1.0 INTRODUCTION, PURPOSE, AND PLANNING PROCESS

1.1 Purpose of the DRECP Planning Effort

This section briefly explains the purpose and objectives of the DRECP planning effort for each federal and state agency that has responsibility for carrying out or approving some aspect of the DRECP. This section also includes each agency's roles and responsibilities, and the discretionary approvals and/or decisions it will make.

1.1.1 Bureau of Land Management

1.1.1.1 BLM Purpose and Need

In accordance with the Federal Land Policy Management Act (FLPMA) (Section 103(c)), public lands are to be managed for multiple use, taking into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant rights-of-way on public lands for systems of generation, transmission, and distribution of electric energy (Section 501(a)(4)). In addition, SO 3285A1, amended February 22, 2010, established a policy encouraging the production, development, and delivery of renewable energy as one of Department of Interior's (DOI) highest priorities. In furtherance of this policy, agencies and bureaus within the DOI have worked collaboratively with each other and with other federal agencies, departments, Tribes, states, local communities, and private landowners to encourage the timely and responsible development of renewable energy and associated transmission while protecting and enhancing the nation's water, wildlife, cultural, and other natural resources (BLM 2010).

The DRECP is intended to provide the BLM a framework to respond to the increasing demand for renewable energy development and transmission as described in the Energy Act of 2005 and SO 3285A1. Additionally, it is the BLM's objective to respond to renewable energy applications on public lands in a more efficient and effective manner and to ensure a consistent application of measures to mitigate the adverse impacts of renewable energy development. The Energy Act's goal of 10,000 MW of renewable energy is a secondary, public interest consideration in the context of BLM's administration of public lands in compliance with FLPMA, BLM right-of-way regulations, and other applicable federal laws and policies.

The BLM will also use the DRECP to:

- conserve biological, physical, cultural, social, and scenic values;
- respond to federal renewable energy goals and policies and consider state renewable energy targets; and
- comply with FLPMA's multiple use[1] and sustained yield, and other management mandates.

In this context, the BLM will also "preserve the unique and irreplaceable resources, including archaeological values, and conserve the use of the economic resources" of the California Desert Conservation Area (CDCA) (FLPMA Sec. 601(a)(6)) and conserve, protect, and restore nationally significant landscapes, including those managed for conservation purposes within the CDCA, as components of the National Landscape Conservation System (NLCS) as required under the Omnibus Public Land Management Act of 2009 (Public Law [PL] 111-11).

1.1.1.1 BLM Roles and Responsibilities

The BLM is an agency of the DOI authorized by Congress to manage and regulate multiple-use activities on federal public lands under FLPMA of 1976, as amended. The BLM manages public land through its land use planning process and in a manner meant to protect various resource values while providing for human occupancy and use (under the mandates of multiple use and sustained yield). In addition to land use planning authorities, the BLM regulates public land use and occupancy through promulgated rules and regulations. Project permitting of utility-scale renewable energy facilities on federal public land is a function of the BLM. The BLM has exclusive authority to permit the use of BLM-administered federal lands under FLPMA authority.

[1] The term "multiple use" means the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and non-renewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output (FLPMA Sec. 103(c)).

1.1.1.1.1 DRECP Development

The BLM has entered into several MOUs related to the development of the DRECP, including the establishment of the Renewable Energy Action Team (REAT), establishment of the Renewable Energy Permit Team (REPT), participation with other agencies, and implementation of California renewable energy goals. During the planning process for the DRECP, BLM has used the findings of the Solar Programmatic EIS and other relevant BLM studies and analyses to help inform the development of the DRECP.

1.1.1.1.2 Federal Endangered Species Act

A federal action agency is a federal agency that authorizes, funds, or carries out actions that may require consultation with the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 of the Federal Endangered Species Act (ESA) (50 CFR Part 402). The BLM will make a decision with regard to amending its land use plans within the DRECP Plan Area. That decision will be a federal action subject to Section 7 consultation under the ESA. BLM will use the DRECP as a basis for consultation with the USFWS. In addition, under Section 7(a)(1), all federal agencies shall, in consultation with and with the assistance of the Secretary of DOI, utilize their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of listed endangered and threatened species.

Under Section 7(a)(2) of the ESA, a federal action agency is required to ensure, in consultation with the USFWS, that any action it authorizes, funds or carries out is not likely to jeopardize the continued existence of any federally listed species or result in the destruction or adverse modification of critical habitat. If a federal action agency determines that an action may affect listed species or designated critical habitat, formal consultation is required (50 CFR 402.14(a)). Although not required by regulation (50 CFR 402.12(b)), BLM has determined it will develop a Biological Assessment for the purpose of evaluating the potential effects of its actions within the Plan Area on species which are listed or proposed to be listed as threatened or endangered under the ESA, and on critical habitat that has been designated or proposed for designation. If an action is likely to adversely affect listed species or critical habitat, consultation under Section 7(a)(2) would result in a Biological Opinion and/or Conference Opinion issued by the USFWS to the federal action agency. The Biological Opinion would indicate whether the USFWS believes the action would jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat (50 CFR 402.14(g)(4)). In addition, the Biological Opinion would provide a statement of incidental take if such take may occur (50 CFR 402.14(i)).

1.1.1.1.3 BLM Land Use Plan Amendments

The BLM is the co-lead federal agency with the USFWS for the NEPA component of the DRECP. BLM regulations under 43 CFR 1610.5-5 require that LUPAs be conducted when, among other reasons, the BLM is considering implementation of new or revised policy that changes land use plan decisions. Plan amendments change one or more of the terms, conditions, or decisions of an approved land use plan. The BLM regulations in 43 CFR 1600 and the NEPA process detailed in the CEQ regulations in 40 CFR 1500 guide preparation of LUPAs.

1.1.1.2 BLM Discretionary Approvals/Decisions to be Made

In order to effectuate the DRECP, the BLM would amend the CDCA Plan, Eastern San Diego, Bakersfield and Bishop Resource Management Plans (RMPs). These amendments will identify 1) desired outcomes expressed as specific goals and objectives and 2) allowable uses and management actions designed to achieve those specific goals and objectives.

1.1.2 U.S. Fish and Wildlife Service

1.1.2.1 USFWS Purpose and Need

The USFWS is considering the issuance of Section 10(a)(1)(B) permits for the incidental take of covered species on non-federal lands within the DRECP Permit Area. The proposed take would be incidental to otherwise lawful activities that are necessary to develop renewable energy resources on non-federal lands within the DRECP Permit Area.

The USFWS's objective and the purpose under the ESA is to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved and to provide a program for the conservation of such species for the continued benefit of the American people. The USFWS's objective is also to support DOI's national policy goals (SO 3285 and SO 3285A1) of identifying and prioritizing specific locations best suited for large-scale production of solar energy on public lands; encouraging the production, development, and delivery of renewable energy as one of DOI's highest priorities; and working collaboratively with others to encourage the timely and responsible development of renewable energy and associated transmission while protecting the nation's water, wildlife, and other natural resources.

The USFWS's action responds to permit requests by determining whether or not to issue permits for covered species related to activities that have the potential to result in incidental take, pursuant to Section 10(a)(1)(B) of the ESA and its implementing regulations and policies. In making permit decisions, the USFWS determines whether the applicant has met the permit issuance criteria and needs to ensure that permit issuance is

not likely to jeopardize the continued existence of listed species or destroy or adversely affect designated critical habitat. The USFWS's permit decisions would be based on approval of the HCP component of the DRECP, which will provide a programmatic framework for a streamlined permitting process and which would result in greater conservation values than a project-by-project, species-by-species process.

1.1.2.2 USFWS Roles and Responsibilities

The USFWS is an agency of the DOI authorized by Congress to administer and enforce the ESA of 1973, as amended (16 USC 1531 et seq.), with respect to terrestrial wildlife, non-anadromous fish species, insects, and plants, and to enter into agreements with states, local governments, and other entities to conserve threatened, endangered, and other species of concern, to authorize incidental take under the ESA, and to provide regulatory assurances in accordance with 50 CFR Section 17.22(b)(5) and Section 17.32(b)(5).

The USFWS has two roles in the DRECP planning effort: as a REAT member working collaboratively with agencies and stakeholders to develop the overall, interagency DRECP on both federal and non-federal lands, and as a regulatory agency responsible for authorizing incidental take of ESA-listed species that would be affected by proposed renewable energy projects. The USFWS is also responsible for consulting under Section 7(a)(2) of the ESA at the request of other federal action agencies, such as BLM, if such agency's action may affect listed species or designated critical habitat.

In the first role, the USFWS's participation in the overall development of the DRECP is to contribute to designing a renewable energy program and conservation strategy for all public trust resources, including natural communities, wildlife, and special status and sensitive species, consistent with the conservation objectives under ESA, NEPA, Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), and other applicable Federal laws, regulations, and mandates under the USFWS's purview. This overall participation includes working with interested parties to determine an environmentally sustainable proportion of the State's renewable energy portfolio to be met in the California deserts that provides for timely and responsible development of renewable energy and associated transmission while protecting the nation's water, wildlife, and other natural resources through avoiding, minimizing, and fully mitigating adverse effects to public trust fish and wildlife resources.

The USFWS's overall role in the DRECP planning effort is to determine whether proposed development is consistent with Sections 7(a)(1) and 7(a)(2) of the ESA on federal lands, including formal consultations that result in biological opinions; and whether to issue incidental take permits under Section 10(a)(1)(B) of the ESA for covered species that

1.2 Planning Process

1.2.1 BLM Land Use Planning Process

The BLM is an agency of the DOI authorized by Congress to manage and regulate multiple-use activities on federal public lands under FLPMA of 1976, as amended. The BLM manages public land through its land use planning process and in a manner meant to protect various resource values while providing for human occupancy and use (under the mandates of multiple use and sustained yield). In addition to land use planning authorities, the BLM regulates public land use and occupancy through promulgated rules and regulations. Project permitting of utility-scale renewable energy facilities on federal public land is a function of the BLM. The BLM has exclusive authority to permit the use of BLM-administered federal lands under FLPMA authority.

Decisions in land use plans guide future land management actions and subsequent site-specific implementation decisions. These land use plan (LUP) decisions establish goals and objectives for resource management (desired outcomes) and the measures needed to achieve these goals and objectives (management actions and allowable uses). Section 202(c) of FLPMA (43 U.S.C. 1712) requires that in developing land use plans, the BLM:

1. Use and observe the principles of multiple use and sustained yield;
2. use a systematic interdisciplinary approach to integrate physical, biological, economic, and other sciences;
3. give priority to designating and protecting areas of critical environmental concern (ACECs);
4. rely, to the extent available, on an inventory of public lands, their resources, and other values;
5. consider present and potential uses of public lands;
6. consider the relative scarcity of the values involved and the availability of alternative means and sites for realizing those values;
7. weigh long-term benefits to the public against short-term benefits;
8. provide for compliance with applicable Tribal, Federal, and state pollution control laws, standards, and implementation plans; and
9. to the extent consistent with the laws governing the administration of public lands, coordinate the land use inventory, planning, and management activities of public lands with land use planning and management programs of other Federal departments/agencies and state/local governments, as well as the policies of approved Tribal and state land resource management programs.

Land use plan revisions are prepared using the same procedures and documentation as for new plans. BLM regulations under 43 CFR 1610.5-5 require that LUPs be amended when, among other reasons, the BLM is considering implementation of new or revised policy that changes land use plan decisions. Plan amendments change one or more of the terms, conditions, or decisions of an approved land use plan. In order to respond to the overall DRECP effort, the BLM would amend the CDCA Plan, Eastern San Diego County, Caliente/Bakersfield and Bishop RMPs as well as identify 1) desired outcomes expressed as specific goals and objectives and 2) allowable uses and management actions designed to achieve those specific goals and objectives. Specifically, the BLM intends to identify:

- areas that are suitable and available for utility-scale solar, wind, and geothermal energy development and transmission;
- areas that are not suitable and are unavailable for this type of use;
- areas and actions that may be used as mitigation for this type of use;
- stipulations and mitigation measures that may be required to reduce or avoid impacts associated with renewable energy development or other large-scale rights-of-way where public lands are available for this use;
- lands within the CDCA to be managed as components of the NLCS under the Omnibus Public Lands Management Act; and
- changes or additions to land use allocations such as (but not limited to) multiple use classes in the CDCA, visual resource management classes, special recreation management areas, wildlife and plant management areas, and areas of critical environmental concern.

In taking these actions, the goal of the BLM is to:

- conserve biological, physical, cultural, social, and scenic values;
- respond to federal renewable energy goals and policies and consider state renewable energy targets; and
- comply with FLPMA's multiple use[2] and sustained yield, and other management mandates.

[2] The term "multiple use" means the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and non-renewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and

Additionally, BLM's purpose is to "preserve the unique and irreplaceable resources, including archeological values, and conserve the use of the economic resources" of the CDCA (FLPMA Sec. 601(a)(6)) and conserve, protect, and restore nationally significant landscapes, including those managed for conservation purposes within the CDCA, as components of the National Landscape Conservation System (NLCS) as required under the Omnibus Public Land Management Act of 2009 (Public Law [PL] 111-11).

1.2.2 Conservation Planning Process

The ongoing DRECP conservation planning process has been a collaborative, multi-disciplinary effort involving REAT agency staff, outside experts, stakeholders, and consultants focusing on developing conservation strategies for the DRECP, which includes the HCP, NCCP and BLM Land Use Plan Amendment alternatives. However, there is still a substantial amount of work to be done. All products of the conservation planning process are currently (December 2012) drafts and subject to further review and revision.

The DRECP will include a reserve system designed to provide for the conservation and management of covered natural communities and species. The DRECP reserve design will be based on the DRECP's biological goals and objectives, and the reserve system will be the principal means by which the biological goals and objectives will be achieved. However, other elements of the conservation strategy will also be critical for achieving the BGOs, such as monitoring and adaptive management and avoidance, minimization and mitigation measures for covered renewable energy projects.

As with other HCPs and NCCPs, the DRECP will identify areas to be protected and managed for species and habitat conservation purposes, as required by the ESA and the NCCPA. Because the DRECP includes a BLM LUPA, the DRECP reserve design will also be reflected in the LUPA. The large extent of publicly owned lands in the DRECP plan area mean that the DRECP reserve system will include National Park System lands, State Parks, and other legally and legislatively protected lands (LLPs or existing conservation areas), as well as BLM lands and private lands conserved for mitigation or conservation purposes. The plan-wide biological reserve design context and the alternative-specific reserve designs depicted in the integrated alternatives maps in this document are intended to show how LLPs could combine with BLM LUPA proposals (proposed DCLs) and conservation planning areas (areas toward which DRECP mitigation contributions would be directed) to assemble a plan-wide reserve that would implement the plan-wide BGOs. A key next step is to analyze whether or how

fish, and natural scenic, scientific, and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output (FLPMA Sec. 103(c)).

each alternative-specific reserve design proposal would be effective in assuring implementation of the overall BGOS and plan-wide biological reserve design context.

Elements of the Planning Process

There are numerous individual elements and iterative steps required to develop a comprehensive conservation strategy. The way in which these elements come together in the DRECP conservation planning process is described below. While not a linear process, these major elements of the conservation strategy development process generally occur in this sequence:

1. Establish Preliminary Species and Natural Communities Coverage Lists
2. Gather Baseline Information
3. Identify Biological Goals and Objectives
4. Develop Reserve Design
5. Identify and Refine Conservation Actions
6. Estimate Effects of Covered Activities
7. Conservation Analysis to Confirm that Reserve Design and Conservation Actions Meet Biological Goals and Objectives
8. Develop Adaptive Management and Monitoring Plan

This section describes the conservation planning process; however, the process and all products related to these elements are currently draft and subject to further review and revision.

Establish Preliminary Species and Natural Communities Coverage Lists

These are the species and natural communities that the conservation strategy is focused on protecting. Covered species are "covered" under the DRECP's conservation strategy and are proposed for inclusion on incidental take authorization and will be protected, monitored, and managed under the DRECP. BLM special-status species not included as Covered Species would be addressed on a case-by-case basis when projects are proposed (see Section 3.1.6.3).

In developing the lists of the covered species, several criteria were considered, including the presence of the species in the plan area, the sensitivity of the species to existing threats, the current status (including listing status) and trends of the species, the potential for covered projects to affect the species, the opportunities for meaningful conservation actions to be applied to the species in the plan area, and the state of scientific information about the species. These criteria were organized into a filtering process that was applied to

the initial list of species considered for coverage. Recommendations of Independent Science Advisors and stakeholder input, including the DRECP Covered Species Working Group, were also considered in developing the list, and consideration of the Independent Science Panel recommendations related to the draft Covered Species list is ongoing. The filtering process was organized into four levels. Level one criteria included:

1. Does the species occur in the Plan Area?
2. Would covered activities affect the species?
3. Is there adequate information about the species to develop conservation strategies?

If a species failed to meet any of these criteria it was removed from consideration as a covered species. Species that met all of these criteria were assessed against the level two criteria:

1. Is the viability and recovery of the species dependent on conservation and management in the Plan Area?
2. Can the species be categorized in one of the functional groups identified for planning species by the ISA?
3. Does the species lend itself to monitoring (able to collect data for statistically valid conclusions) and does it demonstrate measureable responses to stressors, management, and restoration, making it a suitable indicator of natural community health?

Species that failed to meet any of these criteria were removed from consideration as a covered species. Species that met any of these criteria were assessed against level three criteria:

1. Is the species currently listed or likely to become listed during the permit term based on current status, threats, and population trends?
2. Will reasonable monitoring efforts be able to convey reliable species status information to ascertain whether the species conservation objectives are achieved?

Species that met these level three criteria are proposed as covered species. Species that failed to meet these criteria may be considered as planning species (i.e., species that are not covered by incidental take permits but may serve an important surrogate role in conservation planning and implementation, including reserve design and monitoring) based on a number of other (level four) criteria, including whether they are a keystone species, have large area or resource requirements, have a strong association with ecological processes or relationships between organisms, or have an association with an under-represented community or ecological feature such that they would serve a valuable surrogate role in conservation planning and implementation.

document. The variance lands in Alternatives 1 and 6, and no action were not assigned megawatts due to the nature of their land designation.

Conservation Analysis

The primary purpose of the conservation analysis is to evaluate the Conservation Area Reserve System and accompanying conservation actions to determine whether they are sufficient to meet the biological goals and objectives for each species, natural community, and landscape element. The conservation analysis is an iterative process that involves the potential for refinements to the reserve design and/or additional conservation actions if the initial evaluation concludes that a particular biological goal and objective is unlikely to be met. Additional conservation actions can also include more stringent criteria to avoid or minimize impacts to species and communities outside of the Conservation Area Reserve System.

Develop Adaptive Management and Monitoring Plan

The adaptive management and monitoring plan is described generally in Section 2. The purpose of the adaptive management and monitoring plan is to develop a process and framework through which to monitor the implementation of the conservation actions of the DRECP and to adaptively manage the species, natural communities, and ecological processes to ensure the plan implementation achieves the biological goals and objectives. The adaptive management and monitoring plan will establish a strong institutional structure with the authority to implement and enforce the conservation actions. It will coordinate the development of a baseline database to provide the foundation against which future conditions can be measured. The adaptive management and monitoring plan also will provide the plan implementation context to support a feedback system that incorporates the results of previous studies into future management and monitoring actions. The Adaptive Management and Monitoring Plan will be developed consistent with the USFWS HCP Handbook Addendum (i.e., 5-Point Policy) guidance on adaptive management and monitoring (USFWS 2000).

DRECP Conservation Strategy

The eight major elements of the DRECP conservation strategy development process described above culminated in the creation of the conservation strategy for each DRECP alternative consisting of a Conservation Area Reserve System, conservation actions, an adaptive management and monitoring program, and a process to mitigate the development and operational effects of covered activities and to contribute to the overall DRECP conservation plan implementation.

The remainder of this section describes the planning process for the conservation strategy in more detail, including:

- The overarching principles used for reserve design;
- The role of Plan-wide Biological Goals and Objectives (BGOs) in directing the reserve design process;
- A review of existing protection;
- A description of the DRECP reserve design process; and
- A description of the renewable energy goals.

1.2.2.1 Conceptual Conservation Planning Principles

The DRECP "Conservation Strategy" for each alternative includes a network of conservation areas (i.e., the Conservation Area Reserve System) throughout the Plan Area and a variety of hierarchically based Conservation Actions, ranging from conserving important landscape features, to conserving, restoring, and managing representative natural communities, to species-specific conservation, management, and mitigation actions. DRECP Conservation Actions are designed to complement and contribute to ongoing conservation activities that are currently being implemented by public and private land management entities throughout the Plan Area, in a manner generally consistent with, and that achieves the goals and requirements of, the Natural Community Conservation Planning Act (NCCPA), the federal Endangered Species Act (ESA), and the 2010 ISA Report (DRECP ISA 2010).

The DRECP agencies used a systematic and objective approach to designing the Plan-wide Biological Reserve Design Context (Margules and Pressey 2000; Carroll et al. 2003; Moilanen et al. 2009) based on the goals and objectives of the DRECP. The Plan-wide Biological Reserve Design Context is the mapped outcome of the reserve design process that was then used to create the Conservation Area Reserve System (i.e., the Alternative-specific network of conservation areas) for each of the draft Alternatives. The detailed methods for this systematic approach are provided in Appendix H and are integrated into the DRECP Conservation Strategy. The Plan-wide Biological Reserve Design Context process applied scientifically accepted tenets of conservation biology in conjunction with the best available biological data for the Plan Area. This method is consistent with the ISA's recommendations to design a comprehensive, connected, and resilient reserve system using "well-established scientific principles," (DRECP ISA 2010). Information on Covered Species (e.g., population biology, genetics, distribution, life history characteristics), and the ecological integrity of their habitats (e.g., distribution, composition, biodiversity, core integrity, ecosystem function, and landscape-scale physiographic processes) was used to

inform the process of developing the Plan-wide Biological Reserve Design Context. These relevant ecological data for the Covered Species are summarized in the species profiles in the Baseline Biology Report (www.drecp.org/documents). Like the covered species list, the Plan-wide Biological Reserve Design Context will continue to be refined in response to revised modeling, and updated scientific information and evaluation.

In order to develop a biologically functional reserve system, the reserve system must reflect multiple ecologically relevant spatial levels and represent natural and semi-natural landscapes to maintain the ecological integrity of large habitat blocks, ecosystem function, and biological diversity. At the local scale, considerations primarily are driven by the particular needs of Covered Species and natural communities. For example, conservation areas must contain the microhabitats and other resources and conditions necessary for local species populations to persist. At a regional scale, conservation areas must include habitat areas large enough to support populations or important population segments and any seasonal movements among habitat areas. At the landscape scale, the reserve system must include all the important functional components of a particular natural community and represent all natural communities found the Plan Area. In addition, the conservation areas within the reserve system must be linked to allow movement of Covered Species, which is important for functions such as genetic exchange and recolonization following local extirpation. Linkages may be archipelagos (or "stepping stones") for highly mobile species such as migratory birds, but ideally Conservation Areas would be physically linked through continuous habitat to allow movement of more sedentary species that are highly sensitive to habitat fragmentation (e.g., most reptiles). Linkages include those among the conservation areas within the Plan Area, as well as to adjacent habitats outside of the Plan Area.

The Plan-wide Biological Reserve Design Context was also developed to be large enough to allow natural disturbance regimes (e.g., flood events, water- and wind-driven sand transport) to occur to promote a heterogeneous mosaic of natural communities (Groom et al. 2006). The DRECP desert ecosystem has developed in large part in response to these regimes, and requires them to sustain this heterogeneity. Finally, the Plan-wide Biological Reserve Design Context was developed to contain extensions of habitats along environmental gradients (such as ecoregions, slope, elevation, topography, hydrology) to provide opportunities for species and natural communities to respond to the ecological and environmental changes associated with climate change or other changed circumstances.

With these concepts in mind, the DRECP used the following criteria to develop the Plan-wide Biological Reserve Design Context. The same principles, along with the biological goals and objectives (BGOs) for the Plan, will be used to guide the assembly of the Conservation Area Reserve System during plan implementation. These criteria are based on established scientific principles of conservation biology (Soule and Wilcox 1980; Soule

1986; Noss et al. 1997; Margules and Pressey 2000; Groom et al. 2006), and are integrated with the principles and goals of the NCCPA, ESA, and the recommendations of ISA.

Maximize Conservation Area Size. The Conservation Areas will be sufficiently large to offset impacts of Covered Activities and support self-sustaining populations of Covered Species that will contribute to their recovery in the Plan Area. Large Conservation Areas are important for three main reasons:

- To protect and maintain habitat areas large enough to support self-sustaining populations either within a particular Conservation Area (e.g., an endemic species) or important population segments of Covered Species that contribute to their population-wide self-sustainability;
- To maximize protection and provide a buffer for species sensitive to disturbances from adjacent land use; and
- To maximize protection of biodiversity.

Large Conservation Areas are more resilient and generally support more species for longer periods than small Conservation Areas. Large Conservation Areas are also generally more efficient to manage on a per-acre basis because they better allow for planning and implementing large-scale management actions, such as exotic species control, and do not impede natural disturbance regimes and events such as wildfire, flooding, and sand transport. Further, because they tend to have larger "interior" area relative to "edge" area, they are less prone to adverse edge effects, resulting in less intensive management requirements.

Maintain Connectivity. In principle, preserving connectivity reduces the detrimental effects of habitat fragmentation on ecosystem function and species demography. The Plan-wide Biological Reserve Design Context will link existing, currently protected Conservation Areas with new Conservation Areas inside and outside of the Plan Area to ensure the habitat connectivity that maintains the ecological integrity of the system. This will maintain and enhance the ability of native species to move among Conservation Areas to facilitate exchange of genetic material, and support species migration, dispersal, and colonization. In theory, a single, large Conservation Area would be better for supporting self-sustaining species populations than several small, linked Conservation Areas of equal total size. In some cases, however, where a larger Conservation Area or direct connectivity among Conservation Areas is not feasible due to existing conditions (e.g., areas already reduced or isolated by irreversible land uses), small or isolated Conservation Areas can effectively protect certain features or populations with high biological importance (e.g., endemic and narrowly distributed populations). However, such small and/or isolated areas often require more intensive management.

Minimize Edge. The Plan-wide Biological Reserve Design Context will be designed to share the minimum amount of edge with non-conserved lands (especially urban development) as feasible. That is, the Plan-wide Reserve Design will have the greatest feasible area-to-perimeter ratio to minimize the direct and indirect adverse effects of adjacent land uses on Covered Species and natural communities. Minimizing the Plan-wide Biological Reserve Design Context edge to the extent feasible will also reduce management costs. Discrete Conservation Areas that approximate round or square configurations have higher area-to-perimeter ratios and less edge than long and narrow areas. Likewise, the straighter the edge boundary of Conservation Area, the less edge the Conservation Area will have. However, Conservation Areas with lower area-to-perimeter ratios may be necessary to protect defined or linear features with high biological value, such as streams, desert washes, or desert riparian woodlands essential to wildlife movement and plant dispersal.

Target High-Quality, Representative Examples of All Natural Communities. The Plan-wide Biological Reserve Design Context will target high-quality examples of all natural communities and habitat for Covered Species in the Plan Area. "High quality" is defined using various parameters and differs according to community type and species habitat needs. High-quality habitats are frequently characterized by an abundance and diversity of native species, intact natural processes, and few roads or other forms of human disturbances. As part of the reserve design, the best examples of each natural community are identified and protected to the extent feasible. High-quality habitat will conserve core populations of Covered Species. Degraded communities may also need protection in some areas to include unique habitats or species populations, to link Conservation Areas, to function as buffers from incompatible land uses, and/or to provide opportunities for enhancement and restoration required by the Plan.

Target Areas with Limited Access. The Plan-wide Biological Reserve Design Context will target habitat blocks with limited human access. Human contact and activity are thought to be major causes of decline in certain special-status species, such as desert tortoise (*Gopherus agassizii*). Populations of such species in habitats where access related to certain human activities (e.g., development, mining, recreation) is restricted are more likely to persist than those in habitats where human activities are less restricted. Roadless areas should be protected where possible and authorized road use in Conservation Areas should be carefully managed.

Buffer Urban and Rural Use Impacts. The Plan-wide Biological Reserve Design Context will include buffer lands within its boundaries where Conservation Areas are adjacent to existing or planned urban and rural areas (i.e., areas zoned for urban development by local jurisdictions). The purpose of buffers is to reduce direct and indirect adverse effects on Covered Species and natural communities from urban and rural development. The size of

an effective buffer will depend on site-specific conditions such as topography, the types and intensity of adjacent urban development and related activities, separation of the natural community from development, the condition of the buffer lands, and whether Covered Species are known or expected to be present. Buffer areas are expected to be located within the Plan-wide Biological Reserve Design Context, rather than within adjacent land uses.

Preserve Irreplaceable and Threatened Biological Resources. Irreplaceability is a measure of the degree to which conservation goals can be met by preservation of multiple sites. A site with high biological irreplaceability has unique species or natural communities that cannot be preserved or restored elsewhere. An example of an irreplaceable biological resource in the Plan Area is an endemic plant species that occurs only in a very limited area. Threatened biological resources are those most at risk from natural or anthropogenic factors. The Plan-wide Biological Reserve Design Context will prioritize protecting biological diversity and natural communities that have a high level of irreplaceability and a high degree of threat.

Fully Represent Environmental Gradients. The Plan-wide Biological Reserve Design Context will include a range of contiguous environmental gradients (e.g., topography, elevation, geologic substrates, slopes, and aspects) to allow for shifting, expanding, or contracting species distributions in response to natural and anthropogenic change (e.g., habitat removal, climate change). Preservation of environmental gradients accommodates species' response to natural catastrophic events such as fire or prolonged drought. Environmental gradients can also maintain the distribution of the species' genetic and ecological diversity.

Consider Watersheds and Ecoregions. The Plan-wide Biological Reserve Design Context will capture a full range of biogeographic conditions across ecoregions and watersheds. This approach can help to maintain ecosystem function, water availability, habitat, and species diversity.

Consider Full Ecological Diversity within Communities. The Plan-wide Biological Reserve Design Context will reflect the full ecological diversity and heterogeneity within natural communities (e.g., species composition, vegetation structure, physical, and climatic factors) in order to maintain sufficient habitat diversity and species and population interactions. This principle is also called "representativeness" and "comprehensiveness."

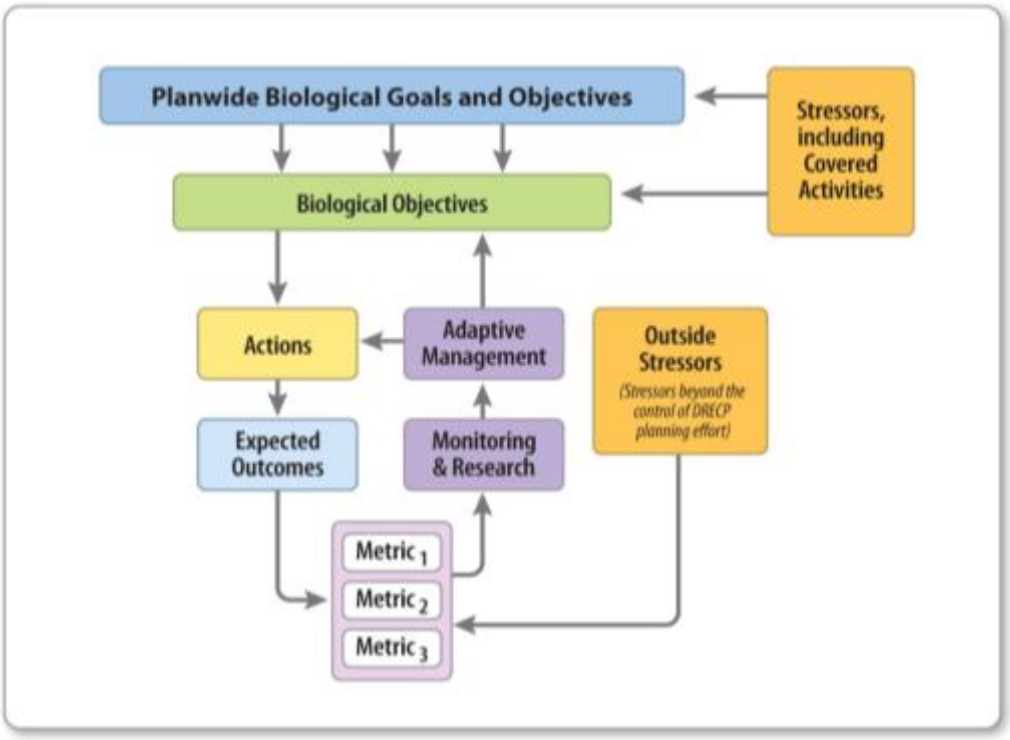
Consider Management Needs. The Plan-wide Biological Reserve Design Context will be manageable. That is, desired management treatments, such as invasive species control, must be feasible within each Conservation Area with identified available funding. In general, larger Conservation Areas are more efficient to manage on a per-acre basis, but

other factors, such as non-biological resource management needs, adjacent land uses, topography, parcel configuration, and access, must also be considered. Management needs may be driven by factors on or off site (e.g., adjacent land uses and watershed processes, such as upstream erosion or ongoing contamination) that are consistent with the Plan's overall management program.

1.2.2.2 Biological Goals and Objectives (BGOs)

This section outlines the process for developing the Plan-wide BGOs and describes how they inform the DRECP Conservation Strategy. Extensive discussions with the DRECP stakeholders regarding the structure of the BGOs led to development of the conceptual model shown in Exhibit 1.3-1. This model articulates how Plan-wide BGOs and other information (e.g., stressors) contribute to the development of specific biological objectives for the DRECP, which relate more directly to the proposed Covered Activities.

Exhibit 1.3-1
Conceptual Model for BGOs Development Context



Adapted from Bay-Delta Conservation Plan Science Advisors Draft Report

The Plan-wide BGOs follow the three-tiered approach based on the concepts of scale: landscape, natural community, and species. After review and input from the stakeholders and REAT agencies, BGOs were refined to provide greater specificity based on key ecological processes and factors critical to species and community conservation. The terms in this conceptual model are defined in the glossary of terms.

In developing the BGOs at the landscape, natural community, and species level, consideration was given to the broad goals established in the DRECP Planning Agreement, which include:

- To provide for the long-term conservation and management of Covered Species within the Plan Area.
- To preserve, restore, and enhance natural communities and ecosystems that support Covered Species within the Plan Area.

Consideration was also given to the biogeographic context of the Plan Area, including the major ecological processes that maintain the desert habitats and associated species, status, trends, limiting factors, and stressors for each landscape, community, and species. This information is documented in the DRECP Baseline Biology Report and Environmental Setting.

Hierarchy in BGO Development

The Plan-wide BGOs have a hierarchical structure that includes the landscape, natural community, and species levels. The structural approach nests the BGOs at the species level within the community and landscape level BGOs to the extent possible. For some Covered Species, the landscape- or natural community-level BGOs provide the objectives for achieving broad goal for these species and additional species-specific goals and objectives are not needed. *To reduce redundancy within the BGO development and documentation, BGOs that apply to multiple Covered Species are stated only once in the overarching species-level BGOs (and not in the species-specific BGOs).* Additional species-specific goals and objectives were developed for those Covered Species that require additional protection and/or management not fully addressed at the landscape or natural community levels. To ensure that the link between landscape- and natural community-level BGOs and Covered Species conservation is explicit, the conservation benefits of all landscape-, natural-community, and species-level BGOs are evaluated in the conservation analysis.

Landscape Level Goals

The primary landscape level goal is to create a DRECP-wide, landscape-scale reserve system consisting of a mosaic of all constituent natural communities that is adaptive to

changing conditions, and includes temperature and precipitation gradients, elevation gradients, and a diversity of geological facets to accommodate range contractions and expansions in response to climate change.

The primary overarching goal for all covered species is protect, manage, and make significant, meaningful, and measurable contributions to recovery of viable self-sustaining populations of covered species throughout the species' natural distribution in the Plan Area, including conserving sufficient habitat and resources to adapt to environmental fluctuations and habitat connectivity to facilitate population movement and genetic exchange among populations.

Natural Community Level Goals

The natural community goals are directed toward promoting biodiversity and ecological function within each community, and to benefit covered or native species dependent on, or closely associated with each community. Specific objectives are established for natural communities at the broad-level (e.g., the general Riparian Communities level) and/or at the mid-level natural community groups (e.g., Southwestern North American riparian/wash scrub group), as appropriate. Elements of the natural community groups (i.e., rare vegetation alliances and locally rare alliance occurrences) will also have conservation actions within the DRECP, which will be included in the DEIR/EIS but are not included in the preliminary analysis.

Species Level Goals

In addition to the landscape and natural community goals and objectives, an overarching goal of the DRECP is to conserve for each species sufficient habitat throughout its natural distribution within the DRECP reserve system to support a viable self-sustaining population in the Plan Area. This overarching species goal is expected to be met in part through the landscape and natural community level goals and objectives. If met, this overarching goal and objective would ensure that the DRECP provides adequate the conservation for each species and contribute to the recovery of each covered species. Frequently, additional species-specific goals and objectives are also needed to address specific stressors, threats, or other unique factors in each species' life history.

1.2.2.3 Existing Conservation and Gap Analysis

As part of the conservation planning process, existing conservation designations were identified in order to determine where existing resource protection and management exist across the Plan Area. Areas outside existing conservation designations were considered

gaps in protection where the DRECP conservation strategy should focus. This analysis was conducted early in the planning process and yielded two primary categories of the Plan-wide Biological Reserve Design Context map: the Legally and Legislatively Protected Areas (LLPs) and the Military Expansion Mitigations Lands (MEMLs). The LLPs and MEMLs are considered existing conservation for the purpose of the DRECP conservation strategy and reserve design. These areas of existing conservation include state and federal Wilderness Areas, National Parks, National Preserves, National Wildlife Refuges, California State Parks, CDFG Conservation Areas (Ecological Reserves and Wildlife Areas), CDFG mitigation and conservation easement areas, privately held conservation areas including mitigation banks and land trust lands, state-chartered conservancy lands, proposed Wilderness and Wilderness Study Areas, and lands conserved as mitigation for the expansion of Department of Defense installations. Although existing protection and/or management exists on lands outside LLPs or MEMLs, the focus of the reserve design was on lands not already legally or legislatively protected.

1.2.2.4 Plan-wide Reserve Design Process

The DRECP Plan-wide Biological Reserve Design Context is a critical element of the planning process because it is the biological reserve design derived from the Plan-wide BGOs. An alternative-specific Conservation Area Reserve System was developed for each alternative based on the Plan-wide Biological Reserve Design Context. The process of developing the Plan-wide Biological Reserve Design Context is described below in 4 primary steps. A more detailed discussion of the Reserve Design methods is provided in Appendix H.

The first step was evaluation of the baseline conservation in the Plan Area provided by existing legally and legislatively protected areas (LLPs) and military mitigation expansion lands (MEMLs), as described above. These lands form the building blocks of existing conservation in the Plan-wide Biological Reserve Design Context.

The second step was application of a systematic conservation planning method (Margules and Pressy 2000; Carroll et al. 2003; Moilanen et al. 2009). In developing the DRECP Plan-wide Biological Reserve Design Context, a reserve selection algorithm called Marxan with Zones (Watts et al. 2009) was used (herein simply referred to as “Marxan”). Marxan evaluates the distribution of all the GIS-based biological data and baseline Conservation Areas and then identifies clusters of habitat where the most efficient reserve design can effectively meet the quantitative conservation acreage targets that are formalized in the DRECP BGOs. The results of the Marxan “scenarios” do not represent the reserve design but provide decision support tools for the iterative reserve design analysis (Ardron et al. 2010).

The third step, iterative reserve design analysis, involved combining additional expert knowledge and area-specific information with the information developed above to develop a draft reserve design. This additional information included expert knowledge of area-specific field conditions not captured by the land cover mapping, finer-grained and site-based ecological information on Covered Species habitat models, knowledge of constraints and limitations due to other land use designations, and inclusion of information from other conservation evaluations such as wildlife corridor modeling. This step was highly iterative and involved extensive review and consideration of the conservation needs of all of the species proposed for coverage by the DRECP. This step was also conducted in accordance with basic principles of reserve design discussed above. This iterative analysis shaped the Plan-wide Biological Reserve Design Context map, which includes a network of conservation areas designed to provide for the long-term conservation of Covered Species, habitats, and natural communities for now and in the future. Proposed Conservation areas (BLM DCLs) and Planned Conservation areas were identified and mapped in this step.

The fourth step was consideration of alternative configurations of Development Focus Areas (DFAs) where the DRECP Covered Activities are expected to primarily occur. This step resulted in the creation of the Conservation Area Reserve System for each alternative, which is the alternative-specific reserve design tailored to the configuration of the proposed DFAs. In this last primary step, the configuration of the reserve design was modified as necessary under each DFA alternative to ensure to the extent feasible that the reserve design still accommodated the conservation needs of the Covered Species and natural communities, as formalized in the DRECP BGOs. This step was also highly iterative and similar to the step-three iterative reserve design analysis.

1.2.3 Federal/BLM Renewable Electricity Goals

A number of Executive and Secretarial Orders (EO and SO), Congressional mandates, and federal agency orders are designed to promote the development of domestic renewable energy resources. The BLM, as the predominant federal land management agency in the desert, is charged with the successful development of solar energy that is consistent with protection of other important resources and values, including units of the National Park System, National Wildlife Refuges, other specially designated areas, and wildlife, cultural, historic, and paleontological values. At the same time, BLM is seeking to facilitate renewable energy development under Secretarial Order 3285A1.

1.2.4 State Renewable Energy Goals and Planning Process

The State of California has a long-term goal of reducing statewide greenhouse gas (GHG) emissions by 80% below 1990 levels by 2050.[3,4] For the state to achieve these goals it is likely that electricity generation will have to shift from carbon intensive fuels sources, and accommodate the electrification of the vehicle fleet, as well as the energy needs of a growing population.[5] Consequently, the renewable resources in the desert are necessary to meet the state's future energy needs.

1.2.4.1 California's Renewable Electricity Goals

California's state-mandated Renewable Portfolio Standard (RPS) requires a minimum percentage of the retail customers' electricity sales to be from a set of defined renewable sources. Introduced in 2002, the RPS was designed to diversify the state's electricity generation resource portfolio and reduce dependence on natural gas.[6] Subsequently, the RPS has become a fundamental component of the state's efforts to reduce greenhouse gas emissions and switch to a low carbon economy.[7]

In its *AB 32 Scoping Plan* report, the ARB (Air Resources Board) identified the 2020 33% RPS target as a foundational policy for meeting the 2020 GHG emission reduction goal, and a necessary precursor to the overall state objective of reducing GHG emission to 80% of 1990 levels by 2050.[8] The Energy Commission echoed this assessment, stating, "(p)reliminary estimates of the amount of renewable energy needed to achieve the 2050 GHG emission reduction goal suggest that California's renewable electricity percentage may need to increase to more than 70%, depending on the pace and policies affecting electrification of the transportation sector, retiring coal generation, and whether existing nuclear plants are relicensed."[9]

1.2.4.2 Overview of the DRECP Renewable Energy Planning Process

To support the state and federal renewable energy goals, the Plan aims to identify desert locations that are compatible with renewable energy development. Thus far the energy

[3] Executive Order S-3-05. Signed June 1, 2005.
[4] Executive Order B-16-12. Signed March 23, 2012.
[5] 2011. *Staff Draft Report on Renewable Power in California: Status and Issues*. California Energy Commission, August 2011, Publication No. CEC-150-2011-002
[6] Senate Bill 1078 (2002 Sher); Senate Bill 107 (2006 Simitian)
[7] Senate Bill X1-2 (Simitian), California Renewable Energy Act. Signed April 12, 2011.
[8] http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm.
[9] 2011. *Staff Draft Report on Renewable Power in California: Status and Issues*. California Energy Commission, August 2011, Publication No. CEC-150-2011-002.

planning process has focused on the identification of Development Focus Areas (DFAs), areas of the plan in which renewable energy development may be compatible with conservation goals. The development of DFAs was an iterative process, with substantial input from the conservation reserve design process; and future state energy goals; and input from renewable energy, conservation, and utility stakeholders.

The following sections summarize the underlying information, assumptions, guiding principles, and the process by which scenarios were developed that identified DFAs and ultimately different Plan alternatives.

Guiding Principles

REAT agencies and stakeholders identified three principles to guide the identification of areas compatible with renewable development.

- To the maximum extent possible, generation should be developed either on already disturbed land or in areas of lower biological value. Identifying areas with low biological value is closely tied to the outcomes of the reserve design process, described in previous sections.
- Generation should, to the maximum extent possible, be aggregated to avoid transmission sprawl, reduce cost, and reduce disturbance across the Plan Area. Again, this principle enables the least disturbance to biologically valuable areas.
- Finally, the Plan should be sufficiently flexible to ensure the Plan does not constrain competition within the market or unnecessarily result in distorted or environmentally incompatible incentives when implemented, i.e., where feasible, the Plan should remain market neutral between different technologies or different project configurations.

Identifying the best locations for renewable energy was an iterative process anchored in assumptions about current and future California energy policy. To plan for future energy development, the following steps were taken:

1. Identify overarching goals for desert generation: Estimate the possible future contribution of desert-located generation to California's energy needs and generation portfolio, based on future policy trend assumptions, using the Renewable Energy Calculator, developed by the CEC. This process is described in Appendix L.
2. Estimate the initial target acreage for DFAs: Estimate the minimum acreage for renewable energy development accounting for differences in technology,

siting, permitting, and mitigation issues encountered when developing projects. This is described in Appendix L.

3. Identify suitable locations for DFAs: Use resource distribution data in combination with agency and stakeholder input to identify and characterize areas suitable for renewable energy development based on the principles laid out above, and accounting for the conservation goals identified during the reserve design process. These data are described in Appendix L.
4. Rely on the assistance of transmission owners and the California Independent System Operator to develop an overarching, conceptual transmission plan that serves the predicted generation capacity and distribution, described in Appendix A.

Taking outputs from the Renewable Energy Calculator, DRECP staff then developed the following planning assumptions to help develop the DRECP Alternatives described in this document.

1. Plan for 20,000 MW of new renewable energy resources for 2040. This amount was adjusted from 21,500 MW (calculated from a compilation of different possible calculator scenarios) to account for 1,500 MW of renewable energy projects approved and under construction since the calculator scenarios were developed.
2. Market factors would drive which technologies will be employed to achieve 20,000 MW of new renewable energy.
3. The 20,000 MW of new renewable energy is distributed to DFAs in each potential alternative on a proportional basis, considering both DFA size and renewable energy resources present in each DFA (solar, wind, geothermal, distributed generation – utility side).
4. Considering land use constraints throughout the planning area, the acres of potential resource in a DFA determine how many MW of each technology can be developed in that particular DFA, using acres per megawatt conversions (see Appendix F). As a result, between 250,000 to 500,000 acres of land would be needed to achieve 20,000 MW of new renewable energy
5. The maximum amount of energy expected from geothermal resources from within the Plan area is 2,800 MW.
6. 2,800 MW of geothermal resources would be developed in all alternatives.

1.2.5 Transmission Planning Goals and Assumptions

In California, multiple groups and entities have engaged in transmission planning, including the Renewable Energy Transmission Initiative (RETI), the California Transmission Planning Group (CTPG), the California Independent System Operator (CAISO), and the utilities themselves. Planning for transmission within and through the DRECP boundary requires building upon those efforts and developing new methods to optimize land use within the Plan Area. Transmission planning for the DRECP aimed to be utility neutral, and assure access and certainty for renewable energy developers and utilities alike.

The previous sections have focused on generation development and the underlying goals assumptions and parameters. The identification of potential transmission system upgrades to serve generation requires a separate set of assumptions in order to identify the location of transmission lines and substations needed to deliver the Plan Area generation to the load centers. The transmission conceptual plan for the DRECP is assumed to serve Plan Area generation growth only and was dependent upon the location and extent of the generation as well as the load center. All transmission planning within California is encouraged to adhere to a set of general principles known as the Garamendi Principles.[1]

The "Garamendi Principles" are:

1. Encourage the use of existing rights-of-way by upgrading existing transmission facilities where technically and economically justifiable;
2. When construction of new transmission lines is required, encourage expansion of existing rights-of-way, when technically and economically feasible;
3. Provide for the creation of new rights-of-way when justified by environmental, technical, or economic reasons, as determined by the appropriate licensing agency;
4. Where there is a need to construct additional transmission, seek agreement among all interested utilities on the efficient use of that capacity.

The transmission plan was based on the same 20,000 to 22,000 MW requirement estimated by CEC's Renewable Portfolio Standard and Acreage Calculator as described in Table 1. The planning process identified the necessary transmission system facility additions to accommodate the 20,000 to 22,000 MWs of renewable generation that could be developed in the 2040 timeframe.

The transmission system upgrades assume that a combination of available and new transmission capacity would be utilized to accommodate generation within the DFAs out to

[1] Senate Bill 2431 (Garamendi, Chapter 1457, Statutes of 1988)

2040. The availability of existing transmission is based on the 2020 pre-renewable cases prepared by the CTPG. The underlying assumption is that in the years leading up to 2040 transmission upgrades for load growth and other grid-related expansion requirements would be implemented so that the available capacity indicated by the 2020 CTPG case would be a reasonable proxy for the availability of existing transmission capacity in 2040.

To establish the transmission impacts of renewable generation within the DFAs and the associated fossil-fired generation displacement in four geographic regions of the Western Electricity Coordinating Council (WECC[10]), CTPG's pre-renewable cases ("0" cases), which were developed in 2011, were reviewed. The CTPG 2020 Spring Case "0" flows were used to help identify the conceptual new delivery lines in Southern California to facilitate delivery of power from the DFAs. The 2020 Fall Case "0" was used to help establish the conceptual new delivery lines between Southern California and Northern California.

The renewable energy estimated to be generated from within the DFAs was assumed to displace less efficient thermal generation with higher variable operating costs throughout the WECC region in the following distributions:

- 25% of displaced thermal generation would be from gas-fired generators in Southern California;
- 25% of displaced thermal generation would be from gas-fired generators in Northern California;
- 25% of displaced thermal generation would be from gas-fired generators in the Pacific Northwest (PNW); and
- 25% of the displaced thermal generation would be from gas-fired generators in the states of the desert Southwest (SW), including Arizona, Nevada, and New Mexico.

For the transmission plan, the Transmission Technical Group (TTG)[11] did not address any transmission that could be built on the Department of Defense lands. Instead, the Department of Defense provided exit point locations at the base boundaries for 1,500 MW and the TTG planned for collector lines to the nearest collector substations. For the purposes of this analysis and at the DOD's request, this 1,500 MW was in addition to the 20,000 to 22,000 MW of renewable generation included in each of the DRECP alternatives.

[10] The four WECC regions are southern California, northern California, the Pacific Northwest and the desert Southwest, except for California.

[11] A group of state and local utility electric transmission planners. The co-chairs of the TTG are staff members from the Energy Commission, CAISO, and CPUC. Utility participants include the Southern California Edison Company (SCE), Imperial Irrigation District (IID), Los Angeles Department of Water and Power (LADWP), Pacific Gas and Electric Company (PG&E), and San Diego Gas and Electric Company (SDG&E).

The TTG identified transmission system facility additions that would accommodate a specified number of megawatts of renewable generation that could be developed in the DFAs by 2040. Each new element of the transmission system (e.g., substation, transmission line) has an assumed capacity (in MW) to accommodate generation, and an associated amount of land that would be impacted by its construction and operation. Standard transmission grid components were assembled to derive a conceptual transmission plan for each alternative. For substations, the acres of permanent land impact are based on the transmission voltages that the substations are designed to serve. Transmission line length and width are based on the distance (length) to substation locations and the width of the right-of-way (ROW) required. Access road length and width are based on the size of the substation, the length of the transmission line, and standard construction methods. Each 230 kV and 500 kV line is assumed to require a permanent access road. The use of helicopters to install transmission lines could reduce the need for access roads but such a site-specific analysis was beyond the scope of the TTG effort.

The basic assumptions used to define impacts of transmission components included consideration of all transmission lines that are likely to be required to interconnect desert renewable projects. This included lines ranging from 34.5 kV to 500 kV, and also substations and access roads. The amount and location of generation is different for each alternative and is described in Appendix F.

Information on the size and mix of generation technologies and how they are distributed in the DFAs enables the calculation of the expected length of gen-ties (collector lines), number and size and location of new collector substations, and likely length of delivery lines to the main transmission grid. For transmission, the technology mix is important when assessing the maximum simultaneous delivery capacity for collector lines from all generators, as this would indicate the maximum size (in MW) of a new line. The maximum simultaneous delivery capacity is defined as the point during the annual load cycle that delivery to load is likely to peak. This is primarily driven by the mix of wind and solar generation. Because solar and wind provide energy at different times of the day, delivery lines were sized to accommodate the expected simultaneous output of the different renewable technologies within each DFA for the time period (month and hour) used to conduct the transmission analysis. To do this, the TTG used its professional judgment to define the percentage of output that would result from the solar, wind, and geothermal generation within each DFA[12] to estimate the maximum simultaneous output. In contrast, collector lines that connect the generators within each DFA to the collector substations are sized to accommodate the maximum possible combined output of all generators within the DFA.

[12] The TTG assumed output at 90% for geothermal facilities, 80% for solar facilities, and between 28 and 52% for wind facilities (based on location).

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