Ecosystem-based emissions reduction potential in California

Dick Cameron, Director of Science for Land Programs, California Chapter
California’s emissions future?

Source: 2030 Scoping plan
Winter precipitation (December-February) 1896-2017

average

www.climate.gov
Land use drivers variable in space and time

Sleeter et al., 2017. Future scenarios of land change based on empirical data and demographic trends, *Earth’s Future*
Ecosystem management and land conservation can substantially contribute to California’s climate mitigation goals.

- Published November 2017 – Open Access
- 14 activities under 3 policy scenarios, focused on natural ecosystems
- 2030 and 2050 cumulative and annual
- Sectoral comparison
Total Annual Implementation area (ac)

- Limited: ~120,000
- Moderate: ~215,000
- Ambitious: ~300,000
Sectoral comparison

Max of **17.4%** of cumulative reductions to meet the 2030 goal
What is the contribution of each activity to the overall reduction potential of California’s land base...?

We analyzed 14 different activities that fell into two main categories: avoided conversion (preventing the conversion of a natural area) and increased sequestration (enhancing the potential of ecosystems to absorb CO2 from the atmosphere). Perhaps unsurprisingly, those activities involving forests and woodlands make up most of the reduction potential.

**Cumulative Reductions by Land-Based Activity**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Limited</th>
<th>Moderate</th>
<th>Ambitious</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>44.6 MMTCO2e</td>
<td>73.2 MMTCO2e</td>
<td>101.5 MMTCO2e</td>
</tr>
</tbody>
</table>

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https://tabsoft.co/2luEwd0
What are the long term trends given climate and land use scenarios?

- 32 futures, 2001-2100 (4 land use scenarios, 4 climate models, 2 emissions trajectories)
- Climate-driven wildfire (Westerling)
- Timber harvest and drought-induced tree mortality incorporated
- 1-km spatial resolution

“Average” (CanESM) climate future, high land use, RCP8.5
Carbon dynamics of California’s lands

Sleeter et al.
In prep.

DRAFT
Drivers of carbon loss in California

Climate-related

Human-related

Sleeter et al.
In prep.
Land use provides consistent reduction potential under different climate futures.

**Warm-Wet Future**
- Land Use
  - BAU: 636 MMT CO₂e
  - Low: 925 MMT CO₂e
  - Net Effect: +289

**Hot-Dry Future**
- Land Use
  - BAU: 673 MMT CO₂e
  - Low: 423 MMT CO₂e
  - Net Effect: +250
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