available at* http://thebreakthrough.org/blog/Beyond_Boom_and_Bust.pdf (showing that the federal government spent $51.4 billion on clean energy technology tax expenditures from 2009 through 2014); Kate Galbraith, *Future of Solar and Wind Power May Hinge on Federal Aid,* N.Y. TIMES, Oct. 25, 2011, http://www.nytimes.com/2011/10/26/business/energy-environment/future-of-solar-and-wind-power-may-hinge-on-federal-aid.html?pagewanted=all; Peter Lynch, *Feed-in Tariffs: The Proven Road NOT Taken . . . Why?*, RENEWABLE ENERGY WORLD (Nov. 23, 2011), http://www.renewableenergyworld.com/rea/news/article/2011/11/feed-in-tariffs-the-proven-road-not-takenwhy?cmpid=WNL-Friday-November25-2011; Morris, *supra* note 71.

74. Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010, Pub. L. No. 111-312, § 707, 124 Stat. 3296, 3312.

75. Calculated based on spreadsheets downloaded on November 26, 2013. *See Section 1603 Awards,* U.S. DEP'T TREASURY (July 30, 2013). http://www.treasury.gov/initiatives/recovery/Documents/Section%201603%20Awards.xlsx.

76. Loan Programs Office, *Our Projects,* U.S. DEP'T ENERGY, http://lpo.energy.gov/programs/1705-2/ (last visited Oct. 8, 2013) (describing the loan guarantee program created as part of ARRA).

77. *Renewable Resources Maps & Data,* NAT'L RENEWABLE ENERGY LAB., http://www.nrel.gov/renewable_resources/ (last visited Oct. 18, 2013).

78. *RE-Powering America's Land,* ENVTL. PROTECTION AGENCY, http://www.epa.gov/oswercpa/ (last visited May 30, 2013).

79. EPA & NAT'L RENEWABLE ENERGY LAB., BEST PRACTICES FOR SITING SOLAR PHOTOVOLTAICS ON MUNICIPAL SOLID WASTE LANDFILLS 1 (2013)

State-level policies and statutes have also played a significant role. California's ambitious RPS was first enacted in 2002 and then strengthened in 2011.[80] The RPS requires utilities to procure thirty-three percent of their energy from renewable sources by 2020 and eighty percent by 2050.[81] California Governor Arnold Schwarzenegger made renewable

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[hereinafter MSW LANDFILLS REPORT], *available at* http://www.epa.gov/oswercpa/docs/best_practices_siting_solar_photovoltaic_final.pdf.

80. *RPS Program Overview*, CAL. PUB. UTIL. COMMISSION, http://www.cpuc.ca.gov/PUC/energy/Renewables/overview (last updated Mar. 1, 2013). The California Legislature passed the first version of the statutory Renewable Portfolio Standard in 2002, originally codified at CAL. PUB. UTIL. CODE § 399.11, et seq. Initially, the RPS encouraged (but did not require) publicly owned utilities to procure twenty percent of their electricity from renewable sources by 2017. *Id.* To qualify as eligible for California's RPS, a generation facility must use a designated renewable resource or fuel. CAL. ENERGY COMM'N, COMMISSION GUIDEBOOK, RENEWABLES PORTFOLIO STANDARD ELIGIBILITY 12–13 (5th ed. 2012) [hereinafter RPS ELIGIBILITY GUIDEBOOK], *available at* http://www.energy.ca.gov/2012publications/CEC-300-2012-002/CEC-300-2012-002-CMF.pdf. State energy agencies recommended accelerating the RPS in the 2003 Energy Action Plan. CAL. ENERGY COMM'N, 2003 INTEGRATED ENERGY POLICY REPORT 5, 8 (2003), *available at* http://www.energy.ca.gov/reports/100-03-019F.PDF; *California Climate Change Portal,* ST. CAL., http://www.climatechange.ca.gov/state/legislation.html (last visited Oct. 7, 2013); *see also* 2006 Cal. Stat. 3299 (modifying the RPS to require that "investor-owned utilities" procure twenty percent of their retail electricity from renewable sources by 2010). Also in 2006, the California legislature passed the Global Warming Solutions Act, Assembly Bill 32. *See* 2006 Cal. Stat. 3424 (charging the California Air Resources Board with reducing California's greenhouse gas emissions to 1990 levels by 2020). The RPS is a central policy for the Air Resources Board in achieving these emission reductions. OFFICE OF THE GOVERNOR OF CAL., CAL. EXEC. ORDER NO. S-21-09 (Sept. 15, 2009), *available at* http://gov.ca.gov/news.php?id=13269.

81. OFFICE OF THE GOVERNOR OF CAL., CAL. EXEC. ORDER NO. S-14-08 (Nov. 17, 2008), *available at* http://gov.ca.gov/news.php?id=11072; *Renewables Portfolio Standards (RPS) Proceeding*, CAL. ENERGY COMMISSION, http://www.energy.ca.gov/portfolio/ (last visited Oct. 7, 2013). In 2011, the California Renewable Energy Resources Act (SB X1-2) was enacted. *See* 2011 Cal. Stat. 5775. SB X1-2 specifically applies the new thirty-three percent RPS to all retail sellers of electricity by December 31, 2020. *California Climate Change Portal,* ST. CAL., http://www.climatechange.ca.gov/state/legislation.html (last visited Mar. 17, 2013). The California Public Utilities Commission is responsible for implementing the RPS, and the California Energy Commission (CEC) certifies that renewable energy sources meet the RPS requirements. CAL. PUB. UTILS. COMM'N, 33% RENEWABLES PORTFOLIO STANDARD IMPLEMENTATION ANALYSIS PRELIMINARY RESULTS 1 (2009), *available at* http://www.cpuc.ca.gov/NR/rdonlyres/1865C207-FEB5-43CF-99EB-A212B78467F6/0/33PercentRPSImplementationAnalysisInterimReport.pdf; RPS ELIGIBILITY GUIDEBOOK, *supra* note 80, at 1.

energy a major policy priority during his two terms in office.[82] More recently, Governor Jerry Brown directed the California Energy Commission (Energy Commission) to "prepare a plan to 'expedite permitting of the highest priority (renewable) generation and transmission projects' to support investments in renewable energy that will create new jobs and businesses, increase energy independence, and protect public health."[83]

With this increased motivation for solar energy development, several energy companies decided to enter the fray and proposed new projects. Building a solar facility is no easy feat, however. Alongside the technical and engineering challenges are significant environmental review and permitting requirements. These requirements come from several different levels of government and multiple agencies. The next section describes the various requirements, demonstrating the lengthy and complicated process of getting a solar facility up and running.

II. SOLAR PROJECT REGULATION AND MITIGATION

> *You could increase [the number of rooftop solar panels] we've got by an order of magnitude, and it still wouldn't be enough . . . . We have to have utility-scale power plants, and we have to have transmission because we are running out of time.*[84]

> *Much of the land being targeted is in fragile desert areas that support rare and endangered plant and animal species. And while the developments are expected to have operational lifetimes of just 30 to 50 years, their impacts will be permanent, irreversibly converting the land to industrial zones.*[85]

Establishing a solar power facility is a multi-step process involving many permitting and environmental review

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82. *See* Joyce Wong Kup et al., *California's Renewables Portfolio Standard: Charting the Course Towards 33% by 2020*, ELECTRICITY J., May 2009, at 79 (2009) (providing numerous examples of Schwarzenegger's commitments).

83. RENEWABLE POWER STAFF REPORT, *supra* note 53, at 1.

84. Humes, *supra* note 21, at 26 (internal quotation marks omitted).

85. Janine Blaeloch, *Myths About Large-Scale Solar Threaten Public Lands*, RENEWABLE ENERGY WORLD (Apr. 26, 2011), http://www.renewableenergyworld.com/rea/news/article/2011/04/myths-about-large-scale-solar-threaten-public-lands.

requirements. Depending on their proposed technology, size, and location, solar projects may have to go through federal, state, and local environmental review; the process can be expensive and time-consuming.[86] The land-intensive nature of solar development triggers many land-use permitting requirements. This section outlines the various environmental permitting and review processes associated with developing large-scale solar in the California desert. Many of the permits require mitigation for negative environmental impacts. After outlining the various requirements, we explore the mitigation plans in depth, considering two case studies in detail.

A. SOLAR FACILITY LICENSING

After defining the scope of the project (including establishing project location, design options, and electrical grid interconnection options), solar project developers must put together a project proposal and begin the permitting process.[87] The licensing process has two central elements.[88] First, there is a multi-level permitting process.[89] To proceed with a project,

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86. *Cf.* William R. Devine, *Permitting of Utility Scale Solar Projects in California Slow Going Despite Significant State and Federal Policy Support and Financial Incentives,* BLOOMBERG L. REP., 2–3 (2010), http://www.allenmatkins.com/~/media/63867BC7DB3F4FB7B1C71C62EADC7511.ashx (explaining that California and other Southwest renewable energy projects may have to obtain federal, state, and local land-use approvals); *A Snapshot of Renewable Energy Deployment*, ENVTL. & ENERGY STUDY INST. (Jan. 2011), http://files.eesi.org/re_deployment_011211.pdf; RENEWABLE POWER STAFF REPORT, *supra* note 53, at 5–9 (defining solar energy characteristics such as total capacity, project size, cost trends, construction timelines, and impact on carbon emissions). The environmental review documents for solar power projects have been impressive in length. One commenter believes that the 11,000-page environmental impact report for Sunrise Powerlink transmission line is the longest in state history. Humes, *supra* note 21, at 26. The CEC also notes that the need to upgrade existing or develop new transmission infrastructure to bring renewable electricity to the load centers is made more complex by the current disconnect between generation and transmission planning and permitting processes, wherein the length of time needed for transmission development requires transmission projects to proceed while there is still uncertainty about where generators will ultimately be located. RENEWABLE POWER STAFF REPORT, *supra* note 53, at 7.

87. *See* RENEWABLE ENERGY ACTION TEAM, BEST MANAGEMENT PRACTICES AND GUIDANCE MANUAL 3 (2010) [hereinafter REAT Manual], *available at* http://www.energy.ca.gov/2010publications/REAT-1000-2010-009/REAT-1000-2010-009-F.PDF#page=23 (describing recommended actions in pursuing a renewable energy project).

88. *See id.* at 11.

89. *See id.*

developers will likely need several permits that vary depending upon the location of the facility and the natural resources on-site. Second, there is an environmental review process.[90] Both state and federal laws require comprehensive environmental review of projects likely to have negative environmental impacts.[91] While governed by separate laws, the environmental review and permitting processes go hand in hand.[92] Often, it is the contemplation of permit issuance that triggers environmental review, and the outcome of the environmental review process that determines permit terms. This next subsection describes some of the more significant permitting requirements. The following section then introduces the two environmental review processes: federal NEPA review and state CEQA review. While this introduction to these legal requirements appears linear, that is misleading. Often multiple permitting and environmental review processes occur simultaneously.

B. PERMITTING PROCESSES

Development of almost any stripe must be accompanied by various permits. The larger the project and the more severe the potential environmental impacts, the more permitting requirements are likely to be triggered.[93] Initial permitting and siting of renewable energy facilities is largely the task of local government.[94] With fifty-eight California counties, there may be a range of approaches governing siting and land-use regulation as it pertains to renewable energy facilities. This may include requirements to obtain special use permits or zoning variances.[95]

To better coordinate siting of large energy facilities, the state legislature designated the California Energy Commission as responsible for siting thermal power plants over 50 MW. Under the Warren-Alquist Act, the Energy Commission has the exclusive authority to license large solar thermal (CSP but not PV) power plants.[96] The Energy Commission's licensing process

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90. *See id.*
91. *See id.* at 13.
92. *See id.* at 11–13.
93. *See id.* at 15–16 (noting the permitting differences based on size of project).
94. *See id.* at 11.
95. *Id.*
96. CAL. PUB. RES. CODE §§ 25120, 25500 (West 2013).

brings state and local permits together into one assessment instead of requiring project proponents to apply for them individually from the various permitting authorities.[97] This twelve- to eighteen-month permitting process incorporates both environmental review and state endangered species act permitting, and supersedes other state, regional, and local siting and permitting decisions.[98] Indeed, the Energy Commission contends that its certificate complies with the state endangered species act and obviates the need for separate review by the California Department of Fish and Wildlife.[99]

There are two processes for solar facilities to choose from: the Application for Certification or the Small Power Plant Exemption.[100] The exemption is available for projects between 50 MW and 100 MW as long as "the proposed project does not create an unmitigated significant impact on environmental resources."[101] For these small projects, the Energy Commission performs the environmental review but does not actually issue the license.[102] The project developer must seek the necessary permits from state and local agencies on its own. Other projects go through the general application process. Despite what may appear to some as hefty application and compliance fees,[103] the Energy Commission's combined review process is attractive. The decision comes relatively quickly and is issued in one consolidated regulatory permit. The Energy Commission coordinates the review and permitting processes of several state and local agencies and works with federal entities as well.[104]

Many facilities are not covered by the Warren-Alquist Act at all, as it only applies to CSP projects with 50 MW or more of generating capacity.[105] Solar facilities over 20 MW (but under 50 MW) still follow local siting laws even though they are

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97. *See* RENEWABLE POWER STAFF REPORT, *supra* note 53, at 62.

98. *Energy Facilities Siting/Licensing Process,* CAL. ENERGY COMMISSION, http://www.energy.ca.gov/sitingcases/ (last visited Nov. 10, 2013); *see* RENEWABLE POWER STAFF REPORT, *supra* note 53, at 62.

99. *See* REAT MANUAL, *supra* note 87, app. A at 87.

100. *Energy Facilities Siting/Licensing Process, supra* note 98.

101. *Id.*

102. *Id.*

103. For larger plants, an Application for Certification costs $268,709 plus an additional $537 per MW. *Id.*

104. *See id.*

105. *Id.* (providing that the Commission has responsibility for licensing only plants that are 50 MW or larger).

"utility scale."[106] Additionally, as more proposed projects shift from CSP to PV, they may fall out of the Energy Commission's siting jurisdiction.[107] For solar facilities that are not covered by the Warren-Alquist Act, permitting requirements vary by jurisdiction. Even determining who is the environmental review lead agency depends on the project location and regional or local permitting requirements.[108] On state-managed lands, the State Lands Commission is usually the lead agency, and on private lands, it is usually the local county government.[109]

1. BLM and Rights-of-Way

The Bureau of Land Management (BLM) is the largest manager of federal lands.[110] The Federal Land Policy Management Act of 1976 (FLPMA) established the BLM and its general "multiple use" framework for managing federal lands.[111] FLPMA authorizes BLM to grant right-of-way (ROW) permits for use of federal lands.[112] While the term right-of-way sounds like a simple easement, ROWs can be much more. They often represent a major use of public lands.[113] One of the common categories for ROWs is "systems for generating, transmitting, or distributing electricity."[114] Like special use permits or licenses, ROWs authorize specific uses of the land

106. *See* REAT MANUAL, *supra* note 87, app. A at 84 (explaining that solar voltaic facilities less than 50 MW still require state and/or local approvals).

107. In 2011, Senate Bill 226 amended the law to allow the CEC to continue to review some projects that began as CSP but would like to switch to PV. 2011 Cal. Stat. 4541–42.

108. REAT MANUAL, *supra* note 87, app. A at 84.

109. *Id.*

110. *The Bureau of Land Management: Who We Are, What We Do*, BUREAU LAND MGMT., http://www.blm.gov/wo/st/en/info/About_BLM.html (last updated Jan. 26, 2012).

111. *See* 43 U.S.C. § 1712 (2006 & Supp. V 2011) (showing the codified land-use planning framework). The BLM's multiple-use framework means that BLM land is subject to a wide variety of uses including recreation, mining, timber harvesting, grazing, wildlife protection and protection of scientific and historical values. *See id.* §§ 1701–1702. Many of these uses are not compatible with solar development. Glicksman, *supra* note 1, at 117–19.

112. The BLM issues ROWs under Title V of the Federal Land Policy Management Act. *See* 43 C.F.R. § 2802 (2012).

113. Some question whether BLM's ROW process is appropriate for siting solar facilities and whether FLPMA's broad multiple-use mandate (without a dominant use or mission) provides an adequate foundation for solar-facility siting and decisionmaking. *See, e.g.*, Glicksman, *supra* note 1, at 148–49.

114. 43 C.F.R. § 2801.9(a)(4) (2012).

for a defined period.[115] ROWs are needed for any construction or operation of facilities on BLM land.[116] This includes both solar facilities themselves and any transmission lines or related infrastructure.[117] ROW authorization is subject to environmental review under the National Environmental Policy Act,[118] and BLM cannot issue a ROW permit until a NEPA assessment is finalized. Indeed, FLPMA requires that projects associated with ROWs meet all statutory and regulatory requirements; this includes compliance with environmental review laws, as well as other federal laws including the National Historic Preservation Act, the Endangered Species Act, the Clean Water Act, the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act.[119]

The ROW authorization process begins with a standard application form[120] and pre-application meetings with BLM staff.[121] Resource agencies[122] recommend that solar developers meet with the BLM at least twelve months before they plan to file their application.[123] ROW grantees must pay an application fee, monitoring fee (to reimburse the BLM for its monitoring duties), and annual rent.[124] Once the BLM receives an application, it begins extensive studies, including completing

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115. BUREAU OF LAND MGMT., OBTAINING A RIGHT-OF-WAY ON PUBLIC LANDS (2009) [hereinafter ROW BROCHURE], *available at* http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/cost_recovery.Par.58417.File.dat/ObtainingaROWPamphlet.pdf.

116. *Id.*

117. *Id.*

118. *See infra* Part II.C.1.

119. 43 U.S.C. § 1764 (2006 & Supp. V 2011) (explaining that the BLM may only issue ROWs where applicants can demonstrate the financial and technical capacity to construct the project in accordance with regulatory requirements); Glicksman, *supra* note 1, at 128–29. FLPMA directs the BLM to prevent any "unnecessary or undue degradation" of the land it manages. 43 U.S.C. § 1732(b). This standard also governs decisions to issue ROWs. *Id.* Unfortunately, the definition of unnecessary or undue degradation has not been clear. *See* Glicksman, *supra* note 1, at 156–57.

120. DEP'T OF INTERIOR, STANDARD FORM 299 (2009), *available at* http://www.gsa.gov/portal/forms/download/117318.

121. 43 C.F.R. § 2804.10(a) (2012); ROW BROCHURE, *supra* note 115, at 2.

122. Specifically, the BLM, the U.S. Fish and Wildlife Service, the California Energy Commission, and the California Department of Fish and Wildlife. *See* REAT MANUAL, *supra* note 87, at 13–16.

123. *Id.* at 13–16.

124. ROW BROCHURE, *supra* note 115, at 4–5; 43 C.F.R § 2806.10(a)(4) (2012) (discussing rent fees); § 2804.14 (showing processing fees); § 2805.16 (showing monitoring fees).

inventories of the resources that are likely to be impacted by the proposed project.[125] To speed up the process, applicants can hire qualified consultants to complete the inventories.[126] ROW applications are generally processed in the order received, and some applications take "extended periods of time."[127]

Prior to 2009, BLM had not approved ROWs for any solar projects.[128] As of November 2013, BLM had approved twelve solar projects in California and had twenty pending applications.[129] The largest approved project will cover over 7000 acres and is projected to generate almost 950 MW.[130] There are seven solar projects under construction on BLM land in California.[131]

2. Federal Endangered Species Act Permitting

California desert solar projects also have to contend with endangered species issues. There are both state and federal laws that protect imperiled species. The Endangered Species Act (ESA) sets forth the general contours of federal protection of threatened and endangered species.[132]

Section 9 of the ESA applies on all land (public or private) and to all persons subject to the jurisdiction of the United States.[133] It prohibits the taking of any listed (threatened or endangered) species.[134] The ESA defines "take" to include

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125. ROW BROCHURE, *supra* note 115, at 10.

126. *Id.* (stating that certain firms and individuals hold permits to inventory cultural resources and endangered species).

127. *Id.*

128. *BLM California Solar Applications*, BUREAU LAND MGMT., http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/pa/energy/solar.Par.84447.File.dat/BLM%20Solar%20Applications%20&%20Authorizations%20April%202013.pdf (last visited Nov. 20, 2013).

129. *Id.* These totals include two approved projects and six pending projects that are sited on private land but require ROW authorization from the BLM for transmission. *See id.*

130. *Id.* The Blythe Solar Power Project was approved by BLM in October 2010. *Id.*; DEP'T OF ENERGY, RECORD OF DECISION FOR BLYTHE SOLAR POWER PLANT (2010), *available at* http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/palmsprings/blythe_feis0.Par.18342.File.dat/Blythe_ROD_FINAL.pdf. The project began construction, but subsequently the project developer decided to convert from CSP to PV and construction was halted. *Blythe Solar Power Project*, BUREAU LAND MGMT., http://www.blm.gov/ca/st/en/fo/palmsprings/Solar_Projects/Blythe_Solar_Power_Project.html (last visited July 21, 2013).

131. DRECP PROJECTS TABLE, *supra* note 3.

132. *See* 16 U.S.C. §§ 1538(a)(1), 1539 (2012).

133. *Id.*

134. *Id.* § 1538(a)(1)(B).

"harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct."[135] Agency regulations further define "harm" as including "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering."[136] Generally, this prohibits both killing and injuring individual members of a listed species and adversely modifying their habitat (if such modification actually kills or injures).[137] There are exceptions to this ban; the most notable being the Section 10 permitting process.[138]

Under section 10, a project applicant can obtain an Incidental Take Permit.[139] These permits allow some harm to listed species where that harm is incidental to an otherwise lawful activity.[140] The permits must be accompanied by a Habitat Conservation Plan describing approaches for minimizing and mitigating impacts to the species.[141] Section 10 applicants are generally those seeking to carry out the project with possible impacts on species. In the context of California desert solar projects, this means the private energy companies seeking to develop and build the facilities. Section 10 also allows larger regional conservation plans that cover wide areas.[142] In such cases, a government entity like a city or county is the applicant.[143] The local government then has the

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135. *Id.* § 1532(19).

136. 50 C.F.R. § 17.3(3) (2012); *see also* Babbitt v. Sweet Home Chapter of Cmtys. for a Great Or., 515 U.S. 687, 707 (1995) (defining harm to include "significant habitat modification or degradation that actually kills or injures wildlife").

137. *See Babbitt*, 515 U.S. at 711.

138. 16 U.S.C. § 1539(a)(1).

139. *Id.*

140. *See id.*

141. *Id.* § 1539 (a)(2)(A); *id.* § 1539 (a)(2)(B)(ii) ("[A]pplicant[s] will, to the maximum extent practicable, minimize and mitigate the impacts of such taking . . . .").

142. *See* J.B. Ruhl, *Regional Habitat Conservation Planning Under the Endangered Species Act: Pushing the Legal and Practical Limits of Species Protection*, 44 SW. L.J. 1393, 1405 (1991) (describing the first regional multi-jurisdictional habitat conservation plan (HCP) in Coachella Valley).

143. *See A Cooperative Planning Effort*, BUTTE REG'L CONSERVATION PLAN, http://www.buttehcp.com/ (last visited Oct. 8, 2013) (discussing a regional HCP coordinated by the Butte County Association of Governments on behalf of four water districts); *Comal County Regional Habitat Conservation Plan*, COMAL COUNTY, http://www.co.comal.tx.us/comalrhcp/ (last visited Oct. 8, 2013) (discussing a regional HCP being developed by Comal County);

responsibility to comply with the ESA requirements.[144] Once it receives an Incidental Take Permit, it can issue sub-permits to individual landowners, developers, or project proponents delegating the take allowances.[145] Because the California desert is home to several endangered species,[146] most solar facility development results in potential take of endangered species and therefore requires a section 10 Incidental Take Permit.[147]

Where federal agencies and federal lands are involved, section 7 of the ESA[148] also plays a pivotal role. Section 7 requires that the federal agency taking the action (the action agency) consult with the U.S. Fish and Wildlife Service (and/or National Oceanic and Atmospheric Administration (NOAA) Fisheries, depending on the species involved).[149] The purpose of consultation is to ensure that the agency action is not likely to (1) jeopardize the continued existence of any listed species; or (2) result in the destruction or adverse modification of designated critical habitat.[150] During the consultation, the

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Purpose, S. EDWARDS PLATEAU HABITAT CONSERVATION PLAN, http://www.sephcp.com/about1.html (last visited Oct. 8, 2013) (explaining that Bexar County and the City of San Antonio issue the local permits under a regional HCP).

144. *See, e.g.*, *A Cooperative Planning Effort*, *supra* note 143.

145. *See, e.g.*, *Benefits*, BUTTE REG'L CONSERVATION PLAN, http://www.buttehcp.com/Background/Benefits/index.html (last visited Oct. 20, 2013).

146. *Endangered Species and Habitat*, CAL. DEP'T FOOD & AGRIC., http://www.cdfa.ca.gov/agvision/docs/Endangered_Species_and_Habitat.pdf (last visited Oct. 17, 2013).

147. *Cf.* 16 U.S.C. § 1539(a)(1) (2012).

148. *See id.* § 1536(a)(1).

149. *See id.*; *see also* U.S. FISH & WILDLIFE SERV. & NAT'L MARINE FISHERIES SERV., ENDANGERED SPECIES CONSULTATION HANDBOOK: PROCEDURES FOR CONDUCTING CONSULTATION AND CONFERENCE ACTIVITIES UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT 1-1 to 1-4 (1998) [hereinafter SECTION 7 HANDBOOK], *available at* http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf. Where the Services are themselves the action agencies (as when issuing section 10 incidental take permits), agency guidance describes procedures for intra-agency consultation. *Id.* at 1-5 to 1-6; *see also* U.S. FISH & WILDLIFE SERV., HABITAT CONSERVATION PLAN HANDBOOK 1-4 (1996) [hereinafter HCP HANDBOOK].

150. The critical habitat referred to in section 7 differs from the habitat discussed in the section 9 context. Critical habitat is habitat that has been specifically designated in a regulation as critical because it "is essential for the conservation of a threatened or endangered species" and it "may require special management and protection." U.S. FISH & WILDLIFE SERV., CRITICAL HABITAT: WHAT IS IT? (2002) [hereinafter CRITICAL HABITAT: WHAT IS IT?], *available at* http://www.fs.fed.us/r9/wildlife/tes/docs/esa_references/

Service also assesses whether any incidental takes of listed species are likely to occur.[151] Section 7 is triggered by any action "authorized, funded, or carried out" by a federal agency.[152] Notably, this includes the issuance of a section 10 Incidental Take Permit.[153]

The section 7 consultation process can take a long time.[154] Consultation begins with the action agency completing a

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critical_habitat.pdf; *see also* 16 U.S.C. § 1533(a)(3)(A)(i) (2012). The Fish and Wildlife Service and NOAA's Fisheries Service are in the process of promulgating new regulations regarding critical habitat. *See Timing of Economic Analysis for Critical Habitat Designations*, U.S. FISH & WILDLIFE SERVICE, http://www.fws.gov/endangered/improving_ESA/CH_Econ.html (last updated June 19, 2013). The Fish and Wildlife Service and NOAA Fisheries (the two agencies charged with carrying out the mandates of the Endangered Species Act) are required to promulgate regulations establishing critical habitat within a year of a species' listing. *See* 16 U.S.C. § 1533(b)(6)(A). The agencies, however, often fall well behind in meeting these deadlines. *Cf.* James Salzman, *Evolution and the Application of Critical Habitat Under the Endangered Species Act*, 14 HARV. ENVTL. L. REV. 311, 342 (1990) (lamenting the "lack of published habitat for . . . species" and claiming the "ESA has failed in its mandate to protect our nation's wildlife"). Critical habitat is specifically delineated—a species' critical habitat designation sets the metes and bounds of the area. *Id.* at 311. Assessing whether an action will lead to adverse modification of critical habitat involves looking at whether the land is designated critical habitat without an inquiry into whether the species is actually present or what the possible impacts on either the species as a whole or an individual will be. (Of course, if there are no species present, the landowner is likely to petition to have her property delisted). *See id.* at 324 (showing that a modification of critical habitat is present when "private development resulting from the highway's construction might adversely affect the habitat").

151. SECTION 7 HANDBOOK, *supra* note 149, at 2-12.

152. 16 U.S.C. § 1536(a)(2).

153. SECTION 7 HANDBOOK, *supra* note 149, at 2-4 to 2-5; *see* 16 U.S.C. § 1536(a)(3) (explaining that section 7 applies to the issuance of permits and licenses).

154. If an agency believes an action may affect a federally listed species, the agency must, at a minimum, initiate informal consultation with the Fish and Wildlife Service (or NOAA Fisheries Service). *See* 50 C.F.R. § 402.13 (2012) (outlining informal consultation process). This voluntary process has no official timeline, but the Service generally tries to complete it in thirty days. SECTION 7 HANDBOOK, *supra* note 149, at 3-2. If, after discussions with the Fish and Wildlife Service, the action agency determines that the action is likely to affect a listed species, formal consultation is initiated, and the Fish and Wildlife Service has ninety days to consult with the agency and applicant (if applicable) and forty-five days to prepare a Biological Opinion and submit it to the agency that initiated consultation. *Id.* at 4-1, 4-3, 4-6. A 2004 Government Accountability Office (GAO) study indicated that thirty percent of Fish and Wildlife consultations between 2001 and 2003 took longer than was allowed by established guidelines; the study indicated that heavy staff workloads and disagreements among agencies increased consultation time.

Biological Assessment, which outlines what the action agency believes the biological consequences of its action will be.[155] The Fish and Wildlife Service then formally responds with a Biological Opinion.[156] Biological Opinions may involve several agencies and many staff, and they can be hundreds of pages long.[157] The goal of the Biological Opinion is to assess whether a listed species will be put in jeopardy or whether the action is likely to result in the destruction or adverse modification of critical habitat.[158] Where such harm is likely, the Service issues a "jeopardy biological opinion."[159] A jeopardy opinion must suggest reasonable and prudent alternatives that remove the likelihood that jeopardy or adverse modification of critical habitat (and thus a violation of section 7(a)(2)) will occur.[160] Alternatively, the action agency could revise the project proposal until the Service finds it is not likely to result in jeopardy or adverse modification of critical habitat.[161] Although it is called an "opinion," a Biological Opinion from the Fish and Wildlife Service is a binding decision document.[162]

U.S. GOV'T ACCOUNTABILITY OFFICE, ENDANGERED SPECIES: FEDERAL AGENCIES HAVE WORKED TO IMPROVE THE CONSULTATION PROCESS, BUT MORE MANAGEMENT ATTENTION IS NEEDED, GAO-04-93 (2004), *available at* http://www.gao.gov/ assets/250/241766.pdf.

155. 50 C.F.R. § 402.12 (2012) (defining Biological Assessments); *Section 7 Consultation: Guidance for Preparing a Biological Assessment*, U.S. FISH & WILDLIFE SERVICE, http://www.fws.gov/midwest/endangered/section7/ba_guide.html (last updated Oct. 24, 2012).

156. 50 C.F.R. § 402.14(h).

157. *See, e.g.*, U.S. FISH & WILDLIFE SERV., BIOLOGICAL OPINION ON BRIGHTSOURCE ENERGY'S IVANPAH SOLAR ELECTRIC GENERATING SYSTEM PROJECT (2011) [hereinafter REVISED IVANPAH BIOLOGICAL OPINION], *available at* http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/needles/lands_solar.Par.71302.File.dat/ISEGS_Reinitiation,%20Final%20BO.pdf; U.S. FISH & WILDLIFE SERV., BIOLOGICAL OPINION FOR SUNRISE POWERLINK (2010), *available at* http://www.cpuc.ca.gov/environment/info/aspen/sunrise/otherdocs/Reinitiated_Biological_Opinion_111010.pdf.

158. 16 U.S.C. § 1536(a)(2).

159. 50 C.F.R. § 402.14(h)(3).

160. 16 U.S.C. § 1536(b)(3)(A) ("If jeopardy or adverse modification is found, the Secretary shall suggest those reasonable and prudent alternatives which he believes would not violate subsection (a)(2) of this Section and can be taken by the Federal agency or applicant in implementing the agency action."); *see also* SECTION 7 HANDBOOK, *supra* note 149, at 2-11 (explaining that one of the options for an action agency who has received a jeopardy biological opinion is to "adopt one of the reasonable and prudent alternatives for eliminating the jeopardy or adverse modification of the critical habitat in the opinion").

161. SECTION 7 HANDBOOK, *supra* note 149, at 2-12, 4-34.

162. *Id.* at 4-48.

The issuance of a jeopardy biological opinion means that the project may not proceed without risking a section 9 violation (which comes with civil and criminal penalties for project applicants).[163] Because the section 7 and section 9 thresholds differ, an action could comply with section 7 (no jeopardy or adverse modification of critical habitat) but still violate section 9 (incidental take of even one individual of a listed species). Thus, both jeopardy and no-jeopardy biological opinions may include recommendations of measures to minimize or avoid possible adverse effects on listed species or their critical habitat.[164] These reasonable and prudent measures must be technically and economically feasible.[165] These measures come in the form of an Incidental Take Statement.[166]

Incidental Take Statements, like Incidental Take Permits from section 10, set forth appropriate mitigation measures and allowable levels of incidental takes of species.[167] These Incidental Take Statements must be complied with by federal agencies,[168] but those agencies often pass on the requirements to private entities. Although an action agency is technically free to disregard a Biological Opinion and proceed with its proposed action,[169] it does so at its own peril; consequently, "if the terms and conditions of an Incidental Take Statement (ITS) are disregarded, and a taking does occur, the action agency or the applicant may be subject to potentially severe civil and criminal penalties."[170]

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163. *Id.* at 2-12.

164. 16 U.S.C. § 1536(b)(4)(C)(ii) (2012); 50 C.F.R. § 402.14(h)(3)(ii) (2012). The Fish and Wildlife Service had a policy of issuing Incidental Take Statements with every formal consultation. SECTION 7 HANDBOOK, *supra* note 149, at 4-46. However, in 2001, the Ninth Circuit found that it was only appropriate to issue incidental take statements where incidental takes will occur. Ariz. Cattle Growers' Ass'n v. U.S. Fish & Wildlife Serv., 273 F.3d 1229, 1237 (9th Cir. 2001).

165. SECTION 7 HANDBOOK, *supra* note 149, at 4-43.

166. *Id.* at 4-45.

167. *See id.*

168. *Id.* at 4-45 to 4-46.

169. *See id.* at 4-15 ("The secretary shall suggest those reasonable and prudent alternatives which he believes would not violate subsection (a)(2) and *can* be taken by the Federal agency or applicant in implementing the agency action." (emphasis added)).

170. Ariz. Cattle Growers' Ass'n v. U.S. Fish & Wildlife Serv., 273 F.3d 1229, 1239 (9th Cir. 2001).

There are multiple places where development of a solar facility triggers ESA review. All projects and actions are subject to section 9's take prohibition.[171] Additionally, where federal agency actions are involved in a solar project, section 7 comes into play. For example, where the BLM grants a ROW, it must engage in section 7 consultation.[172] The resulting Biological Opinion and Incidental Take Statement will instruct the BLM on how to minimize and mitigate any incidental takes that may occur.[173] Often the terms in an Incidental Take Statement are replicated in a ROW as permit terms with which the applicant must comply.

Both Incidental Take Permits and Incidental Take Statements outline procedures for avoiding, minimizing, and mitigating any harm to listed species.[174] The implementation of mitigation programs has been poorly documented and the long-term success of some of these programs is questionable. It is these mitigation programs that most intrigue us and are subject to further discussion below.

3. State Endangered Species Act Permitting

The California Endangered Species Act (California ESA) is built upon the same principles as the federal law.[175] It establishes a list of protected species, and while the goal of the act is to protect and preserve the species, it allows permitted incidental takes.[176] For solar thermal projects (that is CSP, not PV) over fifty MW, the state endangered species act review and permitting process is incorporated into the Energy Commission's licensing program.[177] However, PV projects and

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171. SECTION 7 HANDBOOK, *supra* note 149, at 2-12.

172. *See* Glicksman, *supra* note 1, at 128–29 (noting that projects impacting wildlife will necessitate compliance with other federal statutes).

173. *Cf.* SECTION 7 HANDBOOK, *supra* note 149, at 4-15, 4-45 to 4-46 (explaining the Biological Opinion and Incidental Take Statements generally).

174. *Cf.* 16 U.S.C. § 1539(a)(1) (2012) (explaining Incidental Take Permits); SECTION 7 HANDBOOK, *supra* note 149, at 4-45 (explaining Incidental Take Statements).

175. *Compare* SECTION 7 HANDBOOK, *supra* note 149 (explaining federal endangered species law), *with* CAL. CODE REGS. tit. 14, § 783.2 (2013) (explaining California incidental take permits).

176. *Cf.* CAL. CODE REGS. tit. 14, § 783.2 (2013) (explaining the incidental take permitting procedure); CAL. FISH & GAME CODE §§ 2050–2085 (West 2013).

177. *See supra* Part II.A. This may also include some projects that started out as CSP but have since converted to PV.

utility-scale projects under fifty MW have to pursue separate California ESA compliance.[178]

Administered by the California Department of Fish and Wildlife,[179] the California ESA defines and prohibits takes in the same manner as federal law.[180] Although the state law has no equivalent of critical habitat, it uses a jeopardy standard when assessing permits.[181] In deciding whether to issue a permit, the Department analyzes whether the permit would "jeopardize the continued existence of a species."[182] No permit is issued if jeopardy is likely to occur.[183] To obtain an incidental take permit, the impacts of the authorized take must be minimized and fully mitigated.[184] The mitigation measures must be roughly proportional to the extent of the impacts caused by the proposed project and be capable of successful implementation.[185] Mitigation measures are included in implementation agreements attached to the permits.[186] Generally, these mitigation plans are prepared by the applicant in coordination with the Department and can take the form of a Habitat Conservation Plan prepared under section 10 of the federal Endangered Species Act (federal ESA).[187]

California also has an innovative regional planning initiative with the Natural Community Conservation Planning Act.[188] This voluntary program does not focus on individual species but instead involves assembling conservation plans

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178. *See supra* Part II.A. There is an avenue for projects that are fifty to one hundred MW to opt out of the CEC licensing program as well.

179. Formerly named the California Department of Fish and Game. Kenneth R. Weiss, *Name Change: California Department of Fish and Wildlife*, L.A. TIMES, Jan. 2, 2013, http://articles.latimes.com/2013/jan/02/science/la-sci-sn-california-department-of-fish-and-wildlife-20130102.

180. *See, e.g.*, CAL. FISH & GAME CODE § 2081 (West 2013) (establishing the incidental take permitting process).

181. *Id.* § 2081(c); CAL. CODE REGS. tit. 14, § 783.2(a)(7) (explaining the jeopardy standard).

182. CAL. CODE REGS. tit. 14, § 783.2(a)(7).

183. CAL. FISH & GAME CODE § 2081(c).

184. *Id.* § 2081(b)(2).

185. *California Endangered Species Act: Section 2081(b) and (c)—Incidental Take Permit Process*, CAL. DEP'T FISH & WILDLIFE, http://www.dfg.ca.gov/habcon/cesa/incidental/incid_perm_proced.html (last visited Oct. 8, 2013).

186. *Id.*

187. *See id.*

188. *See* CAL. FISH & GAME CODE §§ 2800–2835 (explaining the regional planning initiative).

covering larger areas and multiple species.[189] This ecosystem-level approach seeks to conserve communities and habitats.[190] While these plans contemplate future development, they are not created in response to any individual project.[191] Natural Community Conservation Plans include authorization for take permits.[192] Such permits are subject to the specific plan's contours and its implementation agreement.[193] Implementation agreements under this act must include provisions "to ensure that implementation of mitigation and conservation measures on a plan basis is roughly proportional in time and extent to the impact on habitat or covered species authorized under the plan."[194] There is currently an effort to create a Natural Community Conservation Plan for the California desert (embodied by the DRECP discussed below).[195]

4. Other Permitting

Projects may also require several other permits stemming from federal, state, and local requirements.[196] For example, projects may need permits under the Clean Water Act, Clean Air Act, the National Historic Preservation Act, and provisions of the California Fish and Game Code. Many of these permits are accompanied by mitigation requirements.[197] For example, section 404 of the Clean Water Act is triggered when fill material is added to jurisdictional wetlands.[198] Complying with permits for filling wetlands requires compensatory

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189. *Natural Community Conservation Planning (NCCP)*, CAL. DEP'T FISH & WILDLIFE, http://www.dfg.ca.gov/habcon/nccp/ (last visited Oct. 8, 2013).

190. *Id.*

191. *See* CAL. FISH & GAME CODE § 2820(a)(3).

192. *Id.* § 2835.

193. *Cf. id.* § 2820(b) (explaining the requirements for an implementation agreement).

194. *Id.* § 2820 (b)(9).

195. *What is DRECP*, DESERT RENEWABLE ENERGY CONSERVATION PLAN, http://www.drecp.org/about/ (last visited July 26, 2013).

196. *See id.* (listing other REAT organizations that were responsible for overseeing the project).

197. *See, e.g.*, Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. 19,594 (Apr. 10, 2008) (describing issuance of new mitigation regulations under section 404 of the Clean Water Act for U.S. Army Corps of Engineers projects).

198. 33 U.S.C. § 1344 (2006 & Supp. V 2011); Morgan Robertson & Palmer Hough, *Wetlands Regulation: The Case of Mitigation Under Section 404 of the Clean Water Act*, *in* WETLANDS 171–73 (Ben A. LePage ed., 2011).

mitigation.[199] Or, local governments may require permits for conversion of farmland.[200] Together all of these permitting programs and mitigation requirements mean that solar developers have a lot to think about and plan for before projects even begin.

C. ENVIRONMENTAL REVIEW PROCESSES

Alongside obtaining the necessary permits, solar projects must also go through both state and federal environmental review.[201] In some cases, especially when federal agencies are involved, the issuance of permits triggers environmental review requirements.[202] Agencies frequently rely on environmental review documents created under the California Environmental Quality Act and the National Environmental Policy Act in making findings and creating permit requirements.[203] Unlike the permit process where the project developer is responsible for assembling documents and complying with requirements, it is the public agencies themselves who are responsible for environmental review.[204] While similar in format, the state and federal environmental review processes can have different outcomes. This section presents both major statutes and highlights the role of mitigation measures under the California law.

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199. Robertson & Hough, *supra* note 198, at 178–82.

200. In California, the Williamson Act is a prominent protector of farmland. The Williamson Act, CAL. GOV'T CODE §§ 51200–51297.4 (West 2013). However, many communities also require mitigation for any loss of farmland through CEQA or local zoning codes. CAL. PUB. RES. CODE § 21095 (West 2013); *see, e.g.*, STANISLAUS CNTY., STANISLAUS COUNTY GENERAL PLAN, APPENDIX B, FARMLAND MITIGATION PROGRAM GUIDELINES (2013), *available at* http://www.co.stanislaus.ca.us/planning/pl/gp/gp-ag-element-b.pdf; s*ee also* Lori Lynch, *Protecting Farmland: Why Do We Do It? How Do We Do It? Can We Do It Better?*, *in* LAND USE PROBLEMS AND CONFLICTS: CAUSES, CONSEQUENCES AND SOLUTIONS 279–83 (John C. Bergstrom, Stephen J. Goetz & James S. Shortle eds., 2013); Coline Perrin, *Regulation of Farmland Conversion on the Urban Fringe: From Land-Use Planning to Food Strategies. Insight into Two Case Studies in Provence and Tuscany*, 18 INT'L PLANNING STUDIES 21 (2013) (discussing farmland policies to prevent farmland conversion).

201. *See* 42 U.S.C. § 4332(C) (2006 & Supp. V 2011); CAL. PUB. RES. CODE § 21001.1 (West 2013).

202. *See* 42 U.S.C. § 4332(C).

203. *See generally* CAL. PUB. RES. CODE § 21001.1.

204. *See CDFW Role in CEQA*, CAL. DEP'T FISH & WILDLIFE, http://www.dfg.ca.gov/habcon/ceqa/role.html (last visited Oct. 8, 2013) [hereinafter CDFW CEQA].

1. NEPA: National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires environmental review of all major federal actions that are likely to have significant environmental effects.[205] The phrase "major federal action" is interpreted broadly to include issuing permits and approvals.[206] Several steps in the approval of solar power projects trigger NEPA review, including BLM approval of ROWs[207] and potentially issuance of incidental take permits under the federal ESA.[208] For such actions, NEPA requires environmental review, generally taking the form of an Environmental Impact Statement or a less intensive review called an Environmental Assessment.[209] An Environmental Impact Statement not only evaluates the environmental impacts of a proposed project (and its alternatives) but also outlines possible mitigation measures.[210]

Courts have interpreted NEPA to be a procedural statute, requiring completion of an environmental review process, but without any substantive requirements regarding actions, alternatives, or mitigation.[211] The actual review process (that

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205. 42 U.S.C. § 4332(C).

206. *Id.*; *see* RONALD E. BASS ET AL., THE NEPA BOOK 29–35 (2d ed. 2001) (explaining the types of government activities falling under "major federal action").

207. BUREAU OF LAND MGMT., NATIONAL ENVIRONMENTAL POLICY ACT HANDBOOK 15 (2008), *available at* http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.84688.File.dat/h1790-1-2008.pdf.

208. *See* U.S. FISH & WILDLIFE SERV., DRAFT FISH AND WILDLIFE SERVICE MANUAL, pt. 550, ex. 1 (2010), *available at* http://www.fws.gov/r9esnepa/550FW/550%20FW%202%20Exhibit%201.pdf (outlining when the Service implements NEPA review). Although it is the policy of the Service to conduct NEPA review, there is a circuit split on the issue. *Compare* Ramsey v. Kantor, 96 F.3d 434, 444 (9th Cir. 1996), *with* Miccosukee Tribe v. United States, 430 F. Supp. 2d 1328, 1335 (S.D. Fla. 2006).

209. 40 C.F.R. §§ 1508.9, 1508.11 (2012) (containing the Council on Environmental Quality's regulations defining Environmental Impact Statements and Environmental Assessments); §§ 1501.3, 1501.4 (containing the Council on Environmental Quality's regulations describing when to complete an Environmental Impact Statement versus an Environmental Assessment). An Environmental Assessment is a preliminary document and its outcome informs the action agency on whether it needs to complete a more in-depth Environmental Impact Statement or can file a Finding of No Significant Impact. BASS ET AL., *supra* note 198, at 44–48.

210. *See* 40 C.F.R. § 1502 (detailing some of the requirements for Environmental Impact Statements).

211. Marsh v. Or. Natural Res. Council, 490 U.S. 360, 371 (1989) ("NEPA does not work by mandating that agencies achieve particular substantive

is, the preparation of the Environmental Impact Statement) is done by the federal agency contemplating the federal action.[212] Thus, for issuance of ROWs, BLM is responsible. For endangered species review, the U.S. Fish and Wildlife Service is responsible. Where multiple federal agencies are involved in issuing permits for one activity, the agencies work together with one agency taking the lead.[213] The environmental review process (and the documents it produces) can be quite lengthy.[214]

2. CEQA: California Environmental Quality Act

In California, solar development projects are also subject to the California Environmental Quality Act (CEQA).[215] CEQA requires a study of any project within the state that will have a significant effect on the environment.[216] The law applies to all discretionary activities that meet the law's definition of a project, which includes both projects carried out by public

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results."); *see also* Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government's Environmental Performance*, 102 COLUM. L. REV. 903, 904 (2002). White House Council on Environmental Quality guidance encourages the use of "Mitigated Findings of No Significant Impact," which would require monitoring. NANCY H. SUTLEY, CHAIR OF THE EXEC. OFFICE OF THE PRESIDENT, COUNCIL ON ENVTL. QUALITY, MEMORANDUM FOR HEADS OF FEDERAL DEPARTMENTS AND AGENCIES ON APPROPRIATE USE OF MITIGATION AND MONITORING AND CLARIFYING THE APPROPRIATE USE OF MITIGATED FINDINGS OF NO SIGNIFICANT IMPACT 9–12 (2011), *available at* http://energy.gov/sites/prod/files/NEPA-CEQ_Mitigation_and_Monitoring_Guidance_14Jan2011.pdf (recommending measures agencies can take to monitor mitigation).

212. *See* 40 C.F.R. § 1502.4.

213. *Cf.* CDFEW CEQA, *supra* note 204 (explaining when CDFW acts as a lead agency).

214. *See, e.g.*, AM. ASS'N OF STATE HIGHWAY & TRANSP. OFFICIALS, IMPROVING THE QUALITY OF ENVIRONMENTAL DOCUMENTS 2 (2006), *available at* http://environment.transportation.org/pdf/IQED-1_for_CEE.pdf (describing "voluminous collections of data" with "overwhelming" documents that are "not clearly written, are poorly organized, and are presented in a format that is difficult to follow" while also explaining that the "unwieldy" and "cumbersome" documents commonly exceed 1000 pages); COUNCIL ON ENVTL. QUALITY, THE NATIONAL ENVIRONMENTAL POLICY ACT: A STUDY OF ITS EFFECTIVENESS AFTER TWENTY-FIVE YEARS, at ix (1997), *available at* http://www.blm.gov/pgdata/etc/medialib/blm/wo/Communications_Directorate/legislation.Par.75991.File.dat/nepa25fn.pdf (explaining that many agencies view NEPA as taking too long and costing too much).

215. *See* CAL. PUB. RES. CODE § 21001.1 (West 2013).

216. CAL. CODE REGS. tit. 14, § 15382 (2013) (defining "significant effect on the environment").

agencies and private projects approved by public agencies.[217] CEQA does not have the same "major Federal action" requirement as NEPA,[218] and it applies wherever the proposed action has the potential to result in "either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment . . . ."[219] Like its federal counterpart, CEQA examines environmental impacts, alternatives, and mitigation measures.[220] While NEPA documents are merely advisory, CEQA actually has some teeth, and project proponents are required to comply with CEQA mitigation plans if they want to proceed with their project.[221] CEQA also requires avoidance of environmental harms,[222] and approved projects must adopt feasible alternatives or mitigation measures to reduce environmental impacts.[223]

CEQA review comes in the form of an Environmental Impact Report (as opposed to NEPA's Environmental Impact Statement).[224] The components of CEQA and NEPA review often overlap, and federal and state lead agencies coordinate these processes where possible.[225] In some cases, agencies coordinate and produce joint documents.[226] In other cases, the BLM and the California Energy Commission have processed

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217. CAL. PUB. RES. CODE § 21001.1.

218. *See* 42 U.S.C. § 4332(C) (2006 & Supp. V 2011).

219. CAL. CODE REGS. tit. 14, § 15378.

220. CAL. PUB. RES. CODE §§ 21002, 21002.1.

221. *Id.* § 21002. *See generally* RONALD E. BASS ET AL., CEQA DESKBOOK 198 (3d ed. 2012) (providing that public agencies may have authority under state or local law to ensure compliance, including "stop work" orders, revocation of project approvals, and criminal sanctions).

222. CAL. PUB. RES. CODE § 21002.

223. Stockton Citizens for Sensible Planning v. City of Stockton, 227 P.3d 416, 425 (Cal. 2010).

224. CAL. PUB. RES. CODE § 21002.1.

225. CAL. CODE REGS. tit. 14, § 15006(j) (2013).

226. EXEC. OFFICE OF THE PRESIDENT & STATE OF CAL. GOVERNOR'S OFFICE OF PLANNING & RESEARCH, NEPA AND CEQA: INTEGRATING STATE & FEDERAL ENVIRONMENTAL REVIEWS, DRAFT FOR PUBLIC REVIEW AND COMMENT 25–30 (2013), *available at* http://energy.gov/sites/prod/files/NEPA_CEQA_Draft_Handbook_March_2013_0.pdf; *see, e.g.*, CAL. PUB. UTILS. COMM'N, SOUTHERN CALIFORNIA EDISON'S DEVERS-PALO VERDE 500KV NO. 2 PROJECT (2006), *available at* http://www.cpuc.ca.gov/environment/info/aspen/dpv2/toc-feir.htm (discussing environmental review for a transmission line project jointly from the BLM and the California Public Utilities Commission).

projects in parallel, under different timelines, and arrived at different decisions.[227]

The CEQA lead agency (the agency responsible for preparing and approving the Environmental Impact Review) for a solar project may be a county (if the project is located on private land and requires land-use approvals) or a state agency that has a special interest in the project (such as the California Department of Fish and Wildlife or the State Lands Commission). For thermal solar facilities over fifty MW, the Energy Commission is the lead agency.[228] The Energy Commission's licensing process described above incorporates CEQA requirements and is considered the CEQA's "functional equivalent."[229] Large CSP projects on federal land must go through NEPA, the Energy Commission's licensing processes for environmental review, and processes for any additional needed permits.

D. COMPENSATORY MITIGATION BASICS

The permitting and environmental review laws detailed above require project developers to perform compensatory mitigation. This section outlines the regulatory background related to compensatory mitigation generally and off-site preservation specifically. To understand potential concerns with mitigation, we begin by tackling what we mean by mitigation. To mitigate means to make something less harmful or severe.[230] In the context of development projects, we think of mitigation as reducing the negative environmental impacts of the proposed project. Federal agencies usually define

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227. In the case of the Palen solar project, the California Energy Commission published a Final Staff Assessment and approved the project. *Palen Solar Power Project*, CAL. ENERGY COMMISSION, http://www.energy.ca.gov/sitingcases/palen/ (last visited Oct. 8, 2013). BLM published a Final Environmental Impact Statement, but has not yet published a Record of Decision to approve the project and grant the right-of-way. *Palen Solar Power Project*, BUREAU LAND MGM'T, http://www.blm.gov/ca/st/en/fo/palmsprings/Solar_Projects/palen_solar_electric/Palen_Solar_Power_Project.html (last updated May 6, 2013).

228. CAL. PUB. RES. CODE § 25543(b).

229. CAL. ENERGY COMM'N, COMMITTEE GUIDANCE ON FULFILLING CALIFORNIA ENVIRONMENTAL QUALITY ACT RESPONSIBILITIES FOR GREENHOUSE GAS IMPACTS IN POWER PLANT SITING APPLICATIONS 1 (2009), *available at* http://www.energy.ca.gov/2009publications/CEC-700-2009-004/CEC-700-2009-004.PDF.

230. *Mitigate Definition*, MERRIAM-WEBSTER.COM, http://www.merriam-webster.com/dictionary/mitigate (last visited Oct. 12, 2013).

mitigation as having three steps: avoidance, minimization, and compensation.[231] For example, to obtain approval for a wetlands fill permit under section 404 of the Clean Water Act, the applicant must first demonstrate that the project avoids impacts to wetlands to the extent feasible.[232] Next, the applicant must minimize any remaining impacts of the proposed project.[233] Finally, after the permit-issuing agency (in this example the Army Corps of Engineers) is satisfied that the only remaining impacts are unavoidable (absent stopping the project), the agency quantifies the damage that will be done to wetlands and requires project proponents to compensate for that damage through "compensatory mitigation."[234] Instead of preventing habitat conversion, developers compensate for the habitat lost. Compensatory mitigation can come in the form of restoration, creation, enhancement, and/or preservation of habitat and other resources, like wetlands or prime agricultural land.[235] This type of mitigation acknowledges habitat destruction will occur.[236]

Here, we outline the components of compensatory mitigation using the well-established case of mitigation for impacts to jurisdictional wetlands. According to Army Corps of Engineers and Environmental Protection Agency regulations, there are four acceptable compensatory mitigation strategies: restoration, establishment, enhancement, and preservation.[237] These are relatively straightforward sounding approaches, but can be quite challenging to implement. Establishment (or

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231. Shari Clare et al., *Where Is the Avoidance in the Implementation of Wetland Law and Policy?* 19 WETLANDS ECOLOGY & MGMT. 165, 165 (2011).

232. 40 C.F.R. § 230.91(c)(2) (2012). *But see* Clare et al., *supra* note 231, at 165–66 (describing the general mitigation sequence and demonstrating that the avoidance prong appears to often get ignored).

233. 40 C.F.R. § 230.91(c)(2) .

234. *Id.*; Richard F. Ambrose, *Wetland Mitigation in the United States: Assessing the Success of Mitigation Policies*, 19 WETLANDS (AUSTL.) 1, 4 (2000); *see generally* James T. Robb, Note, *Assessing Wetland Compensatory Mitigation Sites to Aid in Establishing Mitigation Ratios*, 22 WETLANDS 435, 439 (2002) (expressing concern that applicant motivation and agency failure to enforce may reduce the effectiveness of compensatory mitigation).

235. *See* 40 C.F.R. § 230.92.

236. *See generally* Jessica Owley, *Preservation as a Flawed Mitigation Strategy, in* BEYOND JURISDICTION: WETLANDS POLICY FOR THE NEXT GENERATION (Kim Connolly ed., forthcoming 2014) (discussing concerns with preservation as a mitigation strategy).

237. 40 C.F.R. § 230.92; *see also* Owley, *supra* note 236; *cf.* MALCOLM L. HUNTER, JR. & JAMES GIBBS, FUNDAMENTALS OF CONSERVATION BIOLOGY 273 (3d ed. 2007).

creation) requires building a wetland out of whole cloth where one did not exist before.[238] Wetland creation has been beset by a variety of problems, and there have been many failed attempts at creating functioning wetlands for mitigation.[239] Restoration takes an existing, but degraded, wetland and increases its function by doing things like removing debris and invasive species, planting wetlands species, and ensuring adequate water supplies.[240] This is similar to enhancement, which also starts with an existing wetland and increases its functions. Restoration and enhancement projects have largely fared better than creation projects, and advances in restoration ecology are improving the outcomes for these projects.[241] Yet restoration projects still provide fewer acres and fewer functions than ecologists have predicted.[242] After creating, restoring, or enhancing wetlands, the wetlands themselves are usually protected with conservation easements with the hope of

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238. *See* D. Moreno-Mateos & F.A. Comin, *Integrating Objectives and Scales for Planning and Implementing Wetland Restoration and Creation in Agricultural Landscapes*, 91 J. ENVTL. MGMT. 2087, 2087–88 (2010) (noting that restoration and creation projects may have conflicting internal objectives).

239. *See* William J. Mitsch & Renee F. Wilson, *Improving the Success of Wetland Creation and Restoration with Know-How, Time, and Self-Design*, 6 ECOLOGICAL APPLICATIONS 77, 77–78 (1996); Dennis F. Whigham, *Ecological Issues Related to Wetland Preservation, Restoration, Creation and Assessment*, 240 SCI. TOTAL ENV'T 31, 32 (1999).

240. *See generally* WILLIAM J. MITSCH & JAMES G. GOSSELINK, WETLANDS 377–424 (2007) (providing restoration principles for different types of wetlands and citing examples).

241. *See* Joy B. Zedler & Suzanne Kercher, *Wetland Resources: Status, Trends, Ecosystem Services, and Restorability*, 30 ANN. REV. ENV'T & RESOURCES 39, 60 (2005); Anya Hopple & Christopher Craft, *Managed Disturbance Enhances Biodiversity of Restored Wetlands in the Agricultural Midwest*, 61 ECOLOGICAL ENGINEERING 505–08 (2012), *available at* http://dx.doi.org/10.1016/j.ecoleng.2012.02.028.

242. David Malakoff, *Restored Wetlands Flunk Real-World Test*, 280 SCI. 371, 372 (1999) (noting struggles but suggesting that given enough time the projects might end up more successful than currently being demonstrated); Margaret Seluk Race, *Critique of Present Wetlands Mitigation Policies in the United States Based on an Analysis of Past Restoration Projects in San Francisco Bay*, 9 ENVTL. MGMT. 71 (1985); *see also* Todd Bendor, *A Dynamic Analysis of the Wetland Mitigation Process and Its Effects on No Net Loss Policy*, 89 LANDSCAPE & URB. PLANNING 17, 25–26 (2009) (explaining that even where restoration and creation projects eventually prove successful at establishing functioning wetlands, the time lag between destruction and restoration can cause irrevocable harm).

keeping the wetlands from being degraded or converted again in the future.[243]

The final option for compensatory mitigation is preservation. Preservation involves protecting existing resources. In exchange for destroying wetlands on a project site, one has to protect off-site wetlands. Preservation on its own does not increase function or acreage.[244] It accepts a decrease in both as worth the benefit that will be supplied by the development project.[245] In spite of this, most laws not only acknowledge preservation as an acceptable mitigation measure but even seem to champion preservation as a strategy. There is a great deal of case history supporting preservation as mitigation for impacts on wetlands, farmland, and endangered species habitat.[246]

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243. *See generally* ENVTL. LAW INST. & LAND TRUST ALLIANCE, WETLAND AND STREAM MITIGATION: A HANDBOOK FOR LAND TRUSTS 86 (2012), *available at* http://www.landtrustalliance.org/land-trusts/wetland-and-stream-mitigation-handbook (describing the role of conservation easements and land trusts within section 404 wetland mitigation programs).

244. *See* Owley, *supra* note 236.

245. In the realm of wetlands protection, the Army Corps of Engineers has long noted that preservation is the least favored mitigation strategy on its own (although it does endorse preservation of restored, enhanced, and created wetlands) and should only be undertaken in "exceptional circumstances." Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks, 60 Fed. Reg. 58,605, 58,606 (Nov. 28, 1995). Preserved wetlands can qualify as compensatory mitigation when they "(1) perform physical or biological functions, the preservation of which is important to the region in which the aquatic resources are located, and (2) are under demonstrable threat of loss or substantial degradation due to human activities that might not otherwise be expected to be restricted." *Id.* at 58,609. This is manifested in the fact that pure preservation mitigation banks do not yield as many wetland conversion credits. *Id.* There are cases, however, where based on the above guidelines, preservation as mitigation may protect wetlands that would have otherwise been lost to agricultural conversion or development. For example, we may be able to preserve non-jurisdictional wetlands where development threatens those wetlands. The Clean Water Act's limited jurisdiction means that it cannot protect such areas, so covering them by compensatory mitigation programs may be the best bet. Nothing indicates that compensatory mitigation wetlands must also be jurisdictional. Arguably, protected wetlands should be in the same watershed (or as some mitigation state, in the same "service area") and hydrologically part of the same system. A geographical or hydrological connection would explain how the protection of such wetlands might mitigate for the harm caused by the wetland conversion. Of course, if hydrologically connected to a jurisdictional wetland, that wetland should also be deemed jurisdictional, but the Supreme Court has clung to narrow understandings of hydrological connections.

246. *See* Phillip H. Brown & Christopher L. Lant, *The Effect of Wetland Mitigation Banking on the Achievement of No-Net-Loss,* 23 ENVTL. MGMT. 333,

For the large solar projects in the California desert, compensatory mitigation requirements stem most often from state and federal endangered species protection laws and the California Environmental Quality Act, but may also come from laws protecting federal and state jurisdictional waters. Mitigation under the federal and state ESAs and the California Environmental Quality Act are discussed in more detail below.

1. Mitigation Under the Federal Endangered Species Act

To grant an Incidental Take Permit under the federal ESA, the U.S. Fish and Wildlife Service must find that the applicant will "minimize and mitigate the impacts" of any taking "to the maximum extent practicable."[247] The Code of Federal Regulations defines mitigation to include:

> (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
>
> (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
>
> (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
>
> (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
>
> (e) Compensating for the impact by replacing or providing substitute resources or environments.[248]

Note that this definition of mitigation includes elements that are more properly considered as pre-mitigation measures: avoiding and minimizing impacts. It can also be a confusing definition because there are overlaps in the last three options. Indeed, it can be hard to distinguish between rectifying an impact and compensating for it.

Further assistance in understanding mitigation for incidental takes comes from the Habitat Conservation Planning Handbook of 1996, jointly issued by the U.S. Fish and Wildlife Service and NOAA Fisheries Service.[249] The Handbook

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335 (1999) (discussing wetland mitigation bank case studies). *See generally* Rachelle Alterman, *The Challenge of Farmland Preservation: Lessons from a Six-Nation Comparison*, 63 J. AM. PLANNING ASS'N 220 (1997) (discussing cases of farmland preservation); Melinda Harm Benson, *Intelligent Tinkering: The Endangered Species Act and Resilience*, 17 ECOLOGY & SOC'Y, no. 4, 2012 at 1, 5, *available at* http://dx.doi.org/10.5751/ES-05116-170428 (discussing endangered species habitats and recommending improvements to preservation approaches).

247. 16 U.S.C. § 1539(a)(2)(B)(ii) (2012).

248. 40 C.F.R. § 1508.20(a)–(e) (2012).

249. HCP HANDBOOK, *supra* note 149.

describes the process of mitigating for habitat loss, outlining five types of mitigation projects:

> Potential types of habitat mitigation include, but are not limited to: (1) acquisition of existing habitat; (2) protection of existing habitat through conservation easements or other legal instruments; (3) enhancement or restoration of disturbed or former habitats; (4) prescriptive management of habitats to achieve specific biological characteristics; and (5) creation of new habitats.[250]

The Handbook's approach to mitigation does not include minimization or avoidance and does not offer a hierarchy (or order of preference) for the listed mitigation approaches.[251] Most Incidental Take Permits include preservation (often through conservation easements) as part of their mitigation program.

2. Mitigation Under the California Endangered Species Act

California's ESA offers even more limited information about mitigation standards. Like the federal law, California law has an incidental take permitting program.[252] Using stronger language, California requires that project harms be "minimized and fully mitigated."[253] The only other guidance from the statute is a requirement that mitigation measures "be roughly proportional in extent to any impact on those species that is caused by that person"[254] and "capable of successful implementation."[255] The regulations governing the Act do not provide any further detail regarding what constitutes mitigation, adding only a requirement to demonstrate a plan

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250. *Id.* at 3-21 to 3-22.

251. The order of this list is particularly interesting. Although the Handbook does not indicate that the order reflects any preference for a particular mitigation scheme, the high placement of conservation easements on the list is telling. The final three mitigation types would actually appear to go much further toward mitigating habitat modification than the first two. Not only are there no hints that the order of this list makes a difference, but there is no other mitigation approach preference mentioned.

252. CAL. FISH & GAME CODE § 2080.1(a) (West 2013). For species already covered by a federal incidental take permit (and associated HCP), no further action is necessary. *Id.* However, the California ESA covers more species (and includes candidate species as well as those that are endangered and threatened) than the federal law does. *Id.*; CAL. FISH & GAME CODE § 2068 (defining "candidate species").

253. CAL. FISH & GAME CODE § 2081(b)(2).

254. *Id.* § 2052.1.

255. *Id.*

(and funding) for ensuring compliance with mitigation measures.[256]

The California Department of Fish and Wildlife offers more information on its website, stating that a mitigation plan "should identify measures to avoid and minimize" take as well as "fully mitigate the impact" of any take.[257] This is a tad confusing because under this rubric a mitigation plan includes steps (avoidance and minimization) that should occur before mitigation. This may explain why the Department's proffered list of example measures includes little in the way of compensatory mitigation. The Department website's listed "mitigation measures" include many items that fall outside of the compensatory mitigation framework and appear more in line with minimizing impacts to species, including site delineation, environmental training for construction workers, notification measures, and take avoidance.[258] In terms of mitigation measures undertaken in direct response to takes or habitat loss, the only example the Department includes is "acquisition and transfer of habitat management lands."[259] Such language appears to focus on preservation of existing habitat without mention of habitat restoration or creation.

The California ESA was amended to provide specific guidelines for the DRECP process. The amendments required the REAT Agencies to work together to "fully mitigate the impacts of the take of endangered species, threatened species, or candidate species."[260] The statute goes on to explain that the mitigation action either be found in the Interim Mitigation Strategy[261] or be one that the California Department of Fish and Wildlife has determined to result in "the protection, restoration, or enhancement of the habitat" of species covered by the DRECP.[262] Again, protection or preservation of habitat qualifies as an acceptable mitigation measure.

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256. CAL. CODE REGS. tit. 14, § 783.2(a)(9)–(10) (2013).

257. *California Endangered Species Act (CESA): Section 2081(b) and (c)—Incidental Take Permit Process*, CAL. DEP'T FISH & WILDLIFE, http://www.dfg.ca.gov/habcon/cesa/incidental/incid_perm_proced.html (last visited Aug. 1, 2013).

258. *See id.*

259. *Id.*

260. CAL. FISH & GAME CODE § 2069(b).

261. *See* IMS, *supra* note 48.

262. CAL. FISH & GAME CODE § 2069(c)(1).

3. Mitigation Under the National Environmental Policy Act

The National Environmental Policy Act requires consideration of alternatives and potential mitigation measures. Specifically, an Environmental Impact Statement must include a section on "appropriate mitigation measures."[263] These mitigation measures enter into the discussion of alternatives and into the analysis of environmental consequences, where there must be a discussion of the "[m]eans to mitigate adverse environmental impacts."[264] The Statement must include a discussion of mitigation for "the range" of identified impacts, even where those impacts would not be significant on their own.[265] The Council on Environmental Quality's regulations implementing NEPA have the same definition for mitigation as in the regulations implementing the federal ESA.[266] Thus, the regulations identify five types of mitigation: avoiding, minimizing, rectifying, reducing, and compensating.[267]

What constitutes meaningful or adequate mitigation has been tricky to assess in the NEPA realm. NEPA has been criticized for resulting in paper mitigation—or policies that do not result in action on the ground.[268] Instead, the mitigation measures take the form of continuing studies, consultations, monitoring, and making plans.[269] Mitigation measures need not be feasible to be considered and should be included even if they are outside the jurisdiction of the lead agency or are unlikely to be adopted.[270] But the probability that the mitigation measure will be implemented must be included to ensure that a proposal is fairly assessed.[271] The record of decision (ROD) must state which mitigation measures will actually be implemented.[272]

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263. 40 C.F.R. § 1502.14(f) (2013).

264. *Id.* § 1502.16(h).

265. *See* Forty Most Asked Questions Concerning CEQ's NEPA Regulations, 46 Fed. Reg. 18,026, 18,031 (Mar. 23, 1981), as amended 51 Fed. Reg. 15,618 (Apr. 25, 1986), at Question 19(a).

266. *See* 40 C.F.R. § 1508.20.

267. *Id.*

268. Peter J. Eglick & Henryk J. Hiller, *The Myth of Mitigation Under NEPA and SEPA*, 20 ENVTL. L. 773, 776 (1990).

269. BASS ET AL., *supra* note 206, at 119 fig.5-10.

270. Forty Most Asked Questions Concerning CEQ's NEPA Regulations, 46 Fed. Reg. at 18,031, Question 19(b).

271. *Id.*

272. 40 C.F.R. § 1505.2(c) (2013); Forty Most Asked Questions Concerning CEQ's NEPA Regulations, 46 Fed. Reg. at 18,036, Question 34(c).

Although NEPA requires a discussion of mitigation, there is nothing in the statutes that requires federal agencies to actually carry out the mitigation measures.[273] However, other laws or policies governing an agency's actions (like the Federal Land Policy and Management Act for the BLM) may serve as hook to give NEPA teeth. That is, while courts have consistently held that NEPA only requires consideration of alternatives and mitigation measures and not actual implementation of those measures, agencies could violate their organic acts or other laws if they choose to act in ways that will cause significant environmental harm.

4. Mitigation Under the California Environmental Quality Act

The California Environmental Quality Act uses the same definition for mitigation as the federal ESA.[274] Again, minimization and avoidance are included although they should ideally be part of the project design (things that happen before mitigation). Project timing can make this challenging from an environmental review standpoint though. A key part of the environmental review process is identifying potential impacts and their severity. This means that some project impacts might not be known until the project is relatively well-defined and has undergone environmental review.[275]

E. FAST-TRACKING AND STREAMLINING

In response to the boom in solar project applications (and associated policy goals and funding deadlines), federal and state agencies have "fast tracked" their assessment of some projects.[276] This has involved dedication of additional staff and coordination among agencies. Many environmental groups have been critical of fast-tracking and contend that fast-tracked projects have not received adequate review.[277]

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273. Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 352–53 (1989).

274. *See* CAL. CODE REGS. tit. 14, § 15370 (2013).

275. *See generally* David C. Levy & Jessica Owley, *Preservation as Mitigation Under CEQA: Ho-hum or Uh-oh?*, 14 ENVTL. L. NEWS 18, 18 (2005).

276. In 2009, there was a seventy-eight percent increase in BLM ROW applications for solar energy projects on public lands. Johanna Wald, *Clearing up the Record on Solar Energy on Public Lands*, SWITCHBOARD (Feb. 10, 2012), http://switchboard.nrdc.org/blogs/jwald/clearing_up_the_record_on_sola.html.

277. *See* Debra Kahn, *Despite Permitting Shortcuts, California Projects Still Hit Hurdles*, CLIMATE WIRE (Jan. 3, 2011); Todd Woody, *Sierra Club,*

In 2009, Secretary of the Interior Ken Salazar issued Secretarial Order 3285, naming renewable energy as one of the Department's top priorities and developing an Energy and Climate Change Task Force.[278] ARRA funding created a push for fast-tracking by requiring that projects start construction before incentives expired. Although the term "fast-tracking" does not appear in any statutes, regulations, executive orders, secretarial orders, or agency guidance documents, the BLM began publicizing its fast-tracking efforts in June of 2009.[279] The Interior Department describes the fast track as part of an "overall strategy to spur a rapid and responsible move to large-scale production of renewable energy on public lands."[280]

Under the heading of *Accelerating Clean Energy Permitting*, the Obama Administration's 2013 Climate Action Plan states:

> In 2012 the President set a goal to issue permits for 10 gigawatts of renewables on public lands by the end of the year. The Department of the Interior achieved this goal ahead of schedule and the

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NRDC Sue Feds to Stop Big California Solar Power Project, FORBES (Mar. 27, 2012), www.forbes.com/sites/toddwoody/2012/03/27/sierra-club-nrdc-sue-feds-to-stop-big-california-solar-power-project.

278. KEN SALAZAR, SEC'Y OF THE INTERIOR, SECRETARIAL ORDER NO. 3285: RENEWABLE ENERGY DEVELOPMENT BY THE DEPARTMENT OF THE INTERIOR (2009), *available at* http://www.blm.gov/or/energy/opportunity/files/order_3285.pdf. In 2001, George W. Bush signed Executive Order 13,212, which instructed federal agencies to expedite permitting and construction of energy projects. Exec. Order No. 13,212, 66 Fed. Reg. 28,357 (May 18, 2001). While the Bush Administration appeared to be contemplating fossil fuel production, the Executive Order also applied to renewable energy facilities, and the BLM has cited it as one of the policies guiding its approach to reviewing renewable energy projects. *Why the Solar PEIS Is Needed,* SOLAR ENERGY DEV. PROGRAMMATIC EIS, http://solareis.anl.gov/eis/why/index.cfm (last visited July 29, 2013) (describing the Solar PEIS as a response, in part, to Executive Order 13,212); *see also* BUREAU OF LAND MGMT., SITING AND PERMITTING SOLAR DEVELOPMENT ON BLM-MANAGED LANDS 3 (2012), *available at* http://www.slc.ca.gov/division_pages/mfd/Prevention_First/Documents/2012/SOLAR%20ENERGY%20ON%20PUBLIC%20LANDS.pdf (citing Executive Order 13,212 as requiring expediting of solar permitting).

279. *See* Press Release, U.S. Dep't of the Interior, Secretary Salazar, Senator Reid Announce 'Fast-Track' Initiatives for Solar Energy Development on Western Lands (June 29, 2009), *available at* http://www.doi.gov/news/pressreleases/2009_06_29_release.cfm#.

280. Press Release, U.S. Dep't of the Interior, Salazar Green-Lights First-Ever Solar Energy Projects on Public Lands (Oct. 5, 2010), *available at* http://www.doi.gov/news/pressreleases/Salazar-Green-Lights-First-Ever-Solar-Energy-Projects-on-Public-Lands.cfm; *see also* Press Release, U.S. Dep't of the Interior, Secretary Salazar, Director Abbey Open Renewable Energy Coordination Office in California to Speed Project Processing (Oct. 9, 2009), *available at* http://www.doi.gov/news/pressreleases/2009_10_09_releaseC.cfm.

> President has directed it to permit an additional 10 gigawatts by 2020. Since 2009, the Department of Interior has approved 25 utility-scale solar facilities, nine wind farms, and 11 geothermal plants, which will provide enough electricity to power 4.4 million homes and support an estimated 17,000 jobs.[281]

RPS goals and financial incentives led to an enormous increase in permit applications from renewable energy developers, and federal and state agencies allocated additional staff resources to evaluating these proposed projects.[282]

Fast-tracking appears to have been successful. As part of the push to accelerate permitting, the BLM established five Renewable Energy Coordination Offices (with seventy-one positions) and six Renewable Energy Support Teams (with thirty-five positions).[283] The Palm Springs Renewable Energy Coordination Office opened in October 2009.[284] Between 2009 and 2012, numerous solar projects were designated as "fast track" projects. The first solar project on public land to make it through the fast track was approved in fall 2010.[285] Fourteen

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281. EXEC. OFFICE OF THE PRESIDENT, THE PRESIDENT'S CLIMATE ACTION PLAN 7 (2013), *available at* http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf.

282. Patrick Donnelly-Shores, *Obama: "New" Policy for Renewables on Public Lands, or Fast-Tracking Redux?*, BERKELEY ENERGY & RESOURCES COLLABORATIVE BLOG (June 25, 2013), http://berc.berkeley.edu/obama-new-fast-track/.

283. OFFICE OF INSPECTOR GEN., U.S. DEP'T OF THE INTERIOR, BUREAU OF LAND MANAGEMENT'S RENEWABLE ENERGY PROGRAM: A CRITICAL POINT IN RENEWABLE ENERGY DEVELOPMENT 4 (2012) [hereinafter IG REPORT], *available at* http://docs.wind-watch.org/BLM-Renewable-Energy-Program.pdf.

284. Mary Catherine O'Connor, *New BLM Office Opens to Fast-Track Renewable Energy Proposals*, TRIPLE PUNDIT (Oct. 9, 2009), http://www.triplepundit.com/2009/10/new-blm-office-opens-to-fast-track-renewable-energy-proposals/.

285. Three utility-scale solar projects on public land in the California desert were approved in Fall 2010. Calico (San Bernardino County), Blythe (Riverside County), and Ivanpah (San Bernardino County) solar projects were all approved by BLM and CEC in September and October 2010. Ivanpah was designated as a fast-track project even though it began review in 2007. Press Release, BrightSource Limitless, BrightSource Energy Proposes Reduced Footprint Alternative Mitigation for Ivanpah Solar Electric Generating System (Feb. 11, 2010), *available at* http://www.brightsourceenergy.com/brightsource-energy-proposes-reduced-footprint-alternative-mitigation-for-ivanpah-solar-electric-generating-system. The Calico project has since been withdrawn, and the Blythe project is on hold. *Status of All Projects*, CAL. ENERGY COMMISSION, http://www.energy.ca.gov/sitingcases/all_projects.html (last updated July 30, 2013); *see generally BLM California Solar Applications*, BUREAU LAND MGMT., http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/pa/energy/solar.Par.84447.File.dat/BLM%20Solar%20Applications%20&%20Authorizations%20April%202013.pdf (last updated Sept. 2013).

solar projects were put on the fast track for approval in 2010.[286] These projects were allocated additional staff resources through the Renewable Energy Coordination Offices.[287] It is unclear exactly how much fast-tracking has increased the speed of the BLM's ROW grants to solar developers. As of 2013, the BLM appears to no longer be designating fast track projects, but that may change in the wake of the Obama Administration's 2013 Climate Action Plan.[288]

Similar efforts are occurring on the state level. Although the Energy Commission does not use the term "fast track" in policy documents, the agency did speed up processing of project applications in response to ARRA funding deadlines. The Energy Commission fast tracked several projects to help meet the initial deadline for treasury cash grants in 2010; the Energy Commission needed to review projects in about half of its usual time (nine months instead of eighteen).[289]

California ESA fast-tracking is also occurring. A 2011 law (SB 16) expedites issuance of state incidental take permits for renewable energy projects.[290] The law requires that the California Department of Fish and Wildlife notify permit applicants that their applications are complete within forty-five days of submission.[291] There are further deadlines and requirements for bringing an application to a state of completion.[292] Once the application is complete, the Department has sixty days to determine whether to grant or

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286. Press Release, Bureau of Land Mgmt., BLM Concentrating on Renewable Energy Projects that Could Meet Stimulus Funding Deadline (Dec. 29, 2009), *available at* http://www.blm.gov/wo/st/en/info/newsroom/2009/december/0.html.

287. *See id.*

288. Donnelly-Shores, *supra* note 282; *see Active Renewable Energy Projects*, BUREAU LAND MGMT., http://www.blm.gov/pgdata/content/wo/en/prog/energy/renewable_energy/active_renewable_projects.html (last visited July 21, 2013) (showing no new projects on the fast track).

289. The CEC needed to complete project review within nine to eleven months of accepting Applications for Certification in late 2009/early 2010. *See* CAL. PUB. RES. CODE § 25540.6(a) (West 1979) (specifying twelve months for review). However, between 2003 and 2008, the typical review time was eighteen months. Review of projects has required approximately seventy-five percent more staff resources than a typical natural gas plant; four times the typical workload for the CEC. CAL. ENERGY COMM'N, 2010 INTEGRATED POLICY REPORT UPDATE 59 (2011), *available at* http://www.energy.ca.gov/2010publications/CEC-100-2010-001/CEC-100-2010-001-CMF.PDF.

290. *See* CAL. FISH & GAME CODE § 2099.20(a)(2) (West 2013).

291. *Id.*

292. *Id.* § 2099.20(a)(3)–(4).

deny the permit.[293] Previously, there was no required timeframe for issuing take permits, and according to the sponsor of SB 16, the average issuance time in one California county was six months.[294]

Streamlining is akin to fast-tracking. Alongside speeding up the pace of the permitting and environmental review processes, streamlining seeks to consolidate processes and reduce the number of steps, forms, and associated requirements. Aside from SB 16, neither streamlining nor fast-tracking changes any state or federal environmental laws; they simply quicken and simplify the environmental review and permitting processes to the extent permissible by law. There have been several recent efforts to streamline environmental review processes for renewable energy projects, particularly under CEQA. These efforts include the Jobs and Economic Improvement through Environmental Leadership Act of 2011.[295] Under this law, some large renewable energy projects would be eligible for designation as leadership projects.[296] Leadership projects benefit from expedited considerations to objections. Challenges to leadership projects are heard directly by the Court of Appeal instead of the trial court (the superior court).[297] Moreover, the law instructs the Court of Appeal to issue a decision in 175 days.[298]

State and federal agencies have tried to coordinate their efforts to assess and permit renewable energy projects. Between 2007 and 2009, the Department of the Interior (through the BLM and the U.S. Fish and Wildlife Service), the Energy Commission, and the California Department of Fish and Wildlife signed Memoranda of Understanding codifying agency collaboration in the creation of the Renewable Energy

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293. *Id.* § 2099.20(c).

294. SB 16 Senate Floor Analyses (Cal. Sept. 1, 2011), *available at* http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml.

295. 2011 Cal. Stat. 3741; *see generally* Dian Grueneich et al., *2011 California Renewable Energy Legislation: Watershed Year for Streamlining, Siting and Permitting*, MORRISON FOERSTER (Sept. 13, 2011), http://www.mofo.com/files/Uploads/Images/110913-2011-California-Renewable-Energy-Legislation-Watershed-Year.pdf (summarizing CEQA reform bills).

296. 2011 Cal. Stat. 3743.

297. 2011 Cal. Stat. 3744.

298. Grueneich et al., *supra* note 295, at 3.

Action Team (REAT).[299] The REAT was formed to "streamline and expedite the permitting processes for renewable energy projects while conserving endangered species and natural communities at the ecosystem scale."[300] According to the Energy Commission:

> This coordinated approach should reduce the time and expense for developing renewable energy on federally-owned California land, including the priority Mojave and Colorado Desert regions.
>
> To streamline the application process for renewable energy development, the Energy Commission and [the California Department of Fish and Game] will identify renewable energy development areas and develop a best management practices manual with the goal of reducing the application time in half for specific renewable projects 50 MW and greater proposed in the designated renewable energy development areas.[301]

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299. BUREAU OF LAND MGMT. CAL. & CAL. ENERGY COMM'N, MEMORANDUM OF UNDERSTANDING BETWEEN THE U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT CALIFORNIA DESERT DISTRICT AND THE CALIFORNIA ENERGY COMMISSION STAFF CONCERNING JOINT ENVIRONMENTAL REVIEW FOR SOLAR THERMAL POWER PLANT PROJECTS (2008), *available at* http://www.energy.ca.gov/siting/solar/BLM_CEC_MOU.PDF; CAL. DEP'T OF FISH & GAME, CAL. ENERGY COMM'N, BUREAU OF LAND MGMT. & U.S. FISH & WILDLIFE SERV., MEMORANDUM OF UNDERSTANDING BETWEEN THE CALIFORNIA DEPARTMENT OF FISH AND GAME, THE CALIFORNIA ENERGY COMMISSION, THE BUREAU OF LAND MANAGEMENT, AND THE U.S. FISH AND WILDLIFE SERVICE REGARDING THE ESTABLISHMENT OF THE CALIFORNIA RENEWABLE ENERGY PERMIT TEAM (2008), *available at* http://www.energy.ca.gov/siting/2008-11-17_MOU_BLM_FWS_DFG_CEC.PDF; CAL. ENERGY COMM'N & CAL. DEP'T OF FISH & GAME, MEMORANDUM OF UNDERSTANDING BETWEEN THE CALIFORNIA ENERGY COMMISSION AND THE CALIFORNIA DEPARTMENT OF FISH AND GAME REGARDING THE ESTABLISHMENT OF THE RENEWABLE ENERGY ACTION TEAM (2008), *available at* http://www.energy.ca.gov/siting/2008-11-17_MOU_CEC_DFG.PDF; STATE OF CAL. & U.S. DEP'T OF THE INTERIOR, MEMORANDUM OF UNDERSTANDING BETWEEN THE STATE OF CALIFORNIA AND THE DEPARTMENT OF THE INTERIOR ON RENEWABLE ENERGY (2009), *available at* http://www.energy.ca.gov/33by2020/mou/2009-10-12_DOI_CA_MOU.PDF.

300. RENEWABLE POWER STAFF REPORT, *supra* note 53, at 68–69. Executive Order 2-14-08 called for the formation of REAT. CAL. DEP'T OF FISH & GAME, CAL. ENERGY COMM'N, BUREAU OF LAND MGMT. & U.S. FISH & WILDLIFE SERV., MEMORANDUM OF UNDERSTANDING BETWEEN THE CALIFORNIA DEPARTMENT OF FISH AND GAME, THE CALIFORNIA ENERGY COMMISSION, THE BUREAU OF LAND MANAGEMENT, AND THE U.S. FISH AND WILDLIFE SERVICE REGARDING THE ESTABLISHMENT OF THE CALIFORNIA RENEWABLE ENERGY ACTION TEAM (2008), *available at* http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/pa/energy.Par.76169.File.dat/RenewableEnergyMOU-CDFG-CEC-BLM-USFWS-Nov08.pdf.

301. *California: Desert Renewable Energy Conservation Plan (DRECP)*, FISHWILDLIFE.ORG, http://www.fishwildlife.org/files/California.pdf (last visited Oct. 20, 2013).

There have been two other major federal multi-agency efforts to streamline permitting for renewable energy projects: The Solar Programmatic EIS and the Desert Renewable Energy Conservation Plan. These two efforts are discussed below.

1. Solar Programmatic Environmental Impact Statement

Many of the solar projects in the initial wave approved by the BLM and the Energy Commission in the California desert have come under criticism from environmental[302] and Native American groups.[303] When the BLM initially began reviewing ROW applications for solar projects, it had no policy or guidance regarding appropriate sites for solar development and little agency expertise in renewable energy projects.[304] The BLM and Department of Energy prepared a Solar Programmatic Environmental Impact Statement (the Solar PEIS) to address solar development on BLM land more strategically.[305] The goal of the Solar PEIS was to establish policies and amend land-use plans to facilitate utility-scale solar energy development.[306] The development of the Solar PEIS was part of the BLM's new solar energy program to "standardize, streamline, and speed up the authorization process and establish mandatory design features for solar energy projects on BLM lands."[307]

Finalized in 2012,[308] the Solar PEIS covers twenty million acres of BLM land in six western states (including California)

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302. Todd Woody, *It's Green Against Green in Mojave Desert Solar Battle,* YALE ENV'T 360 (Feb. 1, 2012), http://e360.yale.edu/feature/its_green_against_green_in_mojave_desert_solar_battle/2236/.

303. *See, e.g.*, Jessica Testa, *Citing Sacred Ground, Quechan Protest Solar Plant,* YUMA SUN (June 3, 2012), https://web.archive.org/web/20120608131917/http://www.yumasun.com/articles/tribes-79459-project-solar.html.

304. Wald, *supra* note 276.

305. Alexandra B. Klass, *Energy and Animals: A History of Conflict*, 3 SAN DIEGO J. CLIMATE & ENERGY L. 159, 192 (2012).

306. *See id.* at 191–92.

307. *Id.* at 193.

308. The environmental review process began in May 2008 when BLM issued a Notice of Intent to develop the Solar PEIS. BUREAU OF LAND MGMT., APPROVED RESOURCE MANAGEMENT PLAN AMENDMENTS/RECORD OF DECISION (ROD) FOR SOLAR ENERGY DEVELOPMENT IN SIX SOUTHWESTERN STATES 16 (2012), *available at* http://solareis.anl.gov/documents/docs/Solar_PEIS_ROD.pdf. There was a draft in December 2010, which received over 80,000 comments. *Id.* at 20. The BLM then issued a Solar PEIS Supplement in 2011 and held another set of public meetings. *Id.* at 16. The

that have potential for utility-scale solar development.[309] It identifies seventeen solar energy zones, totaling 285,000 acres, where solar energy and associated transmission infrastructure development are encouraged.[310] Sites in additional "variance zones" can be considered, but will not be given priority.[311] If applicants propose projects on BLM lands outside a solar energy zone, the applicants must demonstrate that development in a solar energy zone would be infeasible.[312] To further facilitate development in these solar energy areas, the BLM intends to coordinate environmental mitigation projects and planning.[313] The Solar PEIS proposes larger mitigation plans encompassing entire solar energy zones to reduce costs and to shorten the time involved in developing mitigation plans.[314] The BLM plans to use regional mitigation plans and monitoring and adaptive management plans.[315]

2. Desert Renewable Energy Conservation Plan

Another ambitious endeavor is the Desert Renewable Energy Conservation Plan (DRECP). This plan has been developed by the REAT Agencies (again, the Energy Commission, the California Department of Fish and Wildlife, the BLM, and the U.S. Fish and Wildlife Service) with input

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BLM released the Final Solar PEIS in July 2012 and on October 12, 2012, Interior Secretary Salazar issued the Record of Decision. *Id.* at 21.

309. IG REPORT, *supra* note 283, at 4.

310. Press Release, U.S. Dep't of the Interior, Obama Administration Releases Roadmap for Solar Energy Development on Public Lands (July 24, 2012), *available at* http://solareis.anl.gov/documents/docs/PressRelease_Final_Solar_PEIS.pdf.

311. Press Release, Bureau of Land Mgmt., Obama Administration Approves Roadmap for Utility-Scale Solar Energy Development on Public Lands (Oct. 12, 2012), *available at* http://www.doi.gov/news/pressreleases/Obama-Administration-Approves-Roadmap-for-Utility-Scale-Solar-Energy-Development-on-Public-Lands.cfm.

312. *See id.*

313. *Instruction Memorandum No. 2011-003: Solar Energy Development Policy*, BUREAU LAND MGMT. (Oct. 7, 2010), http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2011/IM_2011-003.html.

314. *See What's in the Solar PEIS*, SOLAR ENERGY DEV. PROGRAMMATIC EIS INFO. CENTER, http://solareis.anl.gov/eis/what/index.cfm (last visited Nov. 11, 2013).

315. *See Solar PEIS Follow-on Studies*, SOLAR ENERGY DEV. PROGRAMMATIC EIS INFO. CENTER, http://solareis.anl.gov/eis/studies/index.cfm (last visited July 21, 2013).

from stakeholders and a scientific advisory panel.[316] This comprehensive plan is being designed to meet requirements of multiple environmental and land-use laws.[317] The REAT Agencies contend that the DRECP will help meet RPS goals and will provide "binding, long-term endangered species permit assurances while facilitating the review and approval of compatible renewable energy projects in the Mojave and Colorado deserts in California."[318] The plan will be a Natural Community Conservation Plan under the California ESA, a Habitat Conservation Plan under the federal ESA, and a BLM Land Use Plan Amendment.[319] The DRECP intends to identify desert areas in which to streamline permitting and environmental review under the California Natural Community Conservation Planning Act, the federal ESA, the Federal Land Policy Management Act, the National Environmental Policy Act, and the California Environmental Quality Act.[320]

The DRECP planning area is enormous. When completed, the DRECP will be the largest ever Natural Community Conservation Plan and will encompass 22.6 million acres (the size of Indiana) across seven California counties.[321] Eighty percent of the area covered by the DRECP is public land, most

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316. The stakeholder committee includes local governments, developers, environmental groups, recreation groups, a Native American renewable energy organization, and electric utilities. *Desert Renewable Energy Conservation Plan Interim Document—FACT SHEET*, ST. CAL. NAT. RESOURCES AGENCY, 2, http://www.drecp.org/documents/docs/2012-12-18_DRECP_Interim_Document_Fact_Sheet.pdf (last visited Oct. 17, 2013) [hereinafter *DRECP Fact Sheet*].

317. *See id.*

318. *Id.*

319. The Natural Community Conservation Plan would cover the entire plan area. DESERT RENEWABLE ENERGY CONSERVATION PLAN, DESCRIPTION AND COMPARATIVE EVALUATION OF DRAFT DRECP ALTERNATIVES 2.2-6 (2012), *available at* http://www.drecp.org/documents/docs/alternatives_eval/Section_2_Description_of_Alternatives.pdf. Habitat Conservation Plans would cover non-federal land. *Id.* Land Use Plan Amendments would be on BLM land only. *Id.*

320. Letter from DRECP to Stakeholders 1 (2013) [hereinafter Stakeholder Letter], *available at*, http://www.drecp.org/documents/docs/DFA_and_streamlining_concepts_papers_March_28_2013.pdf.

321. Morgan Lee, *Southern California Seeks Balance Between Green Energy, Conservation*, U-T SAN DIEGO (Jan 2, 2013, 12:01 AM), http://www.utsandiego.com/news/2013/jan/02/tp-southern-california-seeks-balance-between/.

of it managed by BLM and also covered by the Solar PEIS.[322] The plan will cover construction, operation/maintenance, and decommissioning for solar, wind, and geothermal power plants and associated transmission infrastructure.[323] It will cover approximately fifty special-status species, including the desert tortoise, Mojave ground squirrel, and desert bighorn sheep.[324] Some, but not all, of these covered species are listed under the federal and California ESAs.[325]

Depending on the final approved plan, the DRECP will identify between 200,000 and 350,000 acres where developers will be encouraged to site renewable energy projects, called "Development Focus Areas."[326] Development Focus Areas are supposed have high potential for renewable energy development (i.e., areas that are sunny and flat or areas with consistently high winds), good access to transmission infrastructure (existing or planned), and lower potential for conflicts with covered species and natural communities than in designated conservation areas.[327] Development Focus Areas will include areas classified as having either minimal or moderate potential for conflicts with sensitive species.[328] Areas identified as having minimal biological resource conflicts would require the fewest hurdles for project siting, while areas with moderate conflicts would require additional surveys, mitigation requirements, and facility design criteria.[329]

The REAT Agencies began working on the DRECP in 2010.[330] Originally, the entire NCCP/HCP and associated

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322. DESERT RENEWABLE ENERGY CONSERVATION PLAN, DESCRIPTION AND COMPARATIVE EVALUATION OF DRAFT DRECP ALTERNATIVES 3.5-2 (2012) ("Seven federal agencies manage a total of approximately 16,800,000 acres, or approximately 74% of the total Plan area.").

323. *Frequently Asked Questions*, DESERT RENEWABLE ENERGY CONSERVATION PLAN, http://drecp.org/whatisdrecp/faq.html (last visited July 30, 2013).

324. The covered species list has not yet been finalized. DESERT RENEWABLE ENERGY CONSERVATION PLAN, DRAFT COVERED SPECIES LIST MEMORANDUM (2013), *available at* http://drecp.org/documents/docs/DRECP_Draft_CSL_Memo_Methods_and_List_June_17_2013.pdf.

325. *See id.* at 2.

326. *DRECP Fact Sheet*, *supra* note 316, at 1.

327. Stakeholder Letter, *supra* note 320.

328. *Id.*

329. *See id.*

330. DESERT RENEWABLE ENERGY CONSERVATION PLAN, PROPOSED PROCESS, SCHEDULE, AND KEY DECISION POINTS FOR THE DRECP NCCP/HCP AND EIR/EIS (2011), *available at* http://www.drecp.org/meetings/2010-09-

environmental reviews were supposed to be released in draft form by mid-2012 and finalized by January 2013.[331] However, the process has been more complicated than anticipated, and many of the details of the plan are still unclear. For example, we know that projects sited outside the specified Development Focus Areas will not benefit from streamlined permitting and that sites with moderate biological sensitivity inside the Development Focus Areas will be subject to additional mitigation requirements,[332] but no specific information about mitigation requirements has been published yet. Draft elements of the plan have been released piece by piece over the past two years.[333] A preliminary conservation strategy was released in 2011; a description and comparison of alternative versions of the DRECP was published in December 2012; draft "Biological Goals and Objectives" were released in April and May 2013; and a revised version of the covered species list was published in June 2013.[334]

Environmental groups, including Defenders of Wildlife, Center for Biological Diversity, Sierra Club, Natural Resources Defense Council, and The Nature Conservancy have critiqued the process of developing the DRECP and the contents of the draft sections that have been released thus far.[335] However, these same groups have also argued that if the DRECP is "based on rigorous planning, a sound conservation strategy and clear, transparent documentation of methodologies, assumptions and decision-making processes, [it] will be the best way to facilitate responsible and sustainable renewable

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08_meeting/DRECP_Proposed_Process_Schedule_and_Key_Decision_Points.pdf.

331. *Id.*

332. *See* Stakeholder Letter, *supra* note 320.

333. *See id.*; ISA FINAL REPORT, *supra* note 19, at 32–33.

334. *See Documents*, DESERT RENEWABLE ENERGY CONSERVATION PLAN, http://drecp.org/documents/ (last updated May 29, 2013).

335. Letter from Kim Delfino, Cal. Program Dir., Defenders of Wildlife et al., to Dave Harlow, Dir. Desert Renewable Energy Conservation Plan, Cal. Energy Comm'n (May 13, 2013) [hereinafter May 2013 Letter], *available at* http://drecp.org/documents/docs/DOW_CBD_CNPS_SC_NRDC_WS_AC_draft_driver_spps_BGO_comments_May_13_2013.pdf; Letter from Kim Delfino, Cal. Program Dir., Defenders of Wildlife et al., to Dave Harlow, Dir. Desert Renewable Energy Conservation Plan, Cal. Energy Comm'n (July 2, 2013) [hereinafter July 2013 Letter], *available at* http://drecp.org/documents/docs/DOW_C_BD_CNPS_SC_NRDC_WS_TNC_draft_driver_BGOs_comment_July_2_201.pdf.

energy development."[336] In terms of process, these environmental groups have expressed concern about transparency of decision-making and scientific assumptions.[337] In terms of content, the groups contend that basic terms, such as "conserve" and "high quality habitat" are not adequately defined; that thresholds for acceptable habitat loss are not adequately explained;[338] and that habitat protection objectives are not clear.[339] Environmental groups have also argued that the DRECP needs to include a more scientifically defensible conservation strategy[340] and a much stronger adaptive management component than it seems to thus far.[341]

i. DRECP and Off-Site Preservation

One of the central issues in the DRECP process, and one that has not yet been resolved, is how to mitigate for the impacts of renewable energy projects on endangered (and other special-status) species.[342] An Interim Mitigation Strategy for the DRECP was published in September 2010, but no subsequent proposals have been published as of July 2013.[343] Acquisition and preservation of off-site mitigation lands is a typical method of complying with various environmental and land-use laws to compensate for impacts to listed species (as well as other environmental impacts).[344] Presumably, the final DRECP mitigation strategy will incorporate several forms of off-site habitat acquisition and preservation. These are likely to include applicant-led assembly of target mitigation lands, payment of in-lieu fees, and use of the SB 34 Advance Mitigation Program (described below). Table 1, taken from a

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336. Letter from Jeff Aardahl, Cal. Rep., Defenders of Wildlife et al., to Dave Harlow, Dir. Desert Renewable Energy Conservation Plan, Cal. Energy Comm'n (Sept. 24, 2012) [hereinafter September 2012 Letter], *available at* http://www.drecp.org/documents/docs/independent_science_2012/comments/Defenders_of_Wildlife_et_al_comments.pdf.

337. *See id.*

338. May 2013 Letter, *supra* note 335, at 1, 2, & 6.

339. July 2013 Letter, *supra* note 335, at 1.

340. Letter from Kim Delfino, Cal. Program Dir., Defenders of Wildlife et al., to Dave Harlow, Dir. Desert Renewable Energy Conservation Plan, Cal. Energy Comm'n 2–3 (Jan. 23, 2013), *available at* http://drecp.org/documents/docs/comments-evals/Environmental_groups_comments_January_2013.pdf.

341. September 2012 Letter, *supra* note 336, at 3.

342. The Interim Mitigation Strategy was published in September 2010, but no final mitigation strategy has been released. *See* IMS, *supra* note 48.

343. *See id.*

344. *See id.* at 15 (describing land acquisition goals for the DRECP).

presentation at a DRECP stakeholders meeting, compares these three approaches to off-site preservation as mitigation for impacts to habitat.

Table 1. Comparison of Typical ESA Mitigation (Applicant-Led), In-Lieu Fee Option, In-Advance Mitigation Option[345]

	Applicant-Led	In-Lieu Fee	In-Advance Mitigation
Responsibility for implementing mitigation	Applicant responsible for implementing compensatory mitigation	Agencies responsible for implementing compensatory mitigation	Agencies responsible for implementing compensatory mitigation
Costs to Applicant	Applicant responsible for actual costs of implementing compensatory mitigation	Applicant costs for implementing mitigation capped by in-lieu fee and 5% contingency	Applicant costs based on actual cost of in-advance mitigation land acquisition
Timing of mitigation land acquisition	Lands identified before project permits are obtained and acquired before (or shortly after) project construction begins–depending on permit requirements	Lands identified and purchased after project permits are obtained	Lands identified and purchased in advance of permits
Certainty regarding acquisition costs	Land acquisition costs usually known to agencies and applicant prior to permit issuance	Land costs unknown to both applicant and agencies prior to permit issuance	Land acquisition costs known to both the agencies and applicant prior to permit issuance
Conservation strategy	Land may be acquired opportunistically, but must meet permit requirements	Lands may be acquired opportunistically or strategically by agencies	Lands, in theory, selected strategically
Ancillary costs	Applicant responsible for actual ancillary costs associated with implementing mitigation	Ancillary costs incorporated into in-lieu fee	Ancillary costs incorporated
Certainty regarding ancillary costs	Ancillary costs variable	Ancillary costs variable depending upon mitigation target areas	Additional certainty in ancillary costs associated with acquisition, restoration, and enhancement actions
Identification of mitigation lands	Mitigation lands identified by applicant and approved by agencies	Mitigation lands identified and acquired by agencies	Mitigation lands identified and acquired by agencies
Coordination of mitigation	Applicant works directly with third parties, land agents, and fee title or conservation easement holders	Single transaction by applicant to implement mitigation	Single transaction by applicant to implement mitigation

345. CAL. ENERGY COMM'N & DEP'T OF FISH & GAME, PRESENTATION AT DRECP STAKEHOLDERS MEETING, IMPLEMENTING SB X8 34 (2010): EFFICIENT IMPLEMENTATION OF BIOLOGICAL MITIGATION MEASURES FOR ARRA PROJECTS 12–13 (2010).

Acquisition of mitigation land may be accomplished in variety of ways. First, where full control of a particular property is important, full fee-simple ownership by a public or private entity may be the best option.[346] Applicants can convey title to already-owned or newly-purchased properties to the public agencies, private mitigation banks, or nonprofit land-conservation organizations known as land trusts.[347] Where the land is held by government agencies or entities (for example California's Department of Fish and Wildlife or a county government), the public entities can manage the land to the species' benefit.[348] Where the land is held by a private interest (often either a for-profit mitigation bank[349] or a nonprofit land trust), restrictions on the land prohibit use of the land in a way that will conflict with the conservation goals.[350] In some cases, permitting agencies determine that successful compensatory mitigation can occur without full fee-simple ownership.[351] In

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346. *See* ADENA R. RISSMAN, FRED CHEEVER, JESSICA OWLEY, REBECCA SHAW, BARTON H. THOMPSON & W. WILLIAM WEEKS, PRIVATE LAND CONSERVATION AND CLIMATE CHANGE: RETHINKING STRATEGIES AND TOOLS, A REPORT TO THE LAND CONSERVATION COMMUNITY (Woods Inst. for the Env't, Stanford University) (forthcoming 2014) (describing various land conservation methods and describing circumstances where fee simple ownership may be the preferred method); Adena R. Rissman, Jessica Owley & Barton H. Thompson, *Saving Space for Change: Adapting Conservation Easements to Climate and Landscape Change* (unpublished manuscript 2013) (on file with authors) (suggesting that fee simple ownership may be provide more flexibility for land conservation).

347. *See* Owley, *supra* note 236 (describing the various methods of acquiring mitigation lands in the analogous wetlands context); ENVTL. LAW INST. & LAND TRUST ALLIANCE, WETLAND AND STREAM MITIGATION: A HANDBOOK FOR LAND TRUSTS 85 (2012), *available at* http://www.landtrustalliance.org/land-trusts/wetland-and-stream-mitigation-handbook (discussing various land protection tools in the context of wetlands mitigation).

348. *See Conservation and Mitigation Banking*, CAL. DEP'T FISH & WILDLIFE, http://www.dfg.ca.gov/habcon/conplan/mitbank/ (last visited Oct. 18, 2013).

349. *Id.* (explaining that species mitigation banks—also called conservation banks—which are governed by state and federal regulations, purchase properties and manage them as preserves for particular listed species or identified habitats).

350. *See* ENVTL. LAW INST. & LAND TRUST ALLIANCE, *supra* note 347, at 86–92 (describing various mechanisms and terms for protecting mitigation wetlands).

351. Owley Lippmann, *supra* note 30, at 293 (explaining the conservation easements, a partial property right, are often used to meet HCP mitigation requirements).

such cases, permit applicants must either arrange for conservation easements on property they own or arrange for conservation easements on other property.[352]

Mitigation lands for species impacts (or conservation easements on mitigation lands) have typically been purchased by developers with agency guidance.[353] The process of assembling appropriate off-site habitat can be expensive and difficult.[354] Because so much land in the California desert is publicly owned (and not available for purchase and preservation as mitigation), complying with off-site compensatory mitigation requirements has been challenging for project developers.[355] Purchasing mitigation credits with mitigation banks is an established practice in wetland mitigation.[356] Purchasing habitat credits for sensitive species impacts with "conservation banks" is less well established, though the U.S. Fish and Wildlife Service began approving conservation banks for federally listed species in the early 1990s.[357] In 2011, there were an estimated 1300 mitigation banks for wetlands[358] and only 100 conservation banks for special-status species.[359]

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352. Jessica Owley, *The Enforceability of Exacted Conservation Easements*, 36 VT. L. REV. 261, 262 & n.9 (2011).

353. CAL. ENERGY COMM'N & DEP'T OF FISH & GAME, *supra* note 345, at 12 (describing "typical CESA implementation").

354. Andrew Oelz & Adam Umanoff, *Numerous Considerations Affect Speed and Ease of California Development,* SOLAR INDUSTRY MAG., July 2013, at 1, *available at* http://www.solarindustrymag.com/issues/SI1307/FEAT_01_Numerous_Considerations_Affect_Speed_And_Ease_Of_California_Development.html.

355. *See, e.g.*, *infra* Part III.A.

356. *See Compensatory Mitigation*, ENVTL. PROTECTION AGENCY, http://water.epa.gov/lawsregs/guidance/wetlands/wetlandsmitigation_index.cfm (last visited Oct. 18, 2013).

357. J.B. Ruhl, Alan Glen & David Hartman, *A Practical Guide to Habitat Conservation Banking Law & Policy*, 20 NAT. RES. & ENV'T 26, 30–31 (2005) (providing history of conservation banking); *Conservation Banks*, NAT'L MITIGATION BANKING ASS'N, http://www.mitigationbanking.org/conservationbanks/index.html (last visited Oct. 18, 2013); *see Conservation and Mitigation Banking*, CAL. DEP'T FISH & WILDLIFE, http://www.dfg.ca.gov/habcon/conplan/mitbank/ (last visited Oct. 17, 2013).

358. Steven Martin & Robert Brumbaugh, *Entering a New Era: What Will RIBITS Tell Us About Mitigation Banking?*, NAT'L WETLANDS NEWSL., May 2011, at 16, 17.

359. *What is Mitigation Banking?*, NAT'L MITIGATION BANKING ASS'N, http://www.mitigationbanking.org/about/whatismitigationbanking.html (last visited Oct. 18, 2013).

Anticipating the difficulty of off-site habitat mitigation for renewable energy projects in the desert, the California legislature enacted a law (SB 34) to facilitate permitting and endangered species mitigation.[360] SB 34 established a $10 million revolving fund for advance purchase of appropriate habitat (or conservation easements on appropriate habitat) within mitigation target areas identified by the DRECP.[361] Essentially, this fund allows the California Department of Fish and Wildlife to pay for and manage an agency-sponsored conservation bank for desert habitat.[362] The key element of this program is the acquisition of land and interests in land prior to project commencement or even project permitting.[363] Third parties (such as land trusts) can apply for advance land acquisition grants to pay for conservation, and developers can purchase credits from the advance mitigation bank to meet mitigation obligations.[364]

The SB 34 Advance Mitigation Program makes it easier for developers to find and fund appropriate mitigation.[365] A developer opting to take advantage of this mitigation option must pay the estimated cost of mitigation actions as determined by the permitting agency, plus up to five percent of the total cost estimate as security.[366] Fees are supposed to

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360. 2010 Cal. Stat. 5200. Note that CEQA, NEPA, CEC certification, and BLM ROW processes may have separate mitigation requirements in addition to CESA mitigation addressed in SB 34. In August 2011, California enacted AB 13, which expands the SB 34 in-lieu fee program to wind/geothermal and to all "covered activity" projects in the DRECP (not just those that are ARRA-funded). 2011 Cal. Stat. 5885 (summarizing the bill's provisions that "expand the definition of eligible projects to include wind and geothermal powerplants").

361. CAL. DEP'T OF FISH & GAME, SB 34 ADVANCE MITIGATION LAND ACQUISITION GRANTS PROGRAM: PROGRAM GUIDELINES 4 (2010), *available at* http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=36426.

362. *Id.*

363. *Id.*

364. *Renewable Energy Resources Fee Trust Fund,* CAL. DEP'T FISH & WILDLIFE, http://www.dfg.ca.gov/Climate_and_Energy/Renewable_Energy/Fee_Trust_Fund.aspx (last visited Oct. 18, 2013) (showing grants to date). Acquired lands are supposed to be protected with conservation easements or deed restrictions. *Id.* The Interim Mitigation Strategy notes that Department of Fish and Game has created a network of land trusts and conservancies and that the agency has identified approximately 50,000 acres that may be available for advance mitigation acquisition. IMS, *supra* note 48, at 21. Eligible projects must be consistent with the DRECP IMS. *See* CAL. DEP'T OF FISH & GAME, *supra* note 361, at 12.

365. *See* CAL. DEP'T OF FISH & GAME, *supra* note 361, at 4.

366. CAL. FISH & GAME CODE § 2099(b)(5) (West 2013).

cover land acquisition or conservation easement costs, restoration costs, monitoring costs, transaction costs, a non-wasting endowment account, administrative costs, and funds sufficient to repay the $10 million loan.[367] One interviewee from the Energy Commission argued that the SB 34 conservation bank process is better than having applicants assemble mitigation lands because the California Department of Fish and Wildlife can develop thoughtful management plans as lands are acquired, and the agency has a "broader regional perspective and a more informed approach" than project developers of private conservation banks.[368]

The DRECP's Interim Mitigation Strategy includes an "in-lieu" fee option in addition to the SB 34 advance mitigation/conservation bank program.[369] Under the in-lieu fee option, a project developer would pay a fee for mitigation land acquisition, but mitigation lands would not need to be already "banked" as they would be with the advance mitigation approach.[370] California Department of Fish and Wildlife would coordinate with the other REAT Agencies to allocate the funds.[371] In-lieu fees have been used for over twenty years for wetland mitigation programs.[372] However, critics have expressed concern over whether collected fees have been used effectively.[373] A 2006 Environmental Law Institute report on use of in-lieu fees called out the risks of the time lag between impacts and implementation of compensatory mitigation and unrealistic plans for financing acquisition, implementation, and

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367. *Id.*

368. Confidential Telephone Interview with Agency Staff (Dec. 21, 2012) (on file with authors).

369. IMS, *supra* note 48, at 2.

370. *See id.* at 28 fig.7 (showing that land acquisition takes place later in the process).

371. *Id.* at 2.

372. ENVTL. LAW INST., THE STATUS AND CHARACTER OF IN-LIEU FEE MITIGATION IN THE UNITED STATES 12 (2006), *available at* http://water.epa.gov/lawsregs/guidance/wetlands/upload/2006_08_14_wetlands_ELI_ILF_Study06.pdf.

373. *See generally* GARY L. JONES & PEG REESE, GOV'T ACCOUNTING OFFICE, WETLANDS PROTECTION: ASSESSMENTS NEEDED TO DETERMINE EFFECTIVENESS OF IN-LIEU-FEE MITIGATION 10 (2001) ("The effectiveness of in-lieu-fee mitigation is unclear."); Royal C. Gardner. *Money for Nothing? The Rise of Wetland Fee Mitigation*, 19 VA. ENVTL. L.J. 1, 4 (2000) ("Despite the good intentions of fee mitigation advocates, the use of fee mitigation raises several troubling policy, ethical, and legal issues.").

long-term management.[374] Thus far, none of the large solar projects in the California desert have used the in-lieu fee option for off-site preservation.[375]

III. CASE STUDIES

In this section, we provide a general overview of the off-site preservation requirements for the large solar projects (over 100 MW) that have been approved since 2010 and are currently under construction in the California desert. For two of these projects (Ivanpah and Genesis), we explore habitat impacts and mitigation in more detail.

Between 2010 and 2012, the Energy Commission, the BLM, and several counties approved twenty-two large solar projects for development in the California desert.[376] Of these, twelve were under construction in the summer of 2013.[377] Three additional projects (Imperial Valley, Palen, and Calico) were approved in 2010,[378] but Imperial Valley and Calico subsequently withdrew their applications.[379] Table 2 shows some basic information about the twelve under-construction projects.

As described in the introduction, many solar projects have been proposed on public land, and these projects have been the subject of a great deal of scrutiny.[380] The Obama Administration's 2013 Climate Action Plan calls for a continued push for renewable energy on federal lands.[381] In

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374. ENVTL. LAW INST., *supra* note 372, at 4.

375. Confidential Telephone Interview with Energy Commission Staff (Dec. 21, 2012).

376. *Utility-Scale Solar, Wind Farms Approved in California, Nevada*, ENV'T NEWS SERVICE (Mar. 13, 2013), http://ens-newswire.com/2013/03/13/utility-scale-solar-wind-farms-approved-in-california-nevada/; *see* BUREAU OF LAND MGMT., *supra* note 5.

377. BUREAU OF LAND MGMT., *supra* note 5; DRECP PROJECTS TABLE, *supra* note 3.

378. *See Large Solar Energy Projects*, CAL. ENERGY COMMISSION, http://www.energy.ca.gov/siting/solar/ (last visited Oct. 19, 2013).

379. *Calico Solar Project*, CAL. ENERGY COMMISSION, http://www.energy.ca.gov/sitingcases/calicosolar/index.html (last visited Nov. 11, 2013) (reporting that the project was terminated on August 27, 2013); *Imperial Valley Solar*, CAL. ENERGY COMMISSION, http://www.energy.ca.gov/sitingcases/solartwo/index.html (last visited Nov. 11, 2013) (reporting that the project was terminated on August 17, 2011).

380. *See, e.g.*, Donnelly-Shores, *supra* note 282 (describing the difficulties public land utility projects have faced).

381. EXEC. OFFICE OF THE PRESIDENT, *supra* note 281.

spite of support from the Obama Administration and substantial dedication of BLM resources to reviewing projects, of the twelve projects currently being constructed, only three are on public land.[382] In addition, nine of these under-construction projects are PV rather than CSP.[383]

Table 2. Large Solar Projects (Over 100 MW) in the California Desert—Under Construction December 2013[384]

Project Name	MW	Project Acres	Land	Type	Lead Agency[385]	Year Approved
Abengoa Mojave Solar	250	1,765	Private	CSP	CEC	2010
AVSP 1	579	3,200	Private	PV	Kern/Los Angeles	2012
Campo Verde Solar	139	1,990	Private	PV	Imperial	2012
Catalina Renewable Energy Project	130	1,223	Private	PV	Kern	2011
Centinela Solar	275	2,067	Private	PV	Imperial and BLM	2011
Desert Sunlight Solar Farm	550	4,144	Public	PV	BLM	2011
Genesis NextEra	250	1,950	Public	CSP	CEC and BLM	2010
Imperial Solar Energy Center South	130	946	Private	PV	Imperial and BLM	2011
Ivanpah	370	3,471	Public	CSP	CEC and BLM	2010
Mount Signal Solar Farm	200	1,409	Private	PV	Imperial	2012
NextLight AV Solar Ranch 1	115	1,050	Private	PV	Los Angeles	2011
NextLight AV Solar Ranch 2	115	1,050	Private	PV	Los Angeles	2011

Table 3 shows published habitat mitigation requirements for these under-construction projects. The listed mitigation acres include estimated off-site habitat acquisition for special-status species and for wetlands. The listed mitigation requirements were found in the environmental review and Energy Commission decision documents for each project.

382. DRECP PROJECTS TABLE, *supra* note 3, at 3.5-9 tbl.3.5-1.

383. BUREAU OF LAND MGMT., *supra* note 5.

384. All data in Table 2 can be found in Desert Renewable Energy Conservation Plan, Baseline RE Projects, Full List (Dec. 12, 2013) [hereinafter DRECP Full List] (unpublished document) (on file with authors); *see* DRECP PROJECTS TABLE, *supra* note 3, at 3.5-9 to 3.5-14 tbl.3.5-1.

385. Lead agencies other than the Energy Commission and the BLM are California counties.

Table 3. Off-site Preservation Requirements for Large, Under-Construction Solar Projects in the California Desert[386]

Project Name	Lead Agency	Mitigation Acres	Estimated Mitigation Land Cost/Acre	Estimated LTMM Cost/Acre	Timing for Mitigation Land Acquisition
Abengoa Mojave Solar	CEC	118	NA	$1,300	12 months after approval
AVSP 1	Kern/Los Angeles	NA	NA	NA	NA
Campo Verde Solar	Imperial	NA	NA	NA	NA
Catalina Renewable Energy Project	Kern	NA	NA	NA	NA
Centinela Solar	Imperial and BLM	44	NA	NA	NA
Desert Sunlight Solar Farm	BLM	6,959	$1,000	$1,450	18 months after approval
Genesis NexEra	CEC and BLM	2,117	$500	$469	18 months after construction
Imperial Solar Energy Center South	Imperial and BLM	65	NA	NA	NA
Ivanpah	CEC and BLM	7,369	$1,000	$1,450	18 months after approval
Mount Signal Solar Farm	Imperial	65	NA	NA	NA
NextLight AV Solar Ranch 1	Los Angeles	NA	NA	NA	12 months after approval
NextLight AV Solar Ranch 2	Los Angeles	NA	NA	NA	

The three projects on federal public land (Desert Sunlight, Genesis, and Ivanpah) require the largest acreages of mitigation land acquisition by orders of magnitude (6959 acres, 2117 acres, and 7369 acres). The projects with county lead agencies either do not specify off-site preservation requirements (Kern County and Los Angeles County) or require less than one hundred acres of compensatory mitigation (Imperial County). In addition, the environmental documents for the four projects with the Energy Commission and/or BLM as lead agency included much more detail on mitigation requirements—not only the acreage and cost details listed in Table 3, but also a suite of criteria for mitigation land including habitat quality, location, and connectivity with other preserved lands.[387] The private land projects with county lead

386. All data in Table 3 can be found in DRECP Full List, *supra* note 384.

387. *See, e.g.*, BUREAU OF LAND MGMT., PLAN AMENDMENT/FINAL EIS FOR THE GENESIS SOLAR ENERGY PROJECT, at G-30 to G-31 (2010), *available at*

agencies included almost no criteria for off-site preservation.[388] Within the scope of this analysis, it is not possible to determine whether the variability in acreage requirements and off-site preservation requirements is a result of lead agency policy differences or a result of the much more extensive biological resources impacts on federal public land.

Only the environmental analyses for Energy Commission and BLM projects included cost estimates for mitigation land acquisition. Table 3 includes both the estimates for per acre land acquisition and for per-acre long-term management and maintenance (LTMM). The $1450 per-acre LTMM estimate comes from the REAT Agencies' *Desert Renewable Energy REAT Biological Resource Compensation/Mitigation Cost Estimate Breakdown* published on July 23, 2010.[389] Estimated LTMM costs include land management, enforcement and defense of conservation easements, region-wide raven management, and ongoing monitoring.[390] The REAT Agencies' estimate for per acre acquisition is $1000.[391]

The final column in Table 3 shows the required timing for mitigation-land acquisition. Again, with one exception, it is the Energy Commission/BLM projects that include a specified timeline for mitigation-land acquisition. All five environmental reviews that include timing requirements allow twelve to eighteen months after project approval or after the start of project construction for the acquisition of mitigation lands.

Below we discuss the off-site habitat acquisition for the Ivanpah and Genesis projects in more detail. We chose these projects because they had among the largest mitigation requirements and because their construction was well underway at the end of 2011.

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http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/palmsprings/genesis.Par.19404.File.dat/Vol2_Genesis%20PA-FEIS_Apdx-G-Certification.pdf.

388. *See, e.g.*, *supra* Table 3.

389. CAL. ENERGY COMM'N, DESERT RENEWABLE ENERGY REAT BIOLOGICAL RESOURCE COMPENSATION/MITIGATION COST ESTIMATE BREAKDOWN FOR USE WITH THE REAT-NEWF MITIGATION ACCOUNT (2010), *available at* http://www.energy.ca.gov/sitingcases/solar_millennium_palen/documents/2010-07-23_REAT_Cost_Estimate_Table_TN-57775.PDF.

390. *Id.*

391. *Id.*

A. IVANPAH

BrightSource's 370 MW Ivanpah solar CSP (power tower) project is on over 3400 acres of BLM land near the Nevada border in San Bernardino County.[392] It is west of Ivanpah Dry Lake and forty miles southwest of Las Vegas.[393] The Energy Commission approved Ivanpah in September 2010 after three years of review.[394] The BLM finalized its environmental review and permitting process for the necessary rights of way in October 2010,[395] and construction began soon afterward. The project was nearly complete in May 2013,[396] and is slated to begin generating electricity before the end of 2013.[397] The estimated $2.2 billion project[398] has been backed by Google[399] and received a $1.4 billion dollar ARRA loan guarantee.[400]

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392. BUREAU OF LAND MGMT., RECORD OF DECISION FOR THE IVANPAH SOLAR ELECTRIC GENERATING SYSTEM PROJECT AND ASSOCIATED AMENDMENT TO THE CALIFORNIA DESERT CONSERVATION AREA PLAN 7 (2010) [hereinafter IVANPAH ROD], *available at* http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/needles/lands_solar.Par.68027.File.dat/FinalRODIvanpahSolarProject.pdf.

393. *See* BUREAU OF LAND MGMT., IVANPAH SOLAR ELECTRIC GENERATING SYSTEM FINAL ENVIRONMENTAL IMPACT STATEMENT 3-109 fig.3.1 (2010), *available at* http://www.doi.gov/news/pressreleases/loader.cfm?csModule=security/getfile&PageID=61541 (showing the location of the project).

394. IVANPAH ROD, *supra* note 392, at 17.

395. *Id.* at 58.

396. Kathleen Zipp, *Ivanpah Solar Project is More than 92% Complete*, SOLAR POWER WORLD (May 22, 2013), http://www.solarpowerworldonline.com/2013/05/ivanpah-solar-project-is-more-than-92-complete/.

397. Jakob Schiller, *Aerial Photos of Giant Google-Funded Solar Farm Caught in Green Energy Debate*, WIRED (Nov. 14, 2012, 6:30 AM), http://www.wired.com/rawfile/2012/11/jamey-stillings-ivanpah-solar-field/; *see The Power—and Beauty—of Solar Energy*, TIME (June 13, 2013), http://science.time.com/2013/06/13/the-power-and-beauty-of-solar-energy/.

398. Ken Wells, *Tortoises Manhandled for Solar Splits Environmentalists*, BLOOMBERG (Sept. 20, 2012), http://www.bloomberg.com/news/2012-09-20/tortoises-manhandled-for-solar-splits-environmentalists.html.

399. Clenn Meyers, *Google Invests $168m in World's Largest Solar Power Tower Plant*, THE GUARDIAN (Apr. 15, 2011), http://www.guardian.co.uk/environment/2011/apr/15/google-solar-mojave-ivanpah (reporting that Google has invested $168 million in the plant).

400. Press Release, BrightSource Limitless, Brightsource Energy Offered Nearly $1.4 Billion in Loan Guarantees From The U.S. Department of Energy (Feb. 22, 2010), *available at* http://www.brightsourceenergy.com/brightsource-energy-offered-nearly-14-billion-in-loan-guarantees-from-the-us-department-of-energy; *DOE Awards Nearly $1.4 Billion in Loan Guarantees to BrightSource Energy*, EERE NEWS (Feb. 24, 2012), http://apps1.eere.energy.gov/news/news_detail.cfm/news_id=15819.

The Ivanpah site initially appeared particularly well-suited for solar; it receives 300 days of sun per year and is near a transmission line.[401] In addition, the project is 1.5 miles from a golf course and only 4.5 miles from the town of Primm, Nevada, making the area appear less pristine than some more remote desert sites.[402] However, the Ivanpah Valley also houses a genetically distinct population of threatened desert tortoise that advocates consider especially important to protect.[403] And when project construction began, it was immediately clear that impacts to tortoises and other sensitive species would be greater than anticipated.[404]

The underestimation of impacts on desert tortoises led to a great deal of scrutiny of the project's environmental impacts.[405] Desert tortoises spend up to ninety-five percent of their lives underground, and the project's original tortoise surveys took place during an especially dry season when tortoises were more likely to stay in their underground burrows.[406] The project's

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401. John Copeland Nagle, *See the Mojave!*, 89 OR. L. REV. 1357, 1399 (2011).

402. Schiller, *supra* note 397 (discussing how a BrightSource spokesperson indicated that they chose the Ivanpah site near the golf course and highway because it already had "some human traffic").

403. *See* CAL. ENERGY COMM'N, IVANPAH SOLAR ELECTRIC GENERATING SYSTEM, COMMISSION DECISION 41–42 (2010) [hereinafter IVANPAH COMMISSION DECISION], *available at* http://www.energy.ca.gov/2010publications/CEC-800-2010-004/CEC-800-2010-004-CMF.PDF (discussing alternative site suggestions by interveners Sierra Club and Western Watersheds Project to minimize impacts on desert tortoises); U.S. FISH & WILDLIFE SERV., DRAFT REVISED RECOVERY PLAN FOR THE MOJAVE POPULATION OF THE DESERT TORTOISE (GOPHERUS AGASSIZII) 46 (2008) (discussing the genetic uniqueness of the Ivanpah Valley population); Press Release, Western Watershed Project, BLM Temporarily Halts Fence Construction on the "Fast Tracked" Ivanpah Solar Power Plant (Apr. 19, 2011), *available at* http://www.westernwatersheds.org/2012/04/blm-temporarily-halts-fence-construction-on-the-fast-tracked-ivanpah-solar-power-plant.

404. Todd Woody, *Spot the Tortoise?*, FORBES, June 8, 2011, at 40, 42–44 (providing that surveys may have been inaccurate largely because they were conducted in 2007, which was a dry year, during which tortoises may have stayed in their burrows and fewer plants than usual germinated).

405. *See id.*; Margot Roosevelt, *Endangered Tortoises Delay Mojave Desert Solar Plant,* L.A. TIMES BLOG (Apr. 28, 2011, 12:18 PM), http://latimesblogs.latimes.com/greenspace/2011/04/desert-tortoise-ivanpah-brightsource-solar-energy-san-bernardino.html (discussing the friction between wilderness conservation advocates and cleaner power).

406. Woody, *supra* note 404, at 44. Basin and Range Watch indicates that tortoise numbers were underestimated because of initial presence/absence surveys taking place during a dry year. *First Solar—Stateline Solar Farm*,

original environmental review and subsequent permits from U.S. Fish and Wildlife Service assumed that up to thirty-eight tortoises lived on the project site and would need to be relocated during construction.[407] However, once construction began, biologists found nearly that many tortoises in the first quarter of the project site.[408] Project construction stopped in April 2011 until the Fish and Wildlife Service issued a revised Biological Opinion in June.[409]

The Incidental Take Statement for the revised Biological Opinion allows capture of up to 289 adult tortoises and mortality of up to forty-three tortoises during a five-year quarantine.[410] The Fish and Wildlife Service estimated that incidental take of desert tortoises would include mortality or injury of between 405 and 1136 tortoises (including small, juvenile tortoises and eggs that would be difficult to detect).[411] The Fish and Wildlife Service estimates that the desert tortoise's Northeastern Mojave Recovery Unit (in which the Ivanpah project site is located) supports up to 42,000 desert tortoises.[412]

There are twenty-two mitigation measures addressing habitat and species impacts in the Commission Decision for the Ivanpah project.[413] These mitigation measures include monitoring and survey requirements, worker environmental training requirements, parameters for moving desert tortoises from the project site and installing fencing to keep them out, general avoidance and minimization measures (minimize disturbance area, limit vehicle speeds, minimize standing

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BASIN & RANGE WATCH, http://www.basinandrangewatch.org/Stateline.html (last visited July 31, 2013).

407. IVANPAH COMMISSION DECISION, *supra* note 403, at 251 (providing that surveys in 2007 and 2008 found twenty-five live desert tortoises on the project site); BUREAU OF LAND MGMT., REVISED BIOLOGICAL ASSESSMENT FOR THE IVANPAH SOLAR ELECTRIC GENERATING SYSTEM PROJECT 14 (2011), *available at* http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/needles/lands_solar.Par.57540.File.dat/ISEGS%20revised%20BA.pdf (providing that the Revised BLM Biological Assessment stated that the original translocation plan could accommodate thirty-eight tortoises, but revised estimates indicated that up to 162 tortoises might need to be moved from the site).

408. Woody, *supra* note 404, at 44.

409. REVISED IVANPAH BIOLOGICAL OPINION, *supra* note 157.

410. U.S. FISH & WILDLIFE SERV., BIOLOGICAL OPINION ON BRIGHTSOURCE ENERGY'S IVANPAH SOLAR ELECTRIC GENERATING SYSTEM PROJECT 86 (2011).

411. *Id.* at 87.

412. *Id.* at 82.

413. *See generally* IVANPAH COMMISSION DECISION, *supra* note 403.

water, and remove garbage from construction areas), weed management, re-vegetation after construction, nesting bird surveys, and special-status plant avoidance.[414] Notably, these are not compensatory mitigation but practices to reduce impacts (falling into the avoidance or minimization category for mitigation). Monitoring of activities is also an important part of this approach.[415] BrightSource has stated that construction activities were, at times, monitored by over 150 biologists.[416]

In addition to the mitigation measures described above, the Energy Commission's approval of the Ivanpah project required acquisition (and permanent preservation) of over 7000 acres of off-site habitat for desert tortoises and other species.[417] Off-site preservation for desert tortoises is specifically addressed in Mitigation Measure BIO-17 in the Final Commission Decision.[418] Mitigation Measure BIO-17 is eleven pages long and includes detailed requirements related to habitat characteristics, acquisition costs, habitat improvement, restoration expectations, and endowment funding.[419] The Commission Decision also required acquisition and preservation of 175 acres of desert dry wash habitat (Mitigation Measure BIO-20).[420]

The mitigation process has moved at a slow pace. As shown in Table 3, the project's mitigation land proposal was originally supposed to be submitted to the agencies within eighteen months of the final Energy Commission decision.[421] That would have been in April 2012. However, the project received several extensions, and mitigation-land acquisition was not finalized until April 2013.[422] BrightSource paid $6.2 million for

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414. *See id.*

415. *See, e.g.*, *id.* at Biological Resources 46 (providing the duties and authorities of biological monitors).

416. *FAQ*, BRIGHTSOURCE LIMITLESS, http://www.brightsourceenergy.com/stuff/contentmgr/files/0/044130f70ec2977f6389387b679dd815/files/ivanpah_tortoise_care___may_2013_final.pdf (last visited Oct. 14, 2013).

417. *BrightSource Energy Ivanpah Solar Electric Generating System*, DEP'T INTERIOR, http://www.doi.gov/news/pressreleases/loader.cfm?csModule=security/getfile&PageID=61540 (last visited Oct. 14, 2013).

418. IVANPAH COMMISSION DECISION, *supra* note 403, at Biological Resources 69.

419. *Id.* at Biological Resources 69–81.

420. *Id.* at Biological Resources 88.

421. *See supra* Table 3.

422. CAL. ENERGY COMM'N, CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE AND ENERGY COMMISSION COMPLETE LANDMARK LAND MITIGATION DEAL FOR IVANPAH SOLAR PROJECT 1 (2013), *available at*

purchased lands and $5.2 million for a long-term management and maintenance endowment.[423] BrightSource submitted an initial habitat preservation proposal in November 2011; the REAT Agencies rejected BrightSource's Castle Mountain Mine mitigation proposal because it did not meet the requirements for acquisition of tortoise and desert dry wash habitat.[424] Subsequently, BrightSource sought to use the Advance Mitigation Program/conservation bank created by SB 34 described above.[425]

To use the SB 34 conservation bank, BrightSource needed permission from the Energy Commission to deviate from the established mitigation measures.[426] The geographic restrictions in the original mitigation requirement for desert dry wash habitat could not be met through the parcels available through the Advance Mitigation Program.[427] The California Department of Fish and Wildlife submitted a revised mitigation proposal, which includes over one hundred parcels from the Advance Mitigation Program, to Energy Commission staff for review and comment in April 2012.[428] This agency-driven mitigation proposal involves parcels outside the project's watershed in the Western Mojave Desert Tortoise Recovery Unit, Colorado Desert Recovery Unit, and in several Desert Wildlife

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http://www.energy.ca.gov/releases/2013_releases/2013-04-18_Ivanpah_Solar.pdf.

423. *Id.* at 2.

424. CAL. ENERGY COMM'N, IVANPAH SOLAR ELECTRIC GENERATING SYSTEM (07-AFC-5C) STAFF ANALYSIS OF PROPOSED MODIFICATIONS TO CONDITION OF CERTIFICATION BIO-20; STREAMBED IMPACT MINIMIZATION AND CONSERVATION MEASURES 3 (2012) [hereinafter STREAMBED IMPACT MINIMIZATION AND CONSERVATION MEASURES], *available at* http://www.energy.ca.gov/sitingcases/ivanpah/compliance/2012-12-21_CEC_Staff_Analysis_of_Proposed_Modifications_to_Condition_of_Certification_BIO-20_Streambed_Impact_Minimization_and_Conservation_Measures_TN-68960.pdf (showing that Energy Commission approval of modified Condition of Certification BIO-20 notes that Castle Mountain Mine mitigation proposal was rejected); *Ivanpah Updates: BrightSource Seeks Mitigation Bank,* BASIN & RANGE WATCH (Nov. 28, 2012), http://www.basinandrangewatch.org/IvanpahUpdates2.html (providing that desert tortoises will not benefit from any more protected "wash" habitat).

425. *See supra* Part II.E.2.

426. CAL. ENERGY COMM'N, PETITION TO AMEND COMMISSION DECISION: IVANPAH SOLAR ELECTRIC GENERATING SYSTEM, No. 07-AFC-5C (2012) [hereinafter PETITION TO AMEND], *available at* http://www.energy.ca.gov/sitingcases/ivanpah/compliance/2012-11-20_Petition_to_Amend_TN-68668.pdf.

427. *Id.* at 5.

428. STREAMBED IMPACT MINIMIZATION AND CONSERVATION MEASURES, *supra* note 424, at 3–4.

Management Areas designated by the BLM to protect high-quality desert tortoise habitat.[429] The Department of Fish and Wildlife argued that these lands offered higher conservation values than those in the geographic region designated by the previous mitigation measure.[430] Energy Commission staff approved the request in December 2012.[431]

Critics have expressed concern about the Ivanpah mitigation lands:

> Our problem has always been: Ivanpah tortoises are not benefitting from mitigation using the SB 34 state mitigation bank; the public is cut out of the loop in being able to review this mitigation, since it takes place after approval and by state agencies that will make the decisions without review. This is mitigation abstracted from the locally impacted ecosystem.[432]

B. GENESIS

The 250 MW Genesis solar project is on BLM land twenty-five miles west of Blythe in Riverside County.[433] The project will cover 1800 acres near Ford Dry Lake.[434] The project is in the Sonoran Desert and is surrounded by the McCoy Mountains to the east, the Palen Mountains (including the Palen/McCoy Wilderness Area) to the north, and Ford Dry Lake to the south.[435] Interstate-10 (I-10) is located to the south of the project site.[436] The site has been used for grazing and off-highway vehicle recreation.[437] The Energy Commission

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429. *Id.* at 4.

430. PETITION TO AMEND, *supra* note 426, at 5.

431. STREAMBED IMPACT MINIMIZATION AND CONSERVATION MEASURES, *supra* note 424, at 5.

432. *Ivanpah Updates: BrightSource Seeks Mitigation Bank*, BASIN & RANGE WATCH (Nov. 28, 2012), http://www.basinandrangewatch.org/IvanpahUpdates2.html.

433. *Genesis Solar Energy Project*, CAL. ENERGY COMMISSION, http://www.energy.ca.gov/sitingcases/genesis_solar/index.html (last visited Nov. 11, 2013).

434. BUREAU OF LAND MGMT., RECORD OF DECISION FOR THE GENESIS SOLAR ENERGY PROJECT AND AMENDMENT TO THE CALIFORNIA DESERT CONSERVATION AREA PLAN RIVERSIDE COUNTY, CALIFORNIA 8 (2010) [hereinafter GENESIS ROD], *available at* http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/palmsprings/genesis.Par.95255.File.dat/Genesis%20ROD.pdf.

435. *Genesis Solar Project*, BUREAU LAND MGMT., http://www.blm.gov/ca/st/en/fo/palmsprings/Solar_Projects/Genesis_Ford_Dry_Lake.html (last visited Oct. 21, 2013).

436. *Id.*

437. *Id.*

approved the project in September 2010 after thirteen months of review,[438] and the BLM finalized the rights of way in November 2010.[439] Construction began in September 2011, was seventy percent complete in July 2013,[440] and is expected to come online in two phases in 2013 and 2014.[441] In 2012, construction was stopped on a portion of the project site for five months because of the discovery of Native American cultural artifacts (grinding stones) and human remains.[442]

The Energy Commission's approval of the Genesis project required acquisition and preservation of 2117 acres of off-site habitat, including nearly 1900 acres of habitat for desert tortoise.[443] Compensatory mitigation requirements are addressed in Mitigation Measure BIO-12.[444] Mitigation Measure BIO-12 also satisfies all or part of the mitigation requirements for the Sonoran creosote bush scrub, golden eagle, special-status and migratory birds, desert kit fox and American badger, and special-status bats.[445] The desert tortoise mitigation for the Genesis project requires compensatory mitigation at a ratio of 1:1 for impacts to 1750 acres of desert tortoise habitat and at 5:1 for impacts to 24 acres of designated critical habitat.[446] BIO-12 is nine pages long and includes other requirements related to reporting,

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438. *Genesis Solar Energy Project*, CAL. ENERGY COMMISSION, http://www.energy.ca.gov/sitingcases/genesis_solar/index.html (last visited Oct. 15, 2013).

439. GENESIS ROD, *supra* note 434, at 52.

440. *Status of all Projects*, CAL. ENERGY COMMISSION, http://www.energy.ca.gov/sitingcases/all_projects.html (last updated July 30, 2013).

441. Andrew Evans, *The Solar Panel Domino Effect*, WASH. FREE BEACON (Apr. 5, 2013, 11:59 AM), http://freebeacon.com/the-solar-panel-domino-effect ("A NextEra spokesman said the project will come online in two phases, half at the end of 2013 and the other half in late 2014.").

442. K. Kaufman, *Cultural Showdown at the Genesis Solar Project,* GREEN DESERT BLOG (Feb. 24, 2012), http://greenenergy.blogs.mydesert.com/2012/02/24/cultural-showdown-at-the-genesis-solar-project; Louis Sahagun, *Discovery of Indian Artifacts Complicates Genesis Solar Project*, L.A. TIMES, Apr. 24, 2012, http://articles.latimes.com/2012/apr/24/local/la-me-solar-bones-20120424.

443. CAL. ENERGY COMM'N, GENESIS SOLAR ENERGY PROJECT COMMISSION DECISION, at Biology 16 (2010) [hereinafter GENESIS COMMISSION DECISION], *available at* http://www.energy.ca.gov/2010publications/CEC-800-2010-011/CEC-800-2010-011-CMF.PDF.

444. *Id.* at Biology 72–80.

445. *Id.* at Biology 12, Biological Resources tbl.2 (summarizing impacts and mitigation in the Final Commission Decision for Genesis).

446. *Id.* at Biology 16.

title/conveyance, funding habitat improvements, and endowment funding (which is estimated at $1450 per acre in the Commission Decision).[447] The measure requires submission of a mitigation land acquisition plan to the Energy Commission and the other REAT Agencies no later than twelve months after the start of construction; it also requires payment of a multi-million dollar security if mitigation is not complete before construction begins.[448]

The developer for the Genesis project, NextEra, chose to have Wildlands, Inc. coordinate its mitigation-land acquisition proposal.[449] Wildlands is a California-based company that creates mitigation banks and conservation banks.[450] Wildlands purports to "provide a one-stop shop for public and private developers" needing to comply with compensatory mitigation requirements for habitat impacts.[451] The company provides developers with experts on land acquisition, biological design, engineering, and construction of mitigation banks.[452] In the case of the Genesis project, Wildlands biologists assessed potential desert conservation lands and real estate specialists and attorneys combed property records and approached potential sellers and negotiated conservation options for target properties.[453]

Public agency representatives characterized working with Wildlands as "pretty pleasant" and "very helpful," but noted that there were tensions over schedule.[454] Wildlands had financial incentives to speed up approval to avoid paying to keep options on mitigation properties for longer than necessary.[455] Meanwhile, coordinating review and approval of land acquisition proposals by all of the REAT Agencies was cumbersome. In spite of the large scale of the mitigation and the challenges of coordinating agency review, the

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447. *Id.* at Biology 72.

448. *See id.* at Biology 110.

449. Telephone Interview with Energy Commission Staff (Oct. 17, 2011).

450. *Wildlands: The Leader in Mitigation Banking*, WILDLANDS, http://www.wildlandsinc.com/profile (last visited Oct. 16, 2013).

451. *Wildlands, Inc., Overview*, LINKEDIN, http://www.linkedin.com/company/455030 (last visited Oct. 21, 2013).

452. *Custom Mitigation Solutions*, WILDLANDS, http://www.wildlandsinc.com/services/custom-mitigation-solutions (last visited Oct. 21, 2013).

453. Telephone Interview with Energy Commission Staff (Oct. 17, 2011).

454. *Id.*

455. *Id.*

Wildlands/Genesis mitigation land was approved within approximately seven months of the company beginning to work with the REAT Agencies.[456] A project manager from Wildlands explained the speed of the process by saying that "we were able to put together a plan because we use our own capital to acquire land aggressively" and that "Wildlands' track record is a big part of how quickly it came together."[457] The manager said that Wildlands' aggressive acquisition strategy is intended in part to build goodwill with agencies by helping applicants meet requirements quickly.[458] He described Energy Commission staff as "great to work with" and stated that the speed of plan approval was "a testament to the agencies."[459] One agency representative noted that they have directed other applicants to Wildlands, but at least one applicant felt that working with the company would be too expensive.[460]

The Wildlands/Genesis mitigation-land acquisition plan establishes a "Colorado Desert Preserve" made up of over 2100 acres of thirty-two mostly contiguous parcels in unincorporated rural Riverside County.[461] Each parcel is in the desert tortoise Colorado Desert Recovery Unit and the Northern and Eastern Colorado Desert Planning Area.[462] Wildlands is purchasing the fee title to all of the conservation properties, and conservation easements on the parcels will be held by the Wildlife Heritage Foundation.[463] The conservation easement agreement covering the properties is based on the model conservation easement developed by multiple agencies for use by agency-approved mitigation banks.[464] While the REAT Agencies did approve the

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456. Confidential Telephone Interview (Oct. 17, 2011).

457. *Id.*

458. *Id.*

459. *Id.*

460. Confidential Telephone Interview with Energy Commission Staff (Oct. 17, 2011).

461. WILDLANDS, FINAL FORMAL ACQUISITION PROPOSAL FOR THE GENESIS SOLAR ENERGY PROJECT, at Executive Summary 1, 2 tbl.1 (2011), *available at* http://www.energy.ca.gov/sitingcases/genesis_solar/compliance/documents/fap.

462. *Id.* at Executive Summary fig.1 (showing mitigation land locations).

463. *Id.* at ex. B-1, 3011–26 (Conservation Easement); *cf., e.g.*, *Project Examples*, WILDLIFE HERITAGE FOUND., http://www.wildlifeheritage.org/services/project-examples/ (last visited Nov. 11, 2013) (providing examples of other mitigation properties managed by the Foundation).

464. The multi-agency Project Delivery Team (California Department of Fish & Wildlife, U.S. Fish & Wildlife Service, and U.S. Army Corps of Engineers) has a standardized template document for Mitigation and Conservation Banks in California. *Bank Conservation Template*, CAL. DEP'T

mitigation land plan for the Genesis project, the Wildlands plan allocates much less funding to long-term maintenance and management than anticipated in the Energy Commission Decision. The Commission Decision anticipated funding of $1450 per acre for long-term stewardship and enforcement, while the Wildlands plan provides only $469 per acre.[465] At least one agency representative felt that Wildlands grossly underestimated the cost of effective long-term management.[466]

Ivanpah and Genesis provide interesting examples of how the large desert solar projects are grappling with mitigation of adverse environmental impacts. With an understanding of these projects under our belt, the next section reflects on the larger implications of the push for solar development in the desert. In particular, our case studies illuminate the broader challenges of perpetual off-site habitat preservation as mitigation for impacts to endangered species.

IV. ANALYSIS

As described above, many factors have contributed to the push for solar development in the California desert. While ARRA funding is no longer a significant driver, RPS goals, agency policies, and potential profits are still creating incentives for desert solar projects.[467] Project applicants must grapple with environmental review and with many permitting requirements, including the state and federal ESAs.[468] These laws are intended to disclose, minimize, and mitigate environmental impacts.[469] The requirements stemming from the federal and state ESAs and from NEPA and CEQA review seek to remedy some of the most significant environmental impacts of these projects through compensatory mitigation.[470] Compensatory mitigation can take the form of creation,

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FISH & WILDLIFE (2010), nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=10094. The template requires that any modifications to the template be identified using tracked changes or other electronic comparison and explained in a memorandum. *Id.*

465. *See* WILDLANDS, FINAL FORMAL ACQUISITION PROPOSAL FOR THE GENESIS SOLAR ENERGY PROJECT, *supra* note 461, at ex. D-1, 3054.

466. Confidential Telephone Interview with Energy Commission Staff (Oct. 17, 2011).

467. *See* Donnelly-Shores, *supra* note 282.

468. *See supra* Part II.B.2.

469. *See supra* Part II.B.2.

470. *See supra* Parts II.C.1–2.

restoration/enhancement, and/or preservation of habitat.[471] This mitigation can be paid for through developer-driven (but agency approved) purchase of full or partial interests in land, through purchase of mitigation bank credits (either through private mitigation banks or an agency-managed bank like the one created under SB 34), or through the payment of in-lieu fees.[472]

These payment mechanisms have implications for how compensatory mitigation plays out. Agencies may use in-lieu fees for land acquisition or for other actions that they determine would mitigate project impacts.[473] Applicant-driven acquisition of habitat may be constrained by tight timeframes, lack of expertise, or difficulty finding landowners willing to sell appropriate habitat. Mitigation banks allow private companies or public agencies to assemble mitigation properties in advance.[474] In theory, this can allow strategic planning of acquisitions. Mitigation banking companies and resource agencies may also be able to apply staff expertise to management and/or creation/restoration/enhancement of preserved habitat. However, mitigation banks have also been criticized for insufficiently creating and protecting high quality habitat and for being inadequately transparent.[475] In-lieu fee programs have been criticized for not using fees effectively, and it may be difficult to prove that in-lieu fees meet legal

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471. *See supra* Part II.D.

472. *See supra* Part II.E.2.

473. *See* ENVTL. LAW INST., *supra* note 372, at 3–4 (explaining the benefits of in-lieu fees).

474. *See, e.g., Renewable Energy Resources Fee Trust Fund, supra* note 364 (stating that SB 34 authorizes the California Department of Fish and Wildlife, in conjunction with other government actors, to "purchase . . . land and conservation easements to protect, restore, and enhance the habitat of CESA listed plants and animals").

475. U.S. GOV'T ACCOUNTABILITY OFFICE, WETLANDS PROTECTION: CORPS OF ENGINEERS DOES NOT HAVE AN EFFECTIVE OVERSIGHT APPROACH TO ENSURE THAT COMPENSATORY MITIGATION IS OCCURRING 4–5 (2005), *available at* http://www.gao.gov/assets/250/247675.pdf (providing that parts of two primary oversight systems for compensatory mitigation are vague and inconsistent); Amos Esty, *Banking on Mitigation,* AM. SCIENTIST, Mar.–Apr. 2007, at 1, *available at* http://www.americanscientist.org/issues/pub/banking-on-mitigation (providing that of twelve studied mitigation banking-sites, twenty-eight percent of the area surveyed lacked rooted vegetation and could not be considered functional wetlands).

mitigation standards.[476] None of the solar projects in the California desert have so far used in-lieu fees.

A number of critiques have been raised about compensatory mitigation, and these critiques are highlighted by our desert case studies. These critiques include the following, which are described below: (a) preservation as mitigation is unsatisfying; (b) off-site mitigation is problematic; (c) preserving land in perpetuity is challenging; (d) the use of exacted conservation easements raises concerns; (e) there may not be adequate scientific information to set up appropriate conservation strategies; and (f) the process of selecting, evaluating, approving, and permanently preserving offsite habitat is not adequately transparent.

A. PRESERVATION AS MITIGATION IS UNSATISFYING

Off-site preservation may protect valuable habitat, and conscientious conservation banks may do a good job of conserving and managing pockets of threatened ecosystems.[477] Nonetheless, one of the central concerns with preservation as mitigation is that it does not prevent net loss of habitat.[478] As an accompaniment to restoration, enhancement, or creation of habitat, preservation can protect habitat.[479] That is, after mitigation projects are completed, it makes sense to encumber the sites with conservation easements to improve the likelihood of long-term protection of the site. Preservation on its own, though, is unsatisfying. It generally protects off-site habitat without truly offsetting project impacts. This is especially true if the habitat preserved as mitigation (usually though use

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476. *See* Edward Grutzmacher & Julia Bond, *In the Absence of CEQA Review, Fee Programs Cannot Presumptively Establish Full Mitigation of Environmental Impacts*, MEYERS NAVE (Feb. 11, 2009), http://www.meyersnave.com/publications/absence-ceqa-review-lieu-fee-programs-cannot-presumptively-establish-full-mitigation-en (describing a California appellate court decision that found an in-lieu fee ordinance insufficient due to lack of evaluation under CEQA).

477. *See, e.g.*, U.S. FISH & WILDLIFE SERV., GUIDANCE FOR THE ESTABLISHMENT, USE, AND OPERATION OF CONSERVATION BANKS 1–2 (2003), *available at* http://www.fws.gov/Endangered/esa-library/pdf/Conservation_Banking_Guidance.pdf.

478. *See, e.g.*, Charles H. Ratner, *Should Preservation Be Used as Mitigation in Wetland Mitigation Banking Programs: A Florida Perspective*, 48 U. MIAMI L. REV. 1133, 1139–42 (1994) (providing that preservation efforts through President Bush's "no net loss" wetlands policy did not prevent losses of wetlands across Florida).

479. *See, e.g.*, *id.* at 1174–77.

conservation easements) is not realistically threatened with development. This raises two related concerns: (1) preservation does not increase environmental benefits, instead it facilitates habitat conversion and (2) preservation projects are often off-site, causing concerns about its true mitigation value.

The public agencies that allow or require preservation as mitigation acknowledge its central problem. For example, the U.S. Fish and Wildlife Service's HCP Handbook (agency guidance for the section 10 permitting program under the federal ESA) instructs field offices to focus on acquisition of high-quality existing habitat, but this comment is followed by the acknowledgment that a focus on such a technique can ultimately result in net loss of habitat value.[480] The California Coastal Commission similarly argues that while mitigation banks may be used for compensatory mitigation, "any broad use of mitigation banks could lead to a net loss of wetland habitat."[481]

California courts have struggled with whether preservation should qualify as mitigation under CEQA. The most instructive cases have arisen in the context of California's goal to protect prime agricultural land.[482] Some conservationists argue that paying one landowner to keep farming does not compensate for the fact that other farmland is converted to nonagricultural uses.[483] Others desire to see preservation considered as mitigation because acknowledgement of preservation as a mitigation strategy means that agencies must include analysis of agricultural easements in environmental review; the lead agency cannot simply declare farmland loss as immitigable and decline to present a mitigation plan.[484] In the case of farmland impacts,

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480. HCP HANDBOOK, *supra* note 149, at 3-22.

481. *Procedural Guidance for The Review of Wetland Projects in California's Coastal Zone*, CAL. COASTAL COMMISSION, http://www.coastal.ca.gov/wetrev/wetch2.html (last visited Oct. 21, 2013).

482. *See, e.g.*, Mira Mar Mobile Cmty. v. City of Oceanside, 14 Cal. Rptr. 3d 308, 318–19 (Cal. Ct. App. 2004) (upholding a proposed mitigation consisting of habitat preservation).

483. *See id.* at 310–11 (emphasizing plaintiffs' arguments regarding coastal sage scrub).

484. *See* Friends of the Kangaroo Rat v. Cal. Dep't. of Corr., 4 Cal. Rptr. 3d 558, 564–65 (Cal. Ct. App. 2004) (depublished) (noting arguments of the appellants that the Department of Corrections "failed to consider reasonable mitigation measures that could reduce or eliminate the significant cumulative impact caused by the conversion of important farmland to nonagricultural use").

courts have generally agreed that preservation via conservation easement does not meet CEQA's mitigation requirements,[485] but some have required use and consideration of conservation easements as a way to at least reduce development pressures and land-use conversion on neighboring sites.[486] These farmland cases are instructive for habitat conservation. Preservation of off-site habitat does not prevent harm to habitat at the project site, but there can still be value to measures that keep other parcels of habitat intact.

For the Ivanpah project, the mitigation measures required preserving 7000 acres of habitat for tortoises and other species as well as 175 acres of dry wash habitat.[487] Compared to the 3400-acre project site, this appears to be an attractive mitigation plan. However, preservation of this 7175 acres does not prevent destruction of 3400 acres of habitat. Preservation on its own would not increase the amount of habitat available in the long run. A true assessment of the value of the mitigation must turn on what those 7175 acres look like, and more importantly, what would happen to them in the absence of such mitigation plans. Where the mitigation lands were not themselves in danger of conversion, encumbering the properties with conservation easements does not yield additional benefits. As explained above, however, Ivanpah has struggled with trying to assemble this acreage and comply with the land requirements.[488] Instead, it obtained approval to use the SB 34 conservation bank whose properties do not all meet the performance standards in Ivanpah's original mitigation measures.[489]

Genesis's mitigation also focuses on off-site preservation.[490] For the 1800 acres of the project site, Genesis has agreed to preserve over 2100 acres off-site.[491] The ratio for protection of tortoise habitat is mostly 1:1 with a 5:1 ratio for the twenty-four acres of designated critical habitat. Again, we must wonder what would have happened to these areas if not for

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485. *See* S. Cnty. Citizens for Responsible Growth v. City of Elk Grove, No. C042302, 2004 WL 219789, at *3 (Cal. Ct. App. 2004); *Friends of the Kangaroo Rat*, 4 Cal. Rptr. 3d at 567.

486. *S. Cnty. Citizens for Responsible Growth*, 2004 WL 219789, at *5–7.

487. *See supra* Part III.A.

488. *See supra* Part III.A.

489. *See supra* Part III.A.

490. *See supra* Part III.B.

491. *See supra* Part III.B.

Genesis' mitigation dollars. Let's take the example of critical habitat. The federal ESA limits what can occur on critical habitat.[492] Section 7 of the act prohibits any federal actions that might lead to adverse modification of critical habitat.[493] Section 9 prohibits negative impacts on any habitat (critical or otherwise) where such actions are likely to injure individual tortoises.[494] With these restrictions, critical habitat should not be at much risk of conversion. Under this theory, protection of critical habitat seems to be poor compensation for destruction of critical habitat. Of course, the fact that the involved agencies are allowing the Genesis project to adversely modify critical habitat demonstrates that such lands may not be as protected as they appear. If we take the critical habitat designation seriously (and section 9 of the Endangered Species Act), not only should critical habitat protection be inadequate mitigation, but critical habitat conversion should not occur in the first place without replacement of those acres through methods like creation and enhancement.[495]

Preservation may be most effective when protecting against potential future impacts from the project (potential land-use changes), as opposed to present-day impacts of the project (immediate loss of habitat). Project developers and agencies should acknowledge that preservation as a sole mitigation measure results in net loss. Thus, preservation as mitigation should be the last option—or better yet, just what we do with lands that we have restored or enhanced.

B. PROBLEMS WITH OFF-SITE MITIGATION

Where preservation is used as a mitigation technique, the focus turns to protecting lands away from the project site.[496] There has long been a tension (acknowledged in the literature) between protecting on-site habitat in the midst of a degraded parcel or off-site habitat, possibly quite far from the original site.[497] There has been conflicting evidence regarding the

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492. *See supra* Part II.B.2.

493. CRITICAL HABITAT: WHAT IS IT?, *supra* note 150.

494. SECTION 7 HANDBOOK, *supra* note 149, at 2-12.

495. *See* Salzman, *supra* note 150, at 342 (imploring Congress to "revisit[ ] critical habit designation").

496. Owley, *supra* note 236.

497. Mark M. Brinson & Richard Rheinhardt, *The Role of Reference Wetlands in Functional Assessment and Mitigation*, 6 ECOLOGICAL APPLICATIONS 69, 74 (1996); J.B. Ruhl & James Salzman, *The Effect of*

success of off-site mitigation programs.[498] Concerns about net loss of habitat are especially acute when a project affects unique habitat or scarce habitat for a unique population of an imperiled species.[499]

There are also advantages to off-site preservation. Off-site mitigation enables concentration of conservation efforts on fewer sites that may be bigger and located in areas where rehabilitation and protection efforts are likely to have greater success.[500] Such economies of scale may increase the likelihood of success for off-site mitigation efforts.[501] Concentrated areas facilitate monitoring and enforcement as they avoid the need to keep track of many scattered mitigation sites.[502]

Although both of our case studies use off-site mitigation, the Ivanpah project has been particularly criticized. Because the desert tortoises at the Ivanpah site are genetically distinct, off-site habitat may be inadequate to protect them.[503] This concern is compounded by the fact that tortoise relocation efforts have not been successful.[504] Thousands of tortoises had been moved in translocation efforts associated with the development of Las Vegas and other desert projects. Some of the movement, however, was not accompanied by equal efforts to ensure tortoise survival.[505] While translocation procedures have improved, some biologists argue that translocation

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Wetland Mitigation Banking on People, 28 NAT'L WETLANDS NEWSL. 1, 8 (2006).

498. Marc. R. Bulson, *Off-Site Mitigation and the EIS Threshold: NEPA's Faulty Framework*, 41 WASH. U. J. URB. & CONTEMP. L. 101, 106 (1992) (stating that there is no evidence that off-site projects are real substitutes for lost resources).

499. *Id.* at 107–08.

500. Deborah L. Mead, *History and Theory: The Origin and Evolution of Conservation Banking, in* CONSERVATION AND BIODIVERSITY BANKING 9, 16 (2008).

501. *Id.*

502. *Id.*

503. Robert W. Murphy et al., *A Genetic Assessment of the Recovery Units for the Mojave Population of the Desert Tortoise, Gopherus Agassizii*, 6 CHELONIAN CONSERVATION & BIOLOGY 229 (2007) (describing allelic differences in the tortoises of the California desert and asserting that recovery plans should be organized within each geographical unit).

504. Press Release, Ctr. for Biological Diversity, Disastrous Desert Tortoise Translocation Suspended (Oct. 10, 2008), *available at* http://www.biologicaldiversity.org/news/press_releases/2008/desert-tortoise-10-10-2008.html (describing a well-known failed relocation effort from Fort Irwin where tortoise survival rates were extremely low).

505. Green, *supra* note 58.

techniques still have a long way to go.[506] In a report prepared for the Desert Renewable Energy Conservation Plan, independent scientists concluded that translocation "is *not* a successful conservation action and may do more harm than good to conserved populations by spreading diseases, stressing resident animals, increasing mortality, and decreasing reproduction and genetic diversity."[507]

Off-site mitigation projects need not be limited to preservation efforts. Restoration and enhancement of off-site habitat can potentially increase the amount of high quality habitat for endangered species, but especially in the case of the desert, there are many issues with these forms of compensatory mitigation as well.[508] Desert restoration is challenging, and harsh climate conditions and slow plant growth mean that restoring desert habitats may take a very long time.[509]

Perhaps most troubling for projects relying on off-site mitigation projects is that it is not always clear that adequate off-site habitat is available. Ivanpah, for example, has struggled to assemble adequate mitigation lands.[510] As more solar and wind facilities are developed in the desert,[511] there is an increasing need to find lands to serve as compensatory mitigation. Mitigation lands are often not located or secured until after project approval and sometimes even after facilities begin operation.[512] The pressures to find mitigation lands will likely shape the desert landscape in unintended ways and may lead to approval of mitigation lands farther and farther from the project sites.

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506. *Id.* ("Even if translocation techniques are improved, [USGS Biologist Kristin Berry] firmly believes that the best thing that can be done for the desert tortoise is to leave it alone.").

507. ISA RECOMMENDATIONS, *supra* note 25, at vii.

508. *See generally* Scott R. Abella, *Restoration of Desert Ecosystems*, NATURE EDUC. KNOWLEDGE PROJECT, http://www.nature.com/scitable/knowledge/library/restoration-of-desert-ecosystems-84676323 (last visited Oct. 20, 2013) (discussing desert restoration techniques and addressing challenges to restoration).

509. *Id.* ("Restoring desert ecosystems is challenged by . . . generally slow rates of plant colonization and growth.").

510. Oelz & Umanoff, *supra* note 354, at 3–4.

511. *See* Zipp, *supra* note 396.

512. James Salzman and J.B Ruhl have identified this as a failure of habitat and wetlands banks because of a nonfungibility of time in the chosen currency (e.g., endangered species habitat). James Salzman & J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 STAN. L. REV. 607, 626, 630 (2000).

Because the majority of the land in the California desert is managed by the BLM, restoration and enhancement on public lands may make sense as compensatory mitigation.[513] Depending on the scale of development, there may not be enough appropriate private land available to preserve. The Department of Interior's off-site mitigation guidance provides that off-site mitigation may be performed on federal lands managed by the BLM.[514] BLM staff have expressed support for "connecting the dots" for mitigation by allowing project applicants to pay for habitat restoration on public lands.[515] In its 2012 policy guidance, the California Department of Fish and Wildlife specified that if mitigation includes restoration/enhancement of publicly owned lands or lands that have previously been used as mitigation, the "fully mitigated standard can be met on conserved and publicly owned lands and the mitigation and the land are protected in perpetuity, the mitigation may proceed if it is consistent with the policy."[516] However, it is unclear whether the Federal Land Policy and Management Act (the BLM's organic act) and the BLM's multiple use mandate contained therein would allow for permanent preservation of restored areas.[517] While the BLM's mandate allows it to set aside land for preservation (i.e., while the BLM generally seeks to facilitate multiple use, not all parcels need to have all uses), restricting land to a single use in perpetuity would be something new for the agency. Indeed, it is not apparent what type of mechanism could be used to permanently restrict public lands. Unless congressionally designated as a Wilderness Area, presumably the BLM would retain the ability to alter land use over time through its land use planning processes. And there is no precedent for conservation easements on federal lands to prevent such alteration.[518] Perhaps there is some comfort for us here,

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513. *See, e.g.*, IVANPAH ROD, *supra* note 392, at 7.

514. *Instruction Memorandum No. 2008-204*, BUREAU LAND MGMT. (Sept. 30, 2008), http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/20080/IM_2008-204.html.

515. Confidential Interview with BLM Staff (Apr. 19, 2012).

516. DEP'T OF FISH & GAME, POLICY FOR MITIGATION ON PUBLICLY OWNED, DEPARTMENT OWNED, AND CONSERVED LANDS (2012), *available at* http://www.water.ca.gov/floodsafe/fessro/docs/flood13_dfg.pdf.

517. Letter From Kim Delfino, *supra* note 340, at 2.

518. We do sometimes see conservation easements held by public entities, including the BLM. *See, e.g.*, U.S. Dep't of the Interior, Bureau of Land Mgmt., Carson City Dist., Conservation Easement with Carson City (Dec. 22, 2010),

though. As discussed in the next section, perpetual restriction of land has its own series of concerns, and enabling protection that can be altered by an experienced land management agency may ultimately yield improved conservation or societal outcomes.[519]

Whether and how restoration on public lands would be allowed as compensatory mitigation under the DRECP is a major source of disagreement among the REAT Agencies.[520] BLM staff acknowledge that other agencies (and the public) "don't understand how BLM actually works and what we can or can't do. They don't know whether we can be trusted or not."[521] Another possibility for compensatory mitigation on public lands would be having project applicants pay for retiring grazing allotments. Congress passed appropriations language in December 2011 that allows relinquishment of some grazing allotments.[522] Solar developers (or others) could then buy out the permits. This would only make sense where the grazing lands represented needed habitat, but there is a lot of overlap between grazing allotments and critical habitat for desert tortoises.[523]

In addition to the concerns outlined above, one land trust interviewee highlighted an unintended consequence of large-scale off-site mitigation in the California desert. The land trust representative argued that Wildlands, Inc. was paying above

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available at http://www.blm.gov/pgdata/etc/medialib/blm/nv/field_offices/carson_city_field/lands_and_realty/carson_city_lands.Par.92492.File.dat/Conservation%20Easememt%20of%20the%20Silver%20Saddle%20Ranch%20&%20Carson%20River%20Area%20Signed%2012-22-10.pdf. We also see conservation easements over public land held by state and local governments. *See generally*, Jessica Owley, *Use of Conservation Easements by Local Governments, in* GREENING LOCAL GOVERNMENT 237 (Patricia Salkin & Keith Hirokawa eds., 2012). A conservation easement burdening federal land and held by a state agency or land trust would be a whole new kettle of fish, raising complicated issues regarding sovereign immunity and property rights.

519. Of course, this rests on some trust of the BLM's decision-making processes and land management skills.

520. *See* Cal. Energy Comm'n, *Durability of Conservation Activities on Public Land Within DRECP*, DESERT RENEWABLE ENERGY CONSERVATION PLAN (Sept. 5, 2012), http://www.drecp.org/meetings/2012-09-05_workshop/2012-09-05_Agenda_Revised.pdf? (reflecting concerns with the durability of mitigation projects).

521. Confidential Telephone Interview with BLM Staff. (Apr. 19, 2012).

522. The Rural Economic Vitalization Act, currently before Congress, would allow voluntary retirement of grazing allotments. *Cf.* H.R. 2201, 113th Cong. (2013).

523. Telephone Interview with Dana Brink, BLM (Apr. 25, 2012).

appraised value for some parcels and that this was increasing the cost of conserving land outside of the mitigation process. That is, conservation as mitigation was making non-regulatory preservation efforts much more expensive because of competition in acquiring high-quality habitat.[524]

C. THE CHALLENGE OF PERPETUITY

There are many factors that make preserving off-site land in perpetuity difficult. Perpetual land protection requires vigilance. The government agencies and nonprofit organizations holding conservation easements must diligently monitor and enforce the restrictions.[525] Where active land management is required (as is often the case with mitigation banks or land held in fee simple by government agencies), the burden is even greater, with needs to constantly monitor the land and update management operations.[526]

These endeavors can be quite costly, and it is hard to assess what amount of money should be set aside for these future efforts.[527] To facilitate long-term preservation of the mitigation lands for renewable energy projects in the California desert, the REAT Agencies have required developers to pay long-term management and maintenance (LTMM) funds.[528] These funds are intended to cover land management, enforcement of conservation easements, and monitoring.[529] The REAT Agencies initially estimated that LTMM funds should be approximately $1450 per acre; exactly how they arrived at this number is not clear.[530] Long-term management costs may vary

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524. Telephone Interview (Nov. 30, 2012).

525. Adena R. Rissman, *Designing Perpetual Conservation Agreements for Land Management*, 63 RANGELAND ECOLOGY & MGMT. 167, 168, 173 (2010).

526. *See* Adena Rissman et al., *Land Management Restrictions and Options for Change in Perpetual Conservation Easements*, 52 ENVTL. MGMT. 277, 285 (2013).

527. *See* ENVTL. LAW INST. & LAND TRUST ALLIANCE, WETLAND AND STREAM MITIGATION: A HANDBOOK FOR LAND TRUSTS 135–39 (2012), *available at* http://www.landtrustalliance.org/land-trusts/wetland-and-stream-mitigation-handbook (offering guidance for calculating the amount of money needed for long-term stewardship of wetland mitigation sites).

528. DESERT RENEWABLE ENERGY REAT, BIOLOGICAL RESOURCE COMPENSATION/MITIGATION COST ESTIMATE BREAKDOWN FOR USE WITH THE REAT-NEWF MITIGATION ACCOUNT (2010), *available at* http://www.energy.ca.gov/sitingcases/solar_millennium_palen/documents/2010-07-23_REAT_Cost_Estimate_Table_TN-57775.PDF.

529. *Id.*

530. *Id.*; Confidential Interview (Apr. 10, 2012).

for a variety of reasons: habitat type, mitigation activity, parcel size, and land manager.[531] In the case of the Genesis project, the REAT Agencies approved a mitigation land plan that only provides LTMM funds of $469 per acre.[532] There appears to be some debate among agency staff about whether that would actually cover long-term costs. In our interviews, one agency representative and one land trust representative argued that this was not adequate and that long-term management of desert lands is particularly challenging because monitors must have desert expertise and because monitoring remote areas may be complicated and dangerous (no cell phone reception, many potential hazards, difficult to access) and should not be done by a monitor working alone. Wildlands estimated its LTMM costs assuming that monitoring would require half a day for one person each year.[533] Whereas, BLM staff noted that it is important to send monitors out in pairs (for safety) and to visit sites more frequently than once per year because even remote sites are vulnerable to off-highway vehicle traffic and illegal dumping, which can quickly require very expensive restoration efforts to remedy.[534] One agency interviewee expressed concern that private mitigation bankers would use unqualified, underpaid subcontractors to do monitoring, and that even the $1450 per acre LTMM cost initially proposed by the REAT Agencies may be inadequate.[535] Agency staff speculated that the approval of the $469 per acre LTMM cost for Genesis was a result of pressure from Wildlands, fatigue on the part of overworked agency staff, and political pressure on agency leaders to get projects approved.[536]

The success (and long-term viability) of perpetual mitigation projects depends on the thoroughness of monitoring and enforcing the land restrictions or active management. Unfortunately, the requirements governing conservation

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531. MARK BUCKLEY ET AL., ECONORTHWEST, REVIEW OF MITIGATION COSTS IN WESTERN STATES 5 (2012), *available at* http://www.wecc.biz/committees/BOD/TEPPC/SPSG/120807/Lists/Minutes/1/120808_Mitigation_Cost_Report_ECONW.pdf.

532. *See supra* Table 3; WILDLANDS, FINAL FORMAL ACQUISITION PROPOSAL FOR THE GENESIS SOLAR ENERGY PROJECT, *supra* note 461, at ex. D-1, 3054.

533. Confidential Interview with BLM Staff (Apr. 19, 2012).

534. *Id.*

535. *Id.*

536. *Id.*

easements and mitigation lands[537] are not always diligently monitored and enforced.[538] Even where adequate money has been set aside for long-term stewardship, motivation for monitoring, enforcing, and actively managing the land may wane.[539] With mitigation banks, the for-profit companies managing the properties may not have incentives to improve the habitat long into the future when the money they received for the program is long gone.[540]

The Interior Department's Office of the Inspector General has already found problems with the BLM's management of renewable energy permits.[541] In its 2012 Report, the Inspector General's Office found significant concerns regarding monitoring operation of solar and wind facilities on BLM land and compliance with ROW terms.[542]

Perpetual conservation means that lands and responsibilities will eventually transfer to new individuals and entities.[543] As new parties become involved, violations are likely to increase, as knowledge and motivation differ for new

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537. BAY AREA OPEN SPACE COUNCIL, ENSURING THE PROMISE OF CONSERVATION EASEMENTS: REPORT ON THE USE AND MANAGEMENT OF CONSERVATION EASEMENTS BY SAN FRANCISCO BAY AREA ORGANIZATIONS 24–26 (1999) (detailing types of violations and enforcement expenses of easements).

538. *See id.* at 13–38 (describing many easements violations and pervasive problems with adequate monitoring and enforcement of conservation easements); Michael Doyle, *Wetlands Easements Not Being Monitored, Investigators Find*, MCCLATCHY NEWSPAPERS (Sept. 9, 2008), http://www.mcclatchydc.com/2008/09/19/52812/wetlands-easements-not-being-monitored.html (describing failure of the Department of Agriculture to monitor conservation easements funded through the Wetlands Reserve Program); *see also* Feduniak v. Cal. Coastal Comm'n, 56 Cal. Rptr. 3d 591, 598 (Cal. Ct. App. 2007) (stating that the California Coastal Commission issues over 1000 permits per year and does not have time to monitor compliance with conservation easements exacted under those permits due to budgetary and time constraints).

539. Doyle, *supra* note 538.

540. This is something we already see with wetlands mitigation banks. Once a mitigation bank is sold out (all the credits purchased), the companies often transfer ownership to nonprofit organizations or others. These new landowners then have the burden to actively maintain quality habitat, and they are not all equally experienced (or equally successful) at doing so. *See* Jessica Owley, *The Increasing Privatization of Environmental Law*, 46 AKRON L. REV. 1091, 1123–26 (2013).

541. IG REPORT, *supra* note 283, at 13.

542. *Id.* at 13–16.

543. *See* LESLIE RATLEY-BEACH, MANAGING CONSERVATION EASEMENTS IN PERPETUITY 13 (2009), *available at* http://www.eli.org/pdfs/landtrusthandbook/9.pdf.

parties.[544] For example, when ROW grants change hands, it is important that the new owner understands the terms. The Inspector General's Office has already found one company out of compliance with its wind project ROW; the company contended that it did not know it was supposed to report to the BLM despite the clear terms of the ROW.[545]

It is also not clear what happens with conservation easements and other mitigation projects as the landscape changes. Common law doctrines of change of conditions and change of neighborhood may serve as justifications for terminating land-use restrictions as climate change (or other forces) alter the landscape.[546] Furthermore, a combination of state conservation easement statutes and common law servitude doctrines indicate that parties to a conservation easement may have multiple ways to terminate or amend the agreement.[547] As many state statutes instruct that conservation easements should be governed by the laws applying to regular easements, the routes for termination or modification may be numerous and would include such things as merger and agreement of the parties.[548]

Finally, perpetual land restrictions present other societal problems.[549] It is not clear what will or should happen to the land as habitat shifts, species go extinct, or pressing societal

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544. *Id.* at 13–14; Owley Lippmann, *supra* note 30, at 335 ("A recent Land Trust Alliance study indicates that all 435 serious conservation easement violations in 1999 were committed by post-transaction owners.").

545. IG REPORT, *supra* note 283, at 14–16.

546. Richard B. Collins, *Alienation of Conservation Easements*, 73 DENV. U. L. REV. 1103, 1104 (1996); Nancy McLaughlin, *Rethinking the Perpetual Nature of Conservation Easements*, 29 HARV. ENVTL. L. REV. 421, 459–61 (2005) (arguing that charitable trust law can offer guidance for addressing changing circumstances and conservation easements); Jeffrey A. Blackie, Note, *Conservation Easements and the Doctrine of Changed Conditions*, 40 HASTINGS L.J. 1187, 1218–22 (1989); Jeffrey M. Tapick, Note, *Threats to the Continued Existence of Conservation Easements*, 27 COLUM. J. ENVTL. L. 257, 278–80 (2002).

547. Jessica E. Jay, *When Perpetual Is Not Forever: The Challenge of Changing Conditions, Amendment, and Termination of Perpetual Conservation Easements*, 36 HARV. ENVTL. L. REV. 1, 61 (2012); Blackie, *supra* note 546, at 1214.

548. *See generally* Jay, *supra* note 547 (providing analysis of common-law and statutory conservation easement framework).

549. Julia Mahoney, *Perpetual Restrictions on the Land and the Problem of the Future*, 88 VA. L. REV. 739, 744 (2002).

needs emerge.[550] For example, is there a place for movable perpetual restriction, for when society determines that the need for renewable energy is so great that desire for new solar facilities outweighs the desire to protect desert tortoise habitat?[551]

D. EXACTED CONSERVATION EASEMENT CONCERNS

The conservation easements used pervasively in the mitigation projects are different from the traditionally studied conservation easements.[552] These conservation easements are the result of permit conditions and are not donated conservation easements.[553] This means that many of the touted benefits of conservation easements are not present: there are no tax deductions for landowners, government involvement is pervasive, and the agreements are not voluntary.[554] The primary purpose of these conservation easements is not to conserve special places[555] but to meet permit conditions and facilitate project development.[556]

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550. *See id.* at 753–57 (discussing issues of flexibility in dealing with changes in nature for conservation servitudes).

551. *See generally id. at* 759–63 (discussing how human cultural values can change assessment of environmental value); Jessica Owley, *Changing Property in a Changing World: A Call for the End of Perpetual Conservation Easements*, 30 STAN. ENVTL. L.J. 121 (2011). *But see* Barton H. Thompson, *The Trouble with Time: Influencing the Conservation Choices of Future Generations*, 44 NAT. RESOURCES J. 601, 607–13 (2004) (asserting that perpetual restrictions are not really as rigid as we might think).

552. Owley Lippmann, *supra* note 30, at 295.

553. Jessica Owley, *The Emergence of Exacted Conservation Easements*, 84 NEB. L. REV. 1043, 1045 (2006). There is an unusual middle category though. Landowners might sell or donate a conservation to a land trust or government agency. *See generally id.* Where that parcel is included in a conservation bank or covered by in-lieu fees, it plays a strange role as a donated exacted conservation easement. Donated conservation easements must adhere to I.R.S. statutes and regulations for the landowner to obtain the tax benefit. *Id.* at 1089–91. These requirements would be superimposed on the rules stemming from the permit requirements, and the role of public and private enforcers is even muddier for this group of properties.

554. *Id.* at 1094–1112.

555. *Cf.* LAND TRUST ALLIANCE, http://www.landtrustalliance.org/ (last visited Aug. 7, 2013) (presenting The Land Trust Alliance's tag line: "Together, conserving the places you love"); *Special Places—Annual Event*, W. VA. LAND TRUST, http://www.wvlandtrust.org/annual_event.html (last visited Aug. 7, 2013) (describing the West Virginia Land Trust's annual Special Places Event and generally emphasizing that personal connections to parcels drive the organization's conservation work); *cf., e.g.*, *Special Places*, NEV. LAND TRUST, http://www.nevadalandtrust.org/special-places/ (last visited Oct. 7,

Exacted conservation easements (or mitigation easements if you prefer) have their own host of concerns involving privatization, accountability, and enforcement.[557] Conservation easements may be held by government agencies or land trusts.[558] When held by land trusts, we may have concerns about private organizations taking on the task of permit compliance.[559] In some cases, the land trusts may be the only entities with the ability to enforce the agreements and, perhaps more alarmingly, they may be able to modify or terminate the agreements without involvement of the permit issuing authority.[560] Public agencies, including the BLM, sometimes uses third parties to act as monitors, and this may raise concerns about accountability.[561]

The conservation easements used to meet mitigation requirements should be considered part of the permit regime. For example, incidental take permits require compliance with habitat conservation plans.[562] Where a habitat conservation plan mandates use of conservation easements (or perhaps purchase of credits from a mitigation bank whose land is encumbered with conservation easements) complying with the conservation easements is necessary to demonstrate permit compliance.[563] Yet, the oversight of exacted conservation easements is unclear. What responsibilities do the permitting authorities retain? Can they monitor the conservation easements? Can they enforce them? Enforcement of conservation easements is even more important when those conservation easements have been exchanged for conversion of endangered species habitat or other environmentally

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2013) (exemplifying how many land trusts use similar language in their mission statements and on their websites).

556. Owley, *supra* note 553, at 1099 ("Instead of taking land by eminent domain, governments can require permit applicants to create conservation easements.").

557. Jessica Owley, *From Citizen Suits to Conservation Easements: The Increasing Private Role in Public Permit Enforcement*, 43 ENVTL. L. REP. 10,486, 10,489–91 (2013).

558. *Id.* at 10,489.

559. *Id.*

560. *Id.* at 10,490–91. This is an unclear area of law. Arguably, the permit issuers should retain oversight of mitigation easements, but there is little positive law, case law, or even agency guidance on this issue. *Id.* at 10,490.

561. *Id.* at 10,491.

562. *See supra* Part II.B.2.

563. Owley, *supra* note 557, at 10,489.

destructive activities.[564] But we don't even have a good idea of what such enforcement would look like.[565] Should violations of conservation easement terms result in revocation of an incidental take permit?[566] While that may seem logical, it is not clear that it would be desirable from a conservation standpoint.

E. SCIENTIFIC INFORMATION MAY BE TOO LIMITED

One of the critical problems with developing mitigation (and siting projects) in the California desert is that, compared to many other areas, there is relatively little understanding of where species may be located and how desert ecosystems function.[567] There are enormous gaps in the survey data for endangered plants and wildlife in the California desert.[568] There is also an urgent need for more controlled scientific studies to develop effective mitigation approaches.[569] In part because it is difficult to anticipate long-term effects of mitigation approaches, it is also important that preservation efforts be accompanied by adaptive management planning.[570] These issues were clearly illustrated by the discovery of far more desert tortoises than anticipated on the Ivanpah solar project site.[571]

F. PROCESS IS NOT TRANSPARENT ENOUGH

Although the process of siting solar facilities is associated with many public hearings and much information is publicly available, the mitigation requirements often fall out of view.

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564. Owley Lippmann, *supra* note 30, at 342 (2004).

565. *Id.* at 336–52.

566. *Id.* at 342–44.

567. *See, e.g.*, ISA RECOMMENDATIONS, *supra* note 25, at 71–73 (describing the need to study fragmentation of wildlife habitats). This is a critique that has been lodged against habitat conservation plans generally. *See, e.g.*, PETER KAREIVA ET AL., USING SCIENCE IN HABITAT CONSERVATION PLANS (1999), *available at* http://www.nceas.ucsb.edu/files/Kareiva%20Using%20science%20in%20habitat%20conservation%20plans.pdf.

568. *Id.* at 93 (discussing the Mojave ground squirrel and the need for "more comprehensive surveys" to ascertain population distributions); Lovich & Ennen, *supra* note 17, at 982 ("[A]lmost no information is available on the effects of solar energy development on wildlife.").

569. ISA FINAL REPORT, *supra* note 19, at 29; *see also* Lovich & Ennen, *supra* note 17, at 989–90.

570. Rissman et al., *supra* note 525, at 172–74.

571. Ken Wells, *Tortoises Manhandled for Solar Splits Environmentalists,* BLOOMBERG (Sept. 20, 2012), http://www.bloomberg.com/news/2012-09-20/tortoises-manhandled-for-solar-splits-environmentalists.html.

NEPA and CEQA allow the public to give input on the environmental impacts and draft mitigation for proposed projects.[572] However, there is no clear legal mechanism for public input on mitigation land siting and management plans. As shown in Table 3, most under-construction desert projects have been allowed twelve to eighteen months after construction begins to submit mitigation land acquisition plans to the REAT Agencies.[573] This means that the mitigation information available for public review often lacked specifics, including key elements like location of mitigation lands and detailed rules regarding the lands. The public may not even know who will hold the conservation easements or manage the mitigation bank. This hampers the public's ability to comment on the specifics of mitigation.

Not only is the public unable to critique mitigation and management plans during the environmental review process, but construction may be well underway before plans are even submitted to the agencies. The Energy Commission has posted the Genesis mitigation land acquisition plan on its website,[574] but the agency was not required to formally respond to any public concerns regarding the mitigation plan.[575] The mitigation plan for Ivanpah was not finalized until April 2013, two and half years after the project was approved and construction began.[576] The process of assembling mitigation parcels and determining management strategies was done within the California Department of Fish and Wildlife and approved by the Energy Commission.[577]

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572. EXEC. OFFICE OF THE PRESIDENT & CAL. GOVERNOR'S OFFICE OF PLANNING & RESEARCH, NEPA AND CEQA: INTEGRATING STATE & FEDERAL ENVIRONMENTAL REVIEWS, DRAFT FOR PUBLIC REVIEW AND COMMENT 23 (2013), *available at* http://energy.gov/sites/prod/files/NEPA_CEQA_Draft_Handbook_March_2013_0.pdf.

573. *Supra* Table 3.

574. *See Genesis Solar Energy Project*, CAL. ENERGY COMMISSION, http://www.energy.ca.gov/sitingcases/genesis_solar/index.html (last visited Nov. 11, 2013).

575. *Id.*

576. Press Release, Cal. Dep't of Fish & Wildlife, California Department of Fish and Wildlife and Energy Commission Complete Landmark Land Mitigation Deal for Ivanpah Solar Project (Apr. 18, 2013), *available at* http://www.energy.ca.gov/releases/2013_releases/2013-04-18_Ivanpah_Solar.pdf.

577. DESERT RENEWABLE ENERGY CONSERVATION PLAN, PROPOSED PROCESS, SCHEDULE, AND KEY DECISION POINTS FOR THE DRECP NCCP/HCP AND EIR/EIS (2011), *available at* http://www.drecp.org/meetings/2010-09-

Use of conservation easement templates or draft management plans may help the problem, but there is no agency guidance regarding the form of conservation easements or management plans. Different agencies and even different field offices within one agency may take different approaches. For example, individual U.S. Fish and Wildlife Service field offices negotiate habitat conservation plans on a case-by-case basis.[578] The Service does not have any standard terms it includes nor does the HCP Handbook provide a sample conservation easement.[579] Additionally, there is no requirement that the field offices be involved in the drafting of the conservation easements covered by an HCP.[580] An HCP could merely require conservation easements without dictating their form. Alternatively, the HCP could provide information on the form exacted conservation easements should take, but this would not necessarily mean that the Service played a role in structuring the resulting agreement. Because the Fish and Wildlife Service does not hold these exacted conservation easements, it seems likely that the terms could be negotiated by the exacted conservation easement holders and the permit applicant. This paragraph is peppered with phrases like "could," "may," and "often" precisely because there are no overarching principles or practices at work here.

Once the mitigation plans are in place, there are further problems with oversight and obtaining information. The lack of information regarding conservation easements and other mitigation projects is pervasive.[581] It is hard to track down these documents, and recording rules vary by state, county, and public agency involved. Again, there is a lack of consistency. The BLM does not have a policy for monitoring and enforcement, so each field office develops its own practices and procedures. For example, the Inspector General's Office

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08_meeting/DRECP_Proposed_Process_Schedule_and_Key_Decision_Points.pdf.

578. *See, e.g.*, HCP HANDBOOK, *supra* note 149, at 1-8 (providing that low-effect HCP permits are evaluated on a case-by-case basis).

579. *See generally id.*

580. *See generally id.*

581. Amy Wilson Morris & Adena Rissman, *Public Access to Information on Private Land Conservation: Tracking Conservation Easements*, 2009 WIS. L. REV. 1237, 1239 (2009) ("The 'privateness' of conservation easements has hidden them from public scrutiny and proved to be a major barrier to aggregating conservation easements data and making it available to the public.").

found "considerable inconsistency" in the level of fees charged by the different offices.[582] The varying level of fees should reflect a varying level of compliance and monitoring that the office feels is necessary.[583] In some cases, it appears that the BLM did not collect fees at all.[584]

Overall, mitigation remains relatively hidden from view. During the environmental review process, the mitigation plans frequently lack important details and (as witnessed with Ivanpah project) mitigation plans can change significantly after construction has commenced. The general difficulty of tracking and understanding exacted conservation easements during their perpetual lifespan only compounds this problem.

IV. CONCLUSION

Solar projects are already causing large-scale changes in the California desert. There is inevitable conflict between the land-intensive solar power plants and protection of endangered species habitat. Although ARRA funding has dried up and some projects have ended up not being viable, there is still a push for desert solar development as evidenced by the Obama Administration's 2013 Climate Action Plan.[585] Large-scale solar is likely necessary to meet RPS goals and substantially reduce greenhouse gas emissions. While the desert provides attractive solar resources, gaps in scientific data, known conflicts with endangered species, and the slow speed of desert recovery from disturbance, mean that siting and mitigating for desert solar projects must be done carefully. Ideally, projects should be located on previously-disturbed and degraded sites.[586] Moving toward the use of more small-scale projects may help developers use sites with fewer resource conflicts.[587] The Arizona BLM has already made a major effort to identify disturbed public lands for renewable energy development,[588] and the EPA has a "RE-Powering America's Land" program,

582. IG REPORT, *supra* note 283, at 16.

583. *Id.*

584. *Id.*

585. EXEC. OFFICE OF THE PRESIDENT, *supra* note 281, at 7.

586. Uma Outka, *Siting Renewable Energy: Land Use and Regulatory Context*, 37 ECOLOGY L.Q. 1041, 1075 (2010).

587. Amy Morris, Jessica Owley & Emily Capello, *Green Siting for Green Energy*, 4 J. ENERGY & ENVTL. L. (forthcoming 2014).

588. BUREAU OF LAND MGMT., RECORD OF DECISION AND RMP AMENDMENTS (2013), *available at* http://www.blm.gov/az/st/en/prog/energy/arra_solar.html.

which identifies brownfields, closed landfills, and abandoned mining sites for potential renewable energy facilities.[589] These programs should be used and expanded. At the very least, projects should be sited outside areas that support the most unique habitats and rare species.

Large-scale planning efforts such as the Solar PEIS and the DRECP are also a potential part of the solution. Because of the scale of potential landscape changes, a regional, multi-agency approach is critical for adequately assessing potential cumulative impacts and implementing effective mitigation. The Solar PEIS and the DRECP are both major efforts at large-scale planning for appropriate siting of renewable energy and coordinated development[590] of mitigation strategies. The DRECP would specifically address mitigation of impacts to endangered species under the state and federal ESAs. While the DRECP's scientific advisory group and environmental groups have expressed concern about many aspects of the draft elements of the DRECP, there is more concern that piecemeal siting approvals and mitigation approaches at the county level may not be adequate.[591]

One of the main issues is that siting decisions and mitigation planning are using incomplete information. While this may be somewhat unavoidable,[592] it is important that we revisit and reevaluate mitigation plans as we gain information. It's also critical that we dedicate more public resources to the types of scientific studies that would help better assess the potential impacts of renewable energy projects in the desert and that agencies require adequate surveys for sensitive species before determining whether to approve a project.

The independent scientific advisors for the DRECP have stated that the "DRECP should be treated as a huge environmental experiment that should be developed and implemented incrementally in an adaptive management

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589. *RE-Powering America's Land*, U.S. ENVTL. PROTECTION AGENCY, http://www.epa.gov/oswercpa/ (last visited May 30, 2013); RENEWABLE POWER STAFF REPORT, *supra* note 53, at 225.

590. *See* Alejandro E. Camacho & Robert L. Glicksman, *Functional Government in 3-D*, 51 HARV. J. ON LEGIS. *38–42 (forthcoming 2014), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2242059 (describing coordinating agency authority, including some of its benefits and challenges).

591. Letter From Kim Delfino, *supra* note 340, at 2.

592. Leshy, *supra* note 4, at 127 ("[U]ncertainty cannot be an excuse for inaction on the adaptation front, for there is simply no time to waste.").

framework—with continuous monitoring and scientific evaluation to reduce uncertainties and improve plan actions over time."[593] In developing energy facilities on sensitive lands, more work needs to be done to evaluate the long-term effectiveness of mitigation undertaken for desert solar projects. We need to develop comprehensive standards for what constitutes adequate off-site preservation as mitigation, including criteria for habitat quality and specifications for funding and capacity for long-term stewardship of exacted conservation easements. We also need to acknowledge that using preservation as a mitigation strategy still results in lost habitat. Acknowledging the realities of the situation can lead to more informed decision-making. Finally, more public discussion needs to happen about how much desert, and how much endangered species habitat, can be lost before it is too much. As one advocate argued, "Climate change is real, and we have to transition to renewable energy. But let's do it without driving species to extinction."[594]

593. ISA RECOMMENDATIONS, *supra* note 25, at 85.

594. Dana Hull, *Huge Solar Power Plants are Blooming in California's Southern Deserts*, INSIDE BAY AREA (Oct. 26, 2011), http://www.insidebayarea.com/business/ci_19200153 (quoting Ilene Anderson of the Center for Biological Diversity) (internal quotation marks omitted).