

THE FUTURE OF LARGE-SCALE SOLAR ENERGY IN CALIFORNIA

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BACKGROUND

The development of large-scale solar energy (LSSE) in the California desert is of vital importance to the states's renewable energy goals. LSSE development can help California meet its 33% Renewable Energy Portfolio Standard by 2020 and reduce greenhouse gas emissions from electricity generation. However, LSSE also has large and permanent impacts on sensitive species habitat, water use and land

To provide a deeper understanding of LSSE development in California, this project compares the potential tradeoffs between the renewable energy gained and the resource impacts from the solar industry's expansion within the CDCA.

demand

scenario

incorporates a

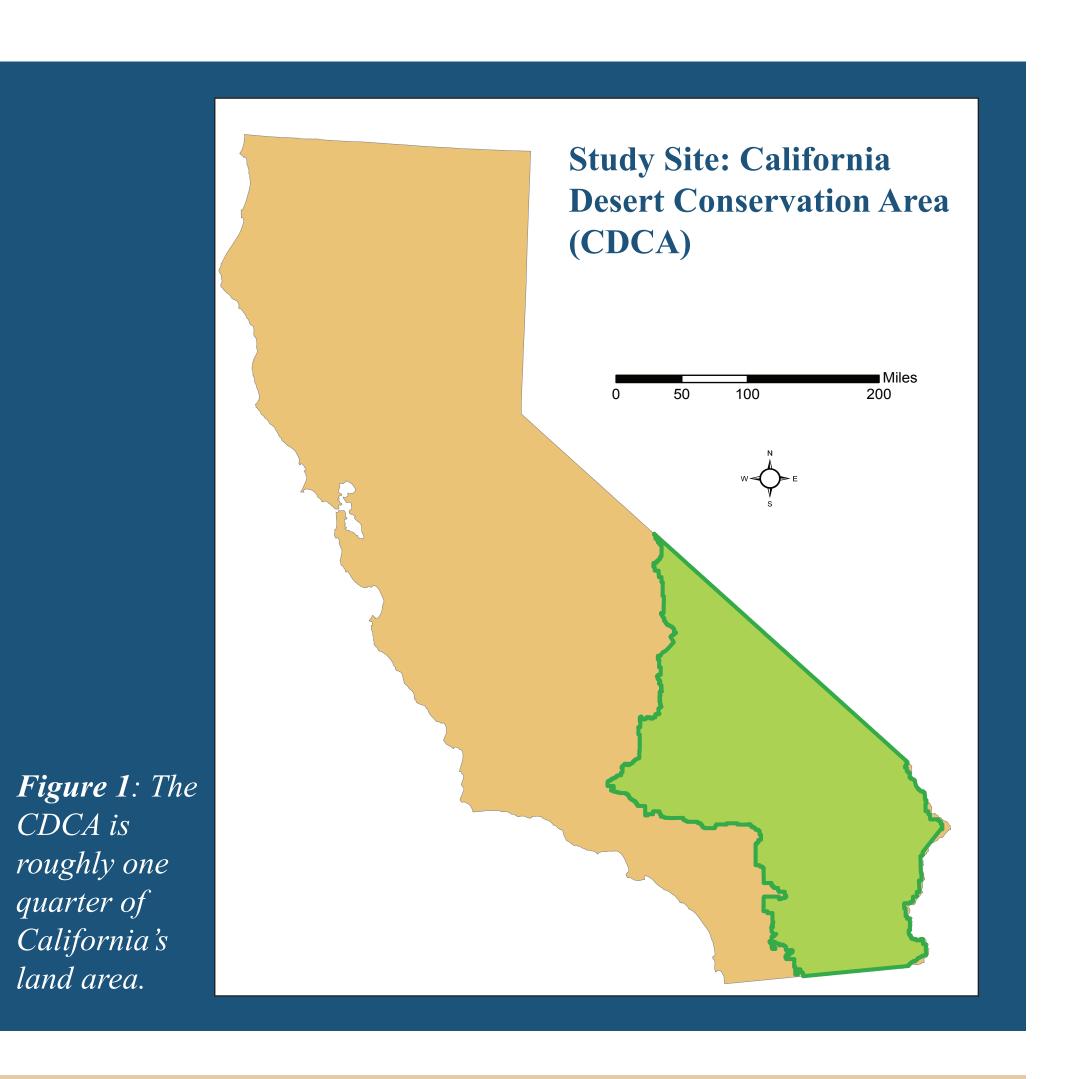
assumptions

trajectory of

development in

results of the

different set of



How much energy will solar contribute in 2020?

SCENARIOS OF LSSE'S CONTRIBUTION TO 2020 ELECTRICITY SUPPLY

→ EXISTING FACILITIES ONLY 0.27% **SCENARIO** –

3.3% SCENARIO **CURRENTLY PERMITTED 2010**

→ BUSINESS AS USUAL

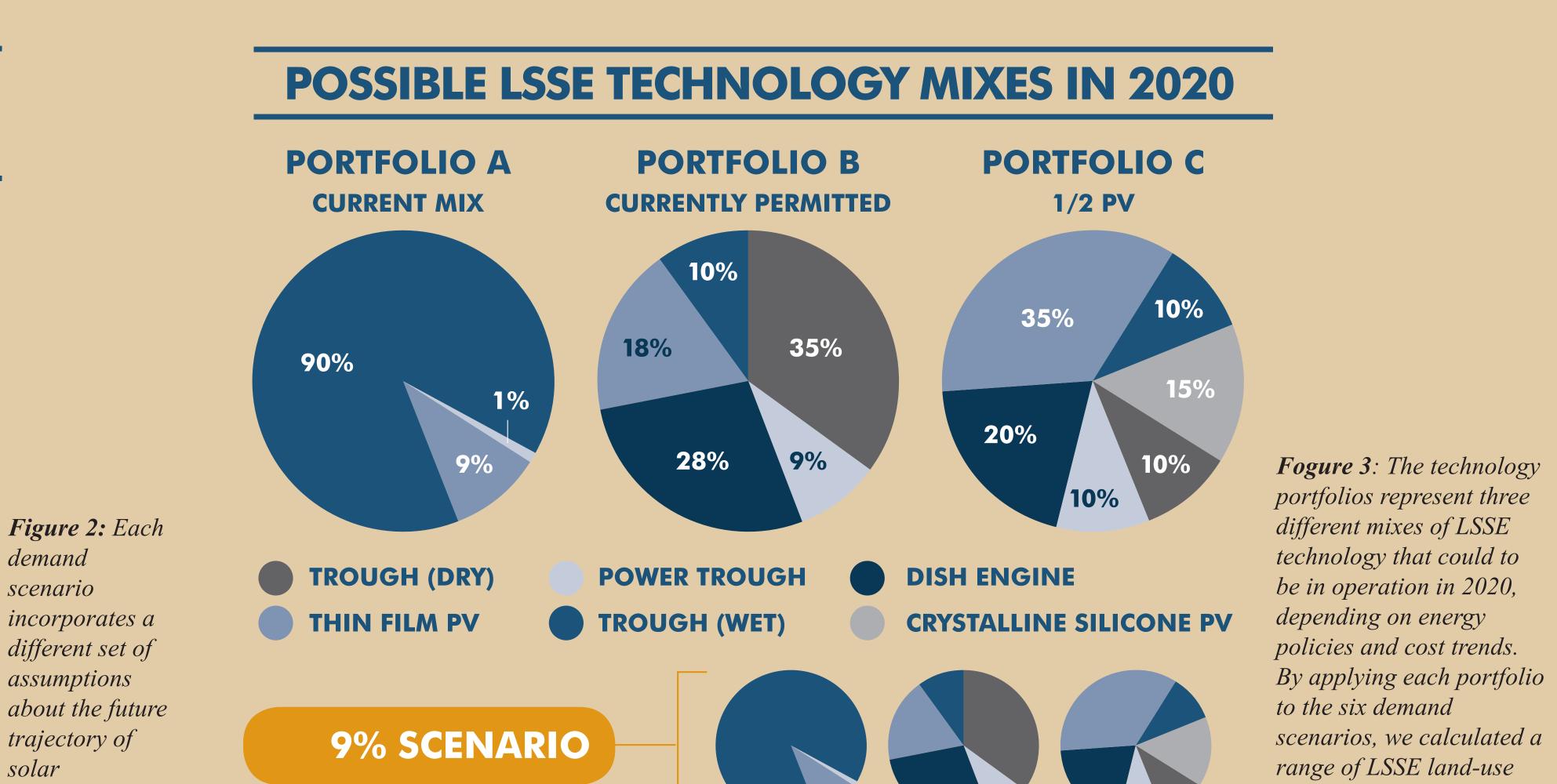
15% SCENARIO MODERATE CHANGES

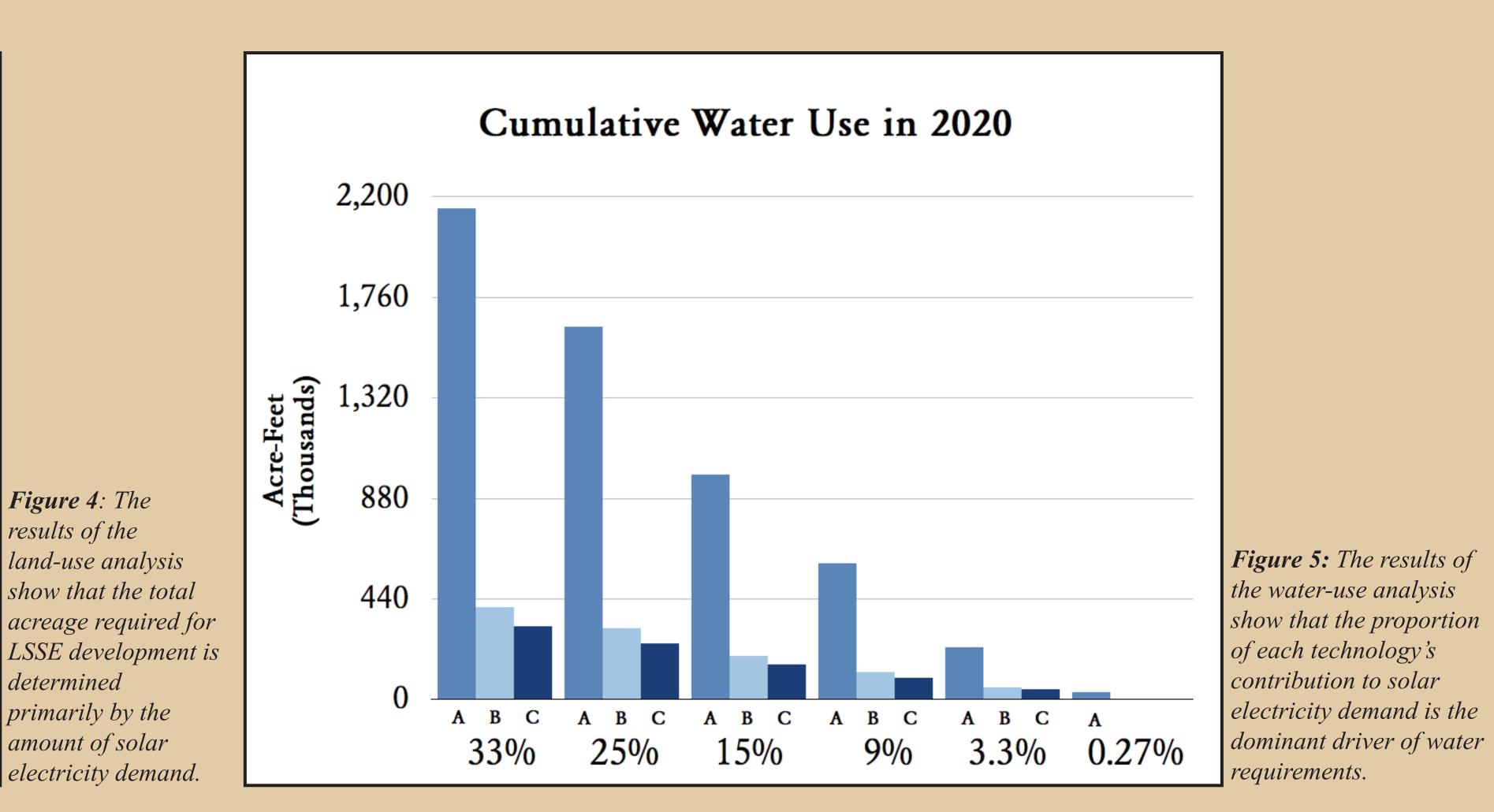
→ SIGNIFICANT CHANGES 25% SCENARIO

33% SCENARIO 100% OF THE RPS

Cumulative Land Use in 2020

What technologies will be used?





If the current trends in energy policy and technology costs continue, then LSSE is likely to contribute between 3.3% and 9% of California's electricity supply in 2020 using a technology mix similar to Portfolio B.

Which areas within the CDCA are most suitable for solar development?

The spatial analysis provides a macro-scale view, rather than a site-level analysis, of potential solar development in the CDCA. By taking into account various physical, environmental and legal constraints, this analysis identifies and quantifies highly-suitable available land for LSSE development in the CDCA. The analysis consists of three steps: (1) eliminating the area that is physically or legally unavailable for LSSE development (Figure 6); (2) ranking the remaining area by its suitability according to essential criteria (Figures 7-9); and (3)combining these criteria using a weighted sum analysis to produce an overall suitability map (Figure 10).

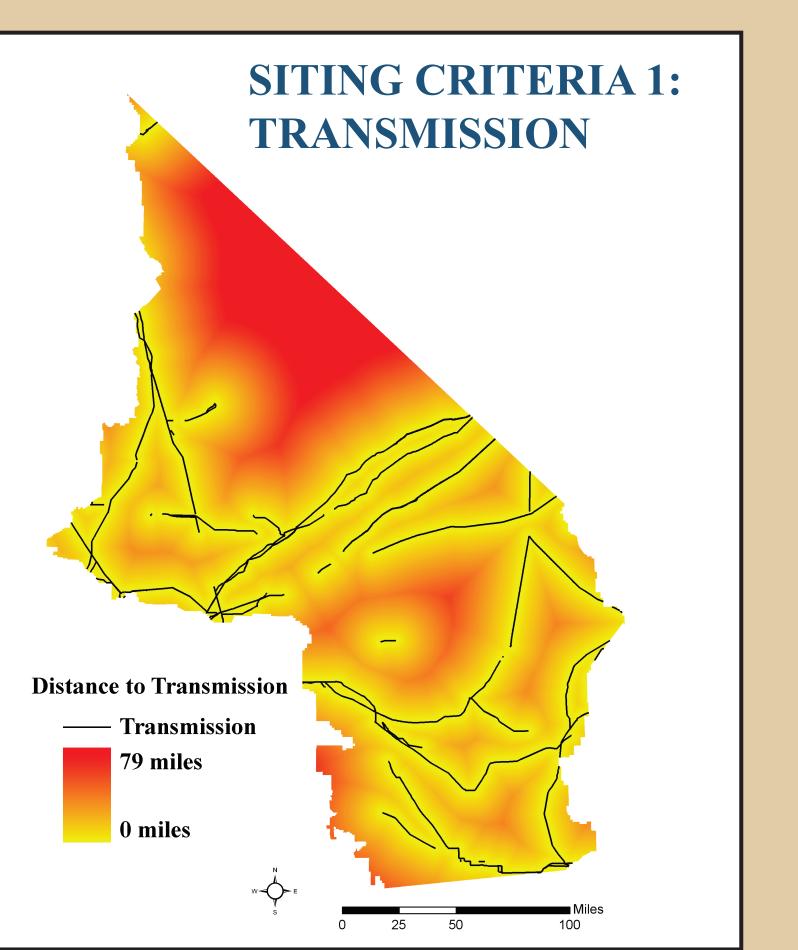
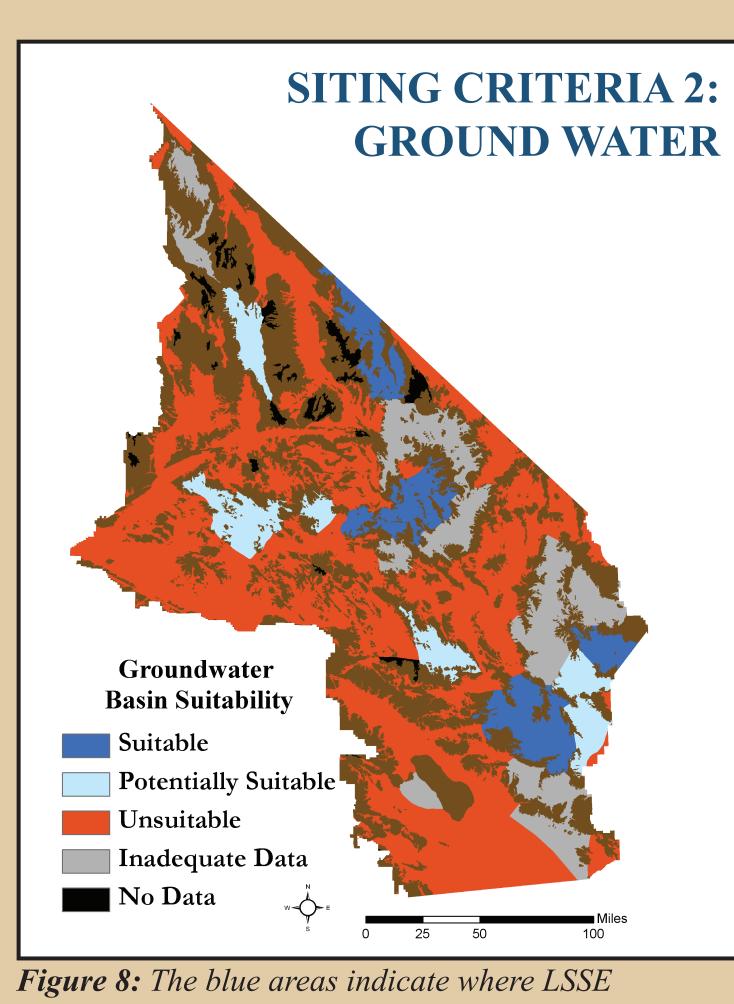


Figure 7: The yellow areas indicate where LSSE development would be closest to existing transmission lines. Proximity to roads is not shown here; however, the spatial patterns are very similar.



development may have less challenges in the permitting process due to groundwater issues.

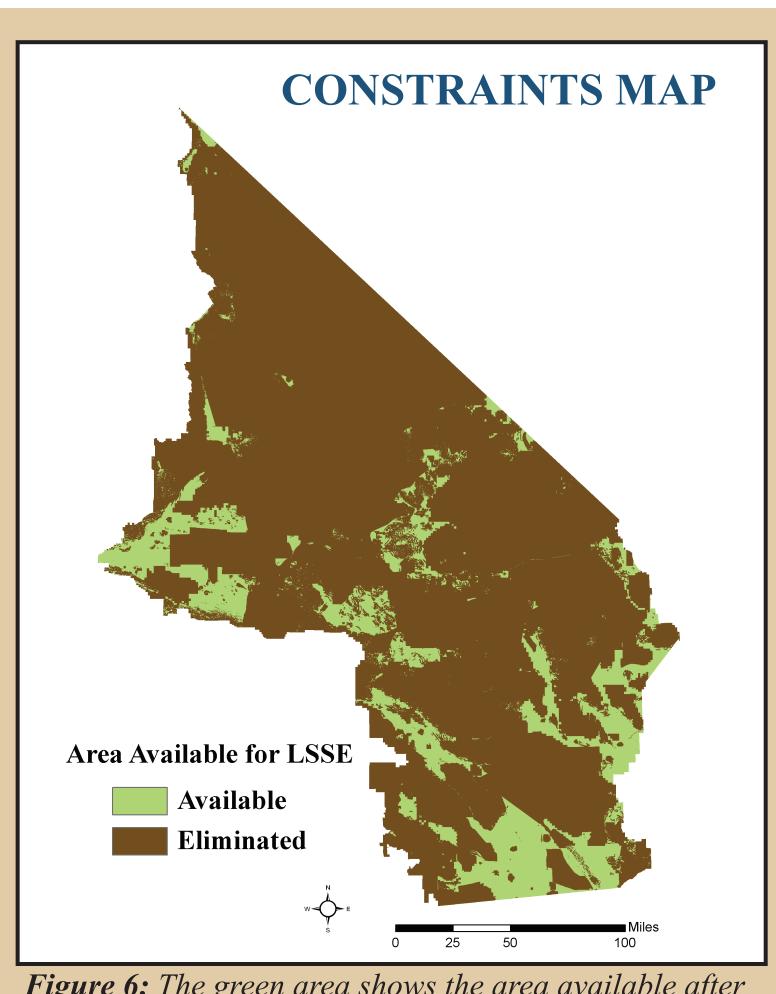
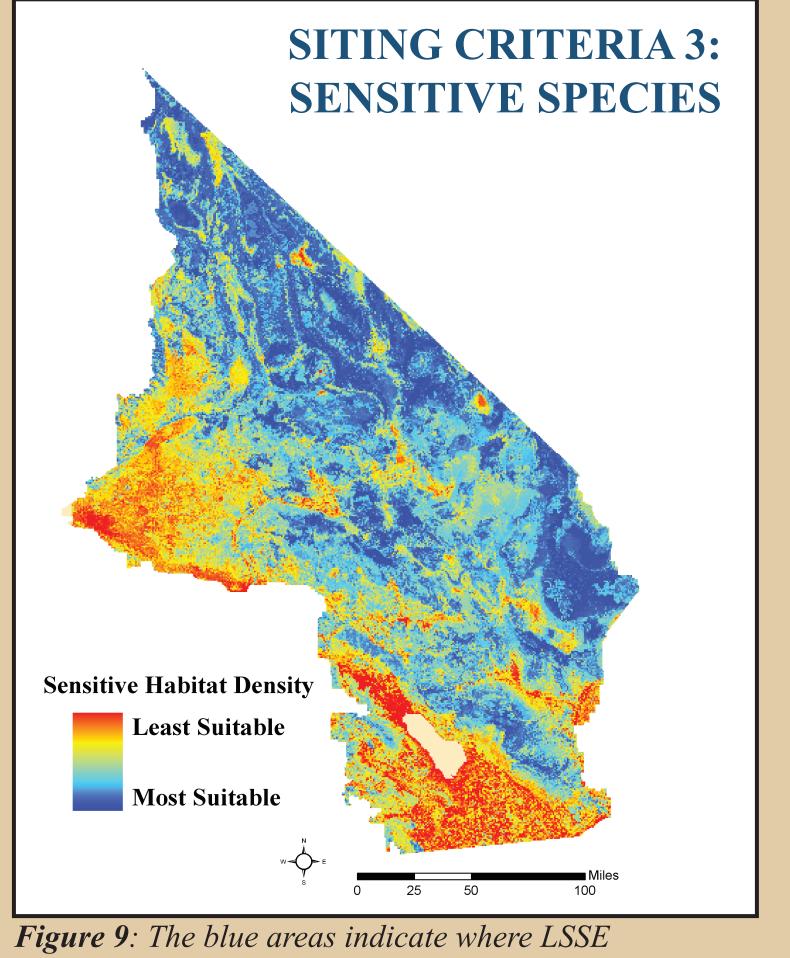


Figure 6: The green area shows the area available after eliminating all of the constraints. This indicates 3.9 million acres available in the CDCA for LSSE development.



development would have the least impact on sensitive species habitat.

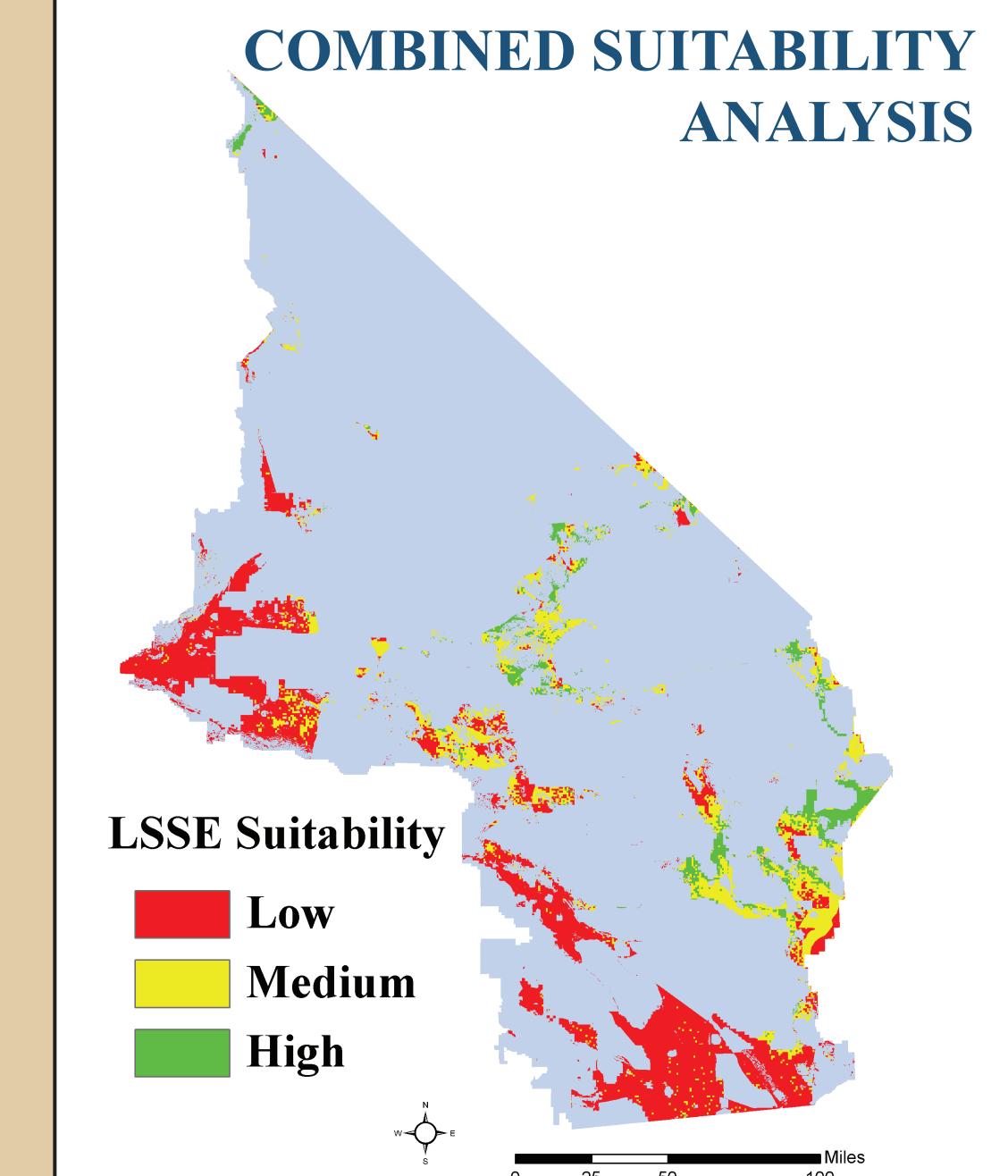


Figure 10: The purpose of the combined suitability analysis is to identify the most suitable areas for LSSE development according to all four siting criteria, and then compare this acreage to the land required by LSSE for its likely development by 2020. The green areas, egual to 420,000 acres. indicate the places most suitable for LSSE development when sensitive species habitat is prioritized.

FINDINGS:

By 2020, LSSE development will likely:

- Provide between 3.3% and 9% of California's electricity supply.
- Reflect the use of water-efficient technologies.
- Require the development of between 38,000 and 100,000 acres of land. Currently, about 420,000 acres of highly-suitable land is available for development.
- Require between 54,000 and 120,000 cumulative acre-feet of water.

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and water-use impacts by