

2022 Scoping Plan Update Modeling and Scenario Workshop



NATURAL AND WORKING LANDS

DECEMBER 2, 2021

Transparency on Oral Comment Process

- Dedicated time for EJAC Members after the conclusion of presentation
- During general comment period:
 - CARB staff will periodically announce approximate number of hands raised
 - No ceding of time to others
 - Any EJAC Members should use the dedicated time after presentations to make any comments to ensure they are heard
 - Please do not email us directly to ask that we give you priority
- Goal to post agendas for workshops at least 48 hours in advance

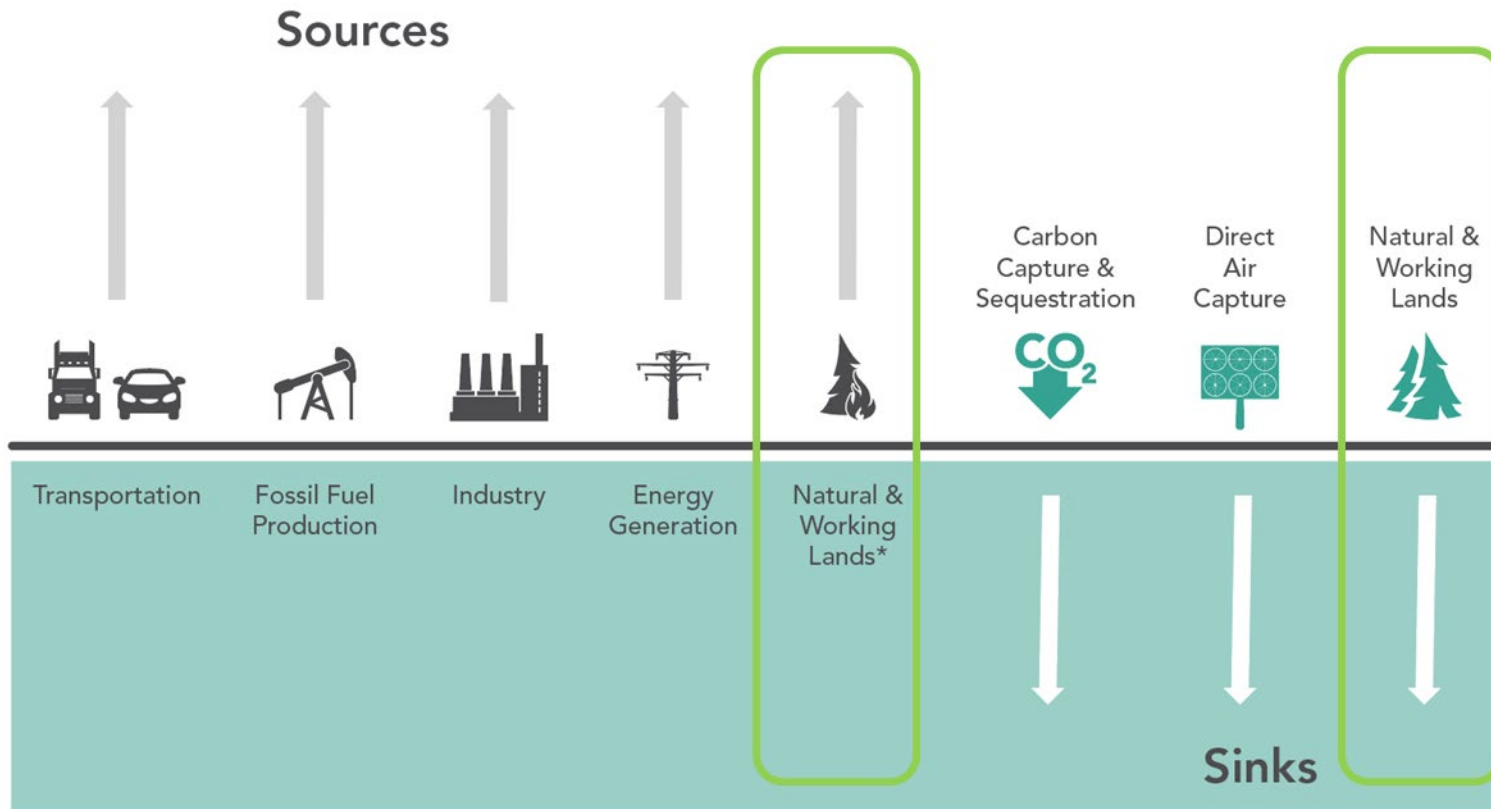
Agenda

- Scoping Plan and Target Development Recap
- NWL Modeling Approach
- EJ Advisory Committee Comments
- Public Comments
- 5 Minute Break
- Scenario Development and Draft Scenarios
- EJ Advisory Committee Comments
- Public Comments
- Closing



Science-based Target: Achieve Carbon Neutrality (CO₂e) Mid-Century

Sources Equal Sinks



*Natural and working land emissions come from wildfires, disease, land and ag management practices, and others

- Include NWL emission sources and sinks
- Prioritize minimizing emissions from sources
- Maximize sinks

Previous workshop overview

- Search “CARB scoping plan workshops” to find our previous workshops
- NWL Inventory
- Target Development approach
 - Meta-analysis and Modeling
 - Target Setting Process
 - Regional Hydrological and Ecological Simulation System (RHESys)
 - Baseline and Business-as-usual scenario
 - Alternative Scenarios and a carbon target
- Presented several key questions regarding our approach

Overview of Feedback Received

On modeling approach:

- Carbon should be prioritized for modeling
- Co-benefits are important and should be quantified, including ecological benefits, SLCP reductions, and wood products/bioenergy
- Reflect geographic/ownership differences
- Model the carbon impact of pesticides, increase organic agriculture
- Include blue carbon
- Disaggregate croplands in some way
- Include inorganic carbon

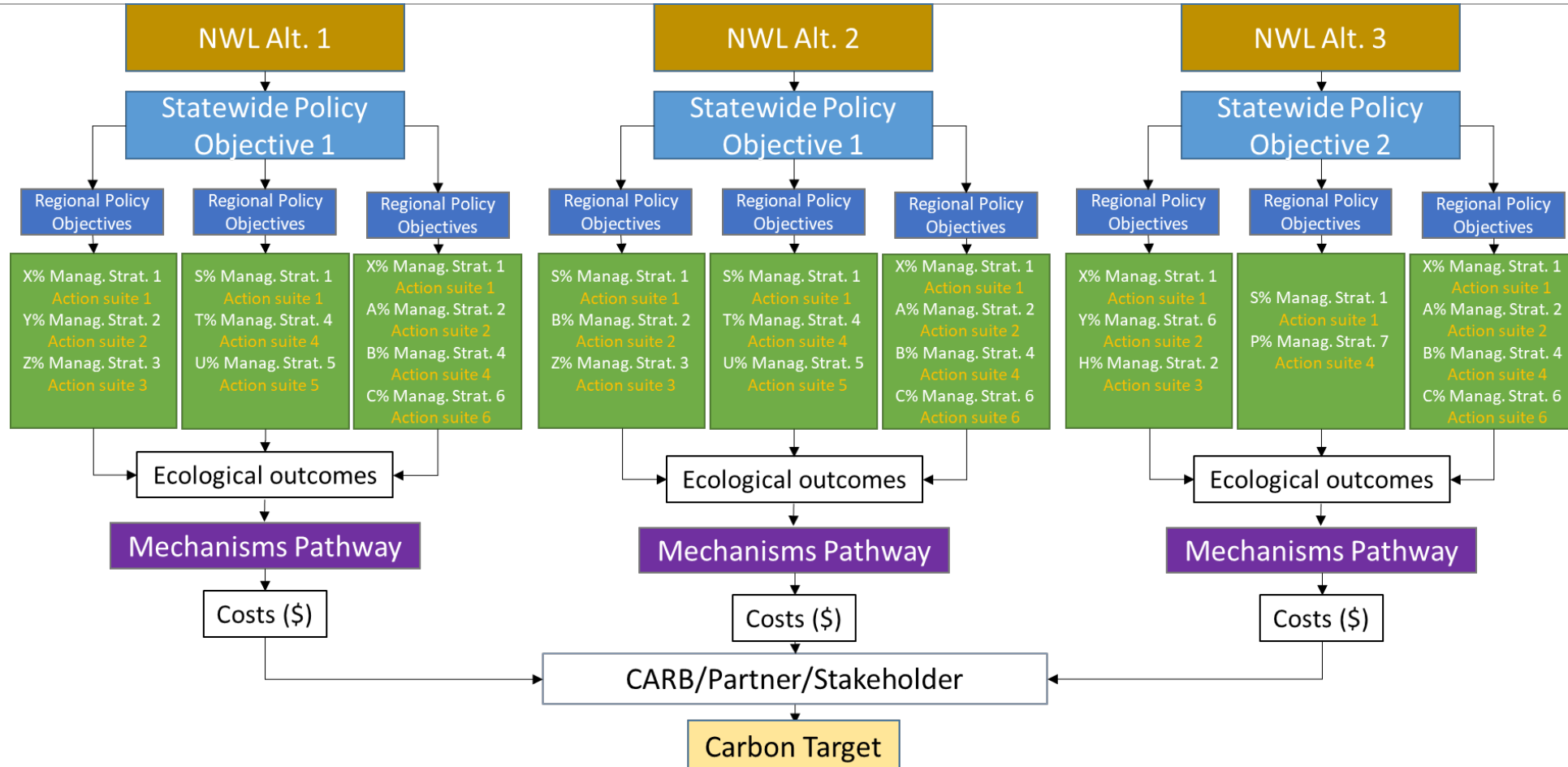
Other Feedback:

- Include aggressive target
- Include local and NWL focused outreach; consider local plans

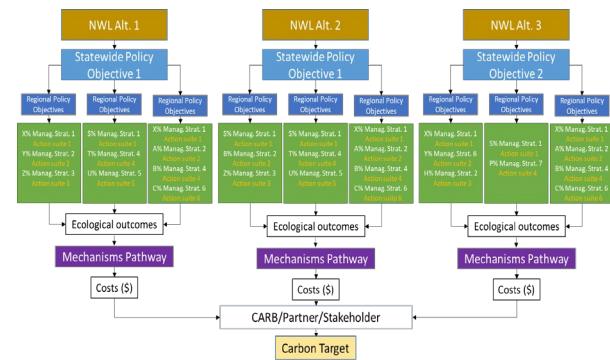
On management strategies

- Reduce clearcuts
- Decrease/increase other forms of forest management (thinning, salvage logging, fuels reduction, prescribed fire, etcl.)
- Change prescribed burning practices and regulation
- 1M acre strategy
- More/less grazing
- Reduce development
- More ecological urban landscapes and regenerative agriculture

Scenario Development Overview



Target Setting Definitions

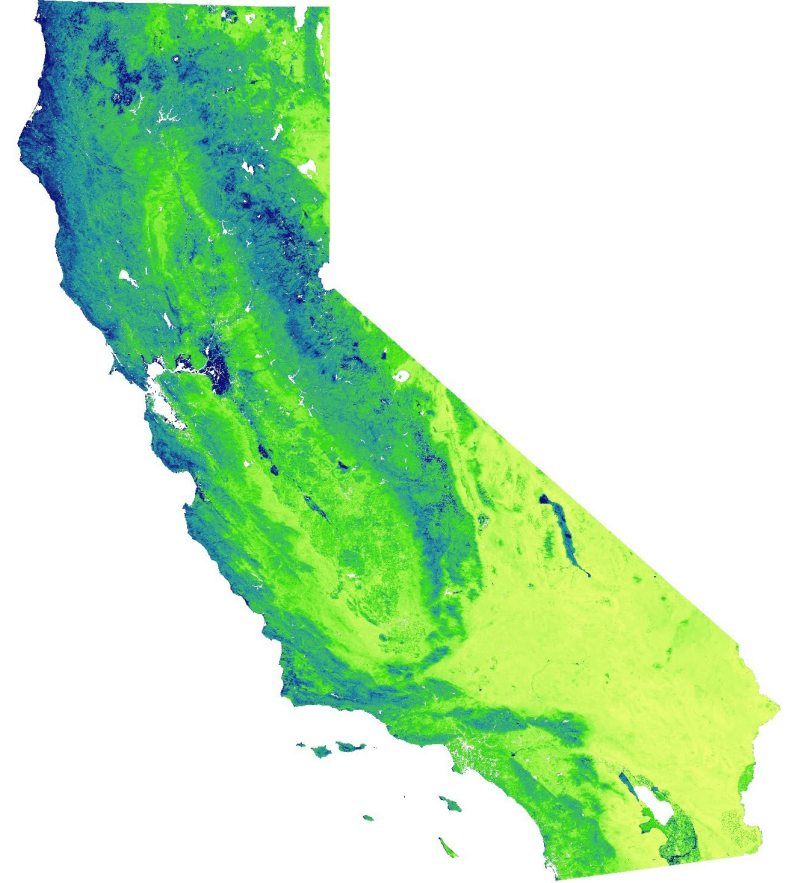


Policy Objective	Management Strategy	Action	Mechanism Pathway
<p>A jurisdictional goal on future outcomes from the land. This should be the ends that are desired, not how these ends will be met.</p>	<p>An overall approach to on-the-ground land management, including where, when, and what type of actions occur that will meet the objective.</p>	<p>On-the-ground activity that alters the landscape. A management strategy is made of up individual actions.</p>	<p>A portfolio of levers that California can use to elicit desired changes in management strategies (legislation, incentives, regulation, etc).</p>
<ul style="list-style-type: none"> Decrease wildfire emissions Increase carbon stocks Increase water availability 	<p>Within a watershed</p> <ul style="list-style-type: none"> Thin 100 acres/3 years Prescribe burn 400 acres/1 year Clear cut 80 acres/2 years 	<ul style="list-style-type: none"> Thinning Clear cuts Prescribed burning Cover cropping Planting Etc. 	<ul style="list-style-type: none"> Ecosystem services markets Conservation easements Biomass products and fuels incentives Subsidies Etc.

NWL Alternative Scenario: A set of policy objectives, management strategies, and a mechanism pathway

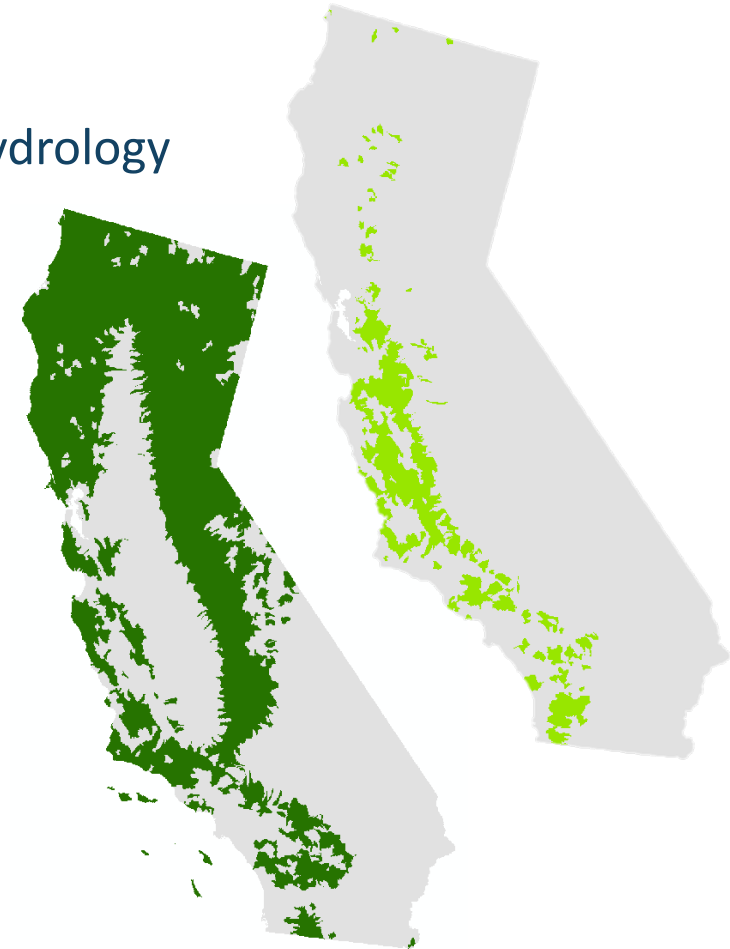
NWL Modeling Approach

- NWL Categories
 - Forests, shrublands, and grasslands
 - Agriculture
 - Settlements
 - Wetlands
 - Deserts and other lands



NWL Modeling Approach – Forests, Shrublands, Grasslands

- Regional Hydrological and Ecological Simulation System (RHESSys)
- Biogeochemical model with climate change, dynamic fire, mortality, and hydrology
- Representative watersheds used to extrapolate statewide
- BAU management data derived from LANDFIRE (2001-2014)
- Treatment categories assessed:
 - Clearcut, Harvest, Thinning, Mastication, Mechanical, Bio/Chem/Herb, Prescribed Fire
- Different ownership/regional combinations manage differently
 - Federal, Tribal, State, County, City, Special District, NGO, Forest Industry, Other Private



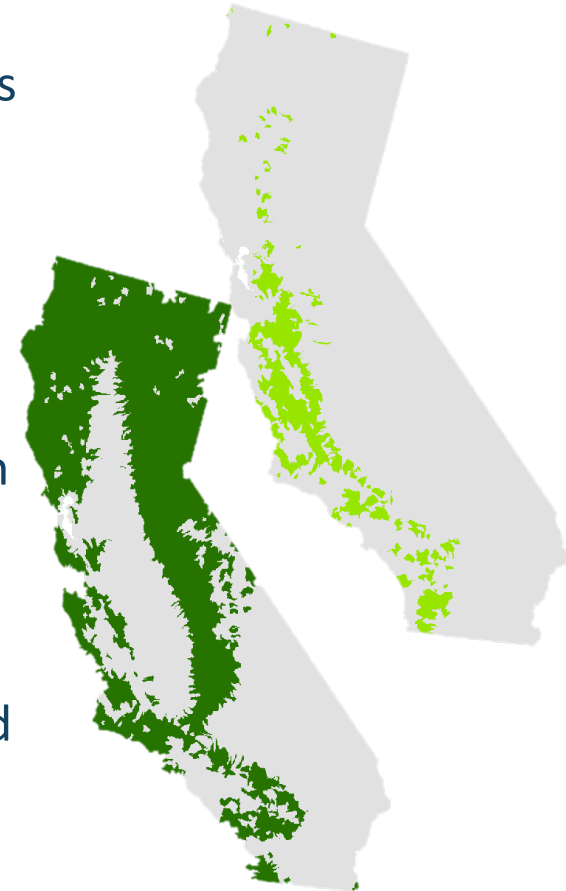
NWL Modeling Approach – Forests, Shrublands, Grasslands

■ Inputs

- Dominant vegetation type
- Aridity
- Ecoregions
- Hydrologic Units
- Stream Flow
- Carbon Stocks/Flux
- Canopy Height
- Stream gauge locations
- Soil data
- Landcover/land use
- Historical/Future climate
- CO2 concentrations
- Nitrogen deposition
- Management maps
- land use change
- Afforestation potential

■ Outputs

- Statewide/regional scales
- Carbon stocks/fluxes
- Water availability
- Wildfire variables
 - Severity, intensity, burn area, biomass burned
- Treatment variables
 - Acres, carbon impacted and removed



NWL Modeling Approach – Agriculture

- Annual Crops – Daycent
 - Biogeochemical – climate change and management impacts
 - Based on national inventory methods, and utilizes previous research from the development of Commet-Planner
- Perennial Crops – CARB Orchard Carbon Model
 - Allometric based utilizing the NWL inventory methods
- Rangelands covered in shrublands and grasslands



NWL Modeling Approach – Agriculture

Perennial Agriculture

- Inputs
 - Statewide orchard age distributions
 - Total perennial agricultural acreage
 - Allometric equations
 - Historical/Future planting acreages
- Outputs
 - Above ground live biomass carbon
 - Removed biomass carbon

Annual Agriculture

- Inputs
 - Climate data
 - Management schedules
 - Soil characteristics
 - Crop type
- Outputs
 - Carbon stocks/fluxes
 - Water use/fluxes



NWL Modeling Approach – Settlements

- Urban Forests
 - CARB Urban Forest Carbon Model – empirically based
- Rural and WUI Forests
 - RHESys
 - Assess the carbon impact associated with varying levels of defensible space
- Currently, only carbon is assessed
 - Future work will assess co-benefits
- Urban carbon not spatially explicit



NWL Modeling Approach – Settlements

Urban Forests

- Inputs
 - Carbon stocks
 - Urban boundaries
 - Climate
 - Investments in urban forests
- Outputs
 - Above ground live biomass carbon

Wildland Urban Interface Defensible Space

- Inputs
 - Carbon stocks
 - Canopy cover
 - Structures
 - Parcel boundaries
- Outputs
 - Carbon needed to be removed to achieve legally enforceable defensible space
 - Carbon needed to be removed to achieve scientifically recommended defensible space

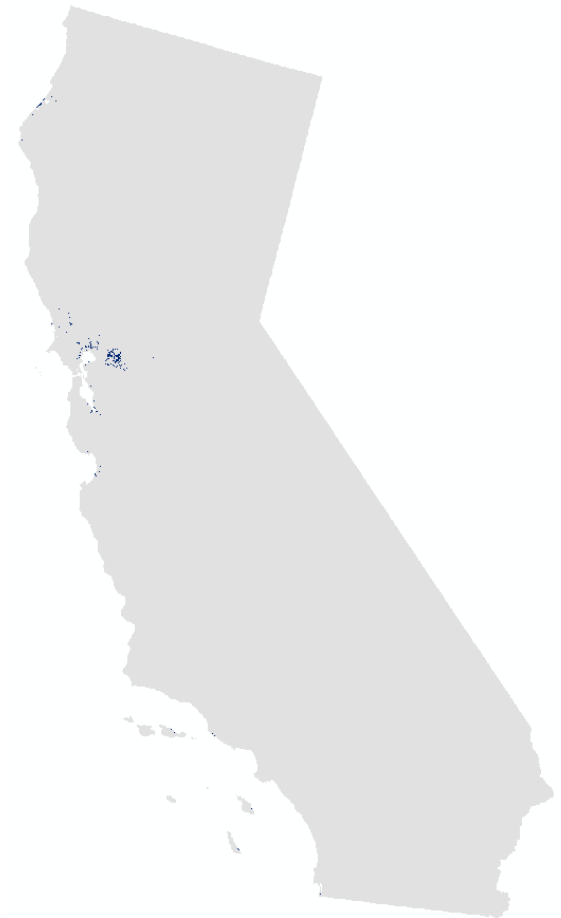
Rural Intermix and influence Forests

- Covered in the Forests modeling



NWL Modeling Approach – Wetlands

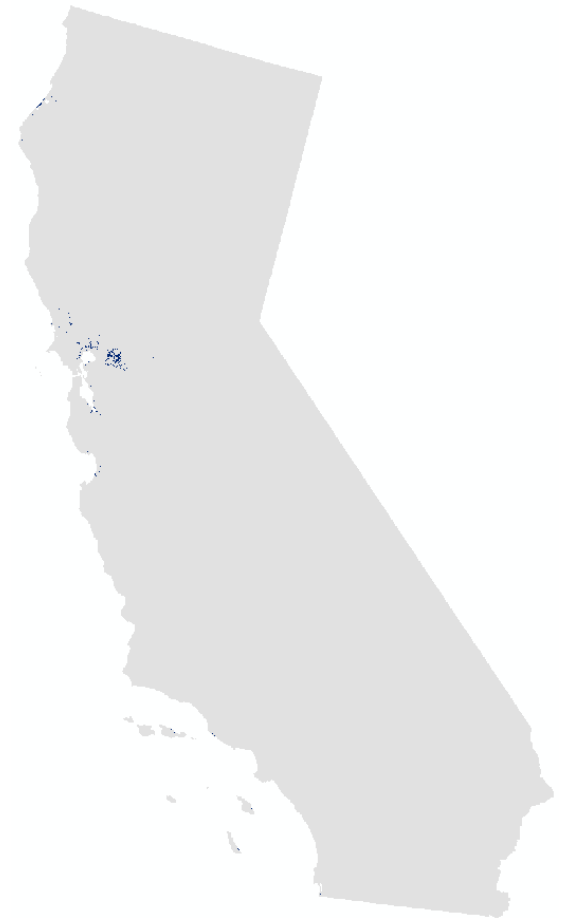
- Most riparian zones, Mountain meadows
 - RHESSys
- Delta and coastal wetlands
 - CARB derived tier-1 empirical model
 - Utilizes Intergovernmental Panel on Climate Change derived carbon sequestration/emissions factors
 - Focused on varying land use change



NWL Modeling Approach – Wetlands

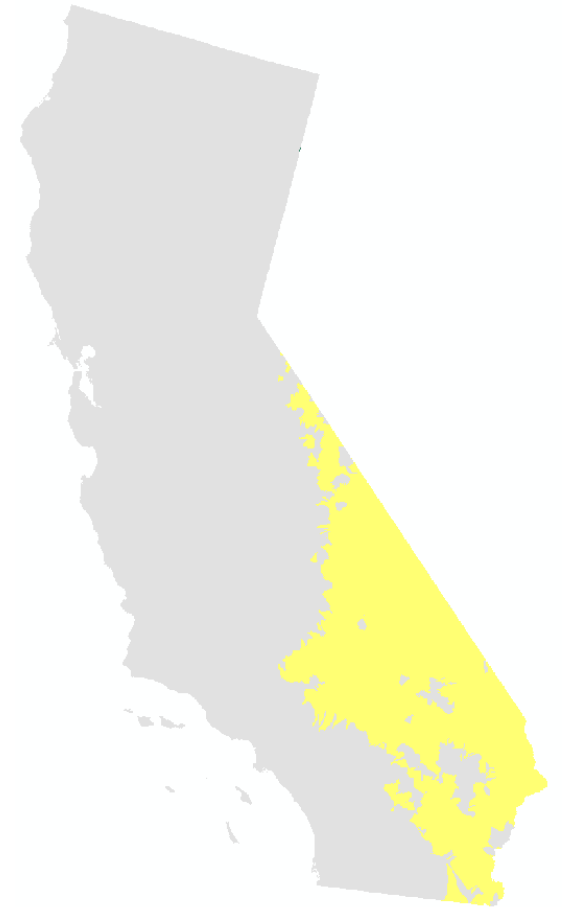
Delta and Coastal Wetlands

- Inputs
 - Carbon stocks
 - Land cover
 - Emissions factors
 - Land use change rates
- Outputs
 - Carbon and Nitrogen fluxes
 - Carbon stocks



NWL Modeling Approach – Deserts and Other Lands

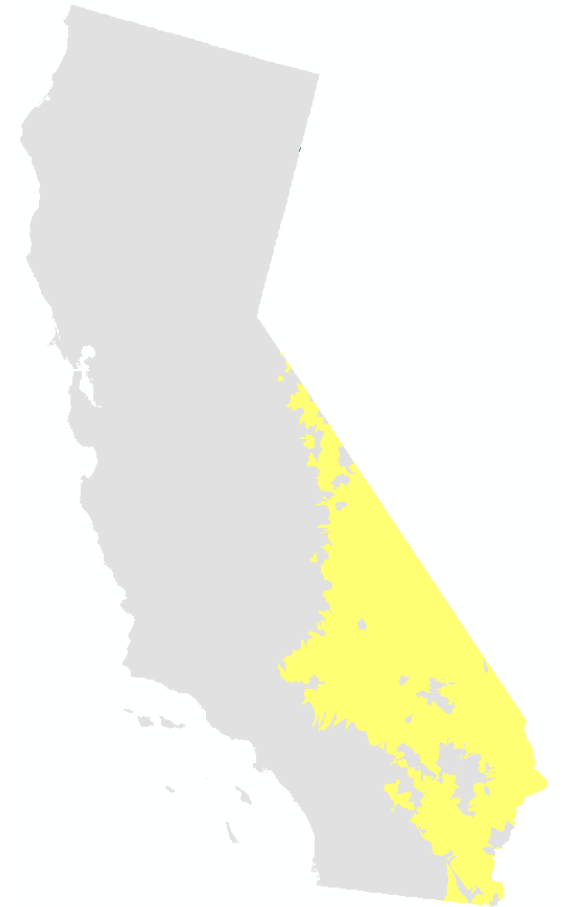
- CARB derived model
- land use change focused
- Utilizes CARB's NWL inventory
- US Geological Survey derived projections of land use change for 4th California Climate Assessment



NWL Modeling Approach – Deserts and Other Lands

Deserts

- Inputs
 - Carbon stocks
 - Land cover
 - Land use change
- Outputs
 - Carbon stocks



Other potential assessments

- Emissions assessment on the impact of wildfire and prescribed burning emissions from Forests, shrublands, and grasslands
- Economic assessment will focus on the cost of activities
- Other co-benefits for forest, shrubland and grasslands

Comments

- Environmental Justice Advisory Committee Comments
- Public Comments
 - Use the “**Raise Hand**” function in the GoToWebinar toolbar, which should be located to the right of your screen as shown
 - When staff call your name, please “**Unmute**” yourself by clicking the red button, and proceed to introduce yourself



5-Minute Break

Scenario Development Overview

- Purpose of Scenarios:
 - Assesses the impact of actions under climate change
 - Scenarios will result in the ecological, health, and economic outcomes
- Each NWL type will be incorporated into each alternative scenario
- Assessments focused on 2030, 2035, and 2045 but may go beyond this time frame

Scenario Development Overview

- Scenarios set objectives and management strategies to reach those objectives
- Management strategies are sets of actions that California can make and are predetermined before modeling
- Each NWL type, ownership, and region will have varying levels of management
- CARB cannot assess an infinite number of scenarios
- CARB is not predetermining a carbon target and finding the management to achieve that target
- CARB does not know the outcomes of the scenarios before modeling

Scenario Development Overview

- Draft Alternative Scoping Plan NWL Scenarios were developed in response to public comment, stakeholder outreach, and through state and federal government collaboration
- Draft scenarios are not the final scenarios
- CARB wants public comments to refine scenarios
- A business-as-usual scenario will also be modeled and assessed
- These scenarios are trying to lay out different visions for how California lands can be managed into the future

Draft Alternative Scoping Plan NWL Scenarios

Scenario Name	BAU	Alt SP NWL Scenario 1	Alt SP NWL Scenario 2	Alt SP NWL Scenario 3	Alt SP NWL Scenario 4	Alt SP NWL Scenario 5
Over-arching Objective	No new climate action	Minimize disturbances, prioritize conservation, maximize carbon stock at 2045.	Prioritize restoration and climate resilience	Model mix of strategies from current commitments/plans	Prioritize wildfire reduction, with additional complimentary policies	Focused on resource utilization

Draft Alternative Scoping Plan NWL Scenarios

Alternative Scoping Plan NWL Scenario #1 - Minimize disturbances, prioritize conservation, maximize near term carbon stocks.

NWL Type	Forests and Shrublands	Agriculture	Settlements	Grasslands	Wetlands	Deserts/Other lands
Objective and general climate action	<p>Have the most possible carbon stocks statewide by 2045.</p> <p>No clearcuts, no fuels management, increase afforestation, no forest/shrubland land conversion, and maximum fire suppression.</p>	<p>Maximize soil carbon stocks and perennial biomass carbon</p> <p>Maximize climate smart ag practices and nutrient cycling (e.g. via orchard recycling, mulching, or composting) at upper bounds of topography, water, and agronomic constraints for carbon. Only model land conversion away from ag resulting from SGMA</p>	<p>Large increase in urban forests. Protect WUI communities from fire.</p> <p>Increase urban tree cover as much feasible. Establish defensible space where legally feasible.</p>	<p>Conserve with no land use change.</p>	<p>Conserve wetland soil organic carbon and restore wetlands.</p> <p>Increase restoration of riparian, coastal, and delta wetlands.</p>	<p>Minimize land conversion.</p>

Draft Alternative Scoping Plan NWL Scenarios

Alternative Scoping Plan NWL Scenario #2 - Prioritize restoration and climate resilience.

NWL Type	Forests and Shrublands	Agriculture	Settlements	Grasslands	Wetlands	Deserts/Other lands
Objective and general climate action	Decrease fire severity and stabilize carbon stocks by 2045. Increase prescribed fire and thinning, increased heterogeneous harvesting and management, biomass available for advanced bioenergy and wood products. Decrease harvesting frequency.	Increase in climate smart practices focused on drought resilience. Increase ag practices and nutrient cycling that increase carbon with an emphasis on the co-benefit of increased drought resilience. Model low level of conversion from ag based on existing conversion rates and SGMA. Increase organic agriculture.	Large increase in urban forests. Protect WUI communities from fire. Increase urban tree cover as much feasible. Establish defensible scientifically recommended defensible space.	Conserve and restore. Tree encroachment reduction	Conserve wetland soil organic carbon and restore wetlands. Increase restoration of riparian, coastal, and delta wetlands. (same as alt 1)	Consistent conservation with goals/targets from other sectors.

Draft Alternative Scoping Plan NWL Scenarios

Alternative Scoping Plan NWL Scenario #3 - Model mix of strategies from current commitments and plans.

NWL Type	Forests and Shrublands	Agriculture	Settlements	Grasslands	Wetlands	Deserts/Other lands
Objective and general climate action	<p>1M acre strategy, 30x30 strategy, NWL Implementation Plan, etc.</p> <p>Align regional management with regional plans/reports.</p>	<p>Moderate increases in climate smart ag practices focused on biodiversity. Maximize nutrient cycling. Low level of conversion away from ag.</p>	<p>Ensure maximum wildfire defensible space. Moderate increase in urban cover. Establish defensible space where legally feasible. (same as alt 1)</p>	<p>Conservation consistent with 30x30 and increase practices in line with 1M acre strategy and implementation plan.</p>	<p>Conserve wetland soil organic carbon and restore wetlands. Increase restoration of riparian, coastal, and delta wetlands. (same as alt 1)</p>	<p>Consistent conservation with goals/targets from other sectors. (same as alt 2)</p>

Draft Alternative Scoping Plan NWL Scenarios

Alternative Scoping Plan NWL Scenario #4 - Prioritize wildfire reduction, with additional complimentary policies.

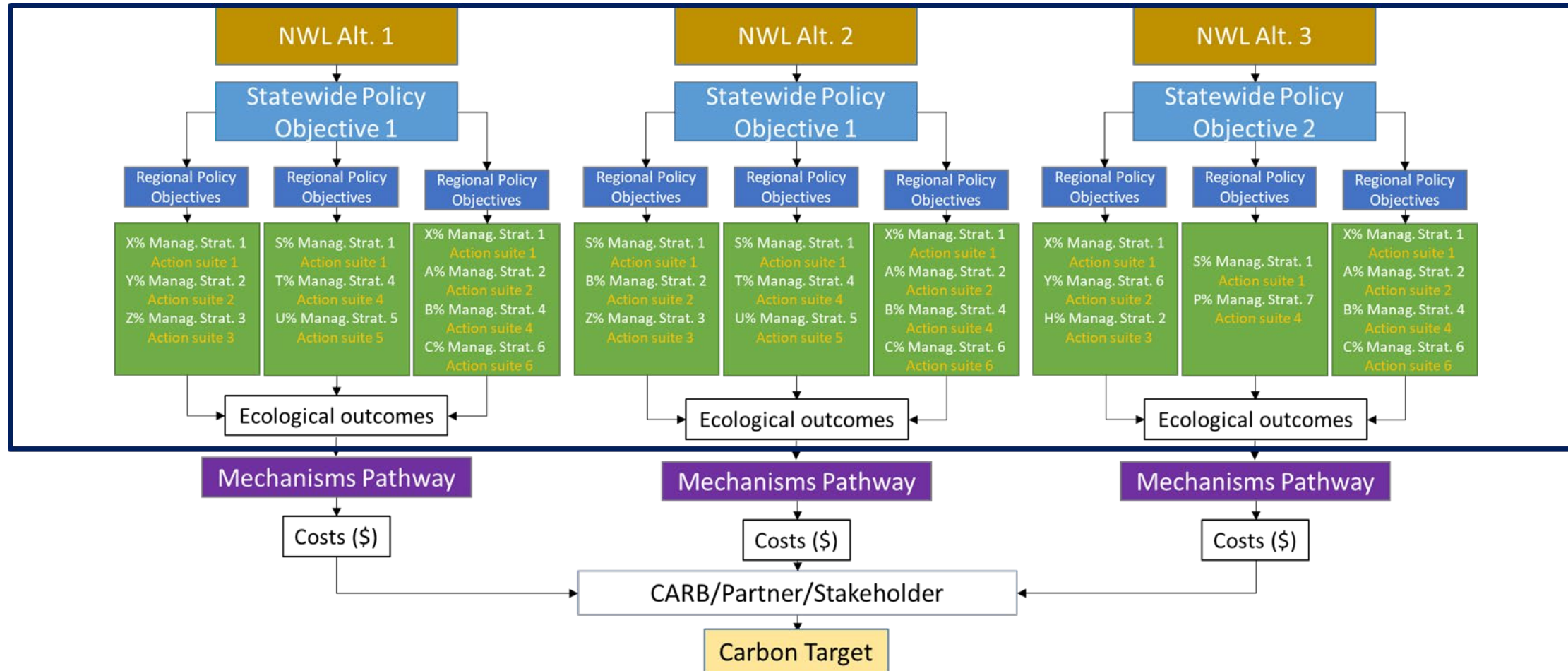
NWL Type	Forests and Shrublands	Agriculture	Settlements	Grasslands	Wetlands	Deserts/Other lands
Objective and general climate action	<p>Decrease wildfire emissions, wildfire around communities, and fire sizes.</p> <p>Maximize fire suppression. Increase fuel breaks in lands around communities. Increase prescribed fire and thinning. Increased heterogeneous management</p>	<p>Moderate increases in climate smart practices above BAU. Little to no agricultural land loss.</p> <p>Increase organic agriculture.</p>	<p>Ensure maximum wildfire defensible space.</p> <p>Moderate increase in urban cover. Establish defensible scientifically recommended defensible space. (same as alt2)</p>	<p>Conserve and restore.</p> <p>Wildfire risk reduction</p>	<p>Conserve wetland soil organic carbon and restore wetlands.</p> <p>Increase restoration of riparian, coastal, and delta wetlands.</p> <p>(same as alt 1)</p>	<p>Consistent conservation with goals/targets from other sectors.</p> <p>(same as alt 2)</p>

Draft Alternative Scoping Plan NWL Scenarios

Alternative Scoping Plan NWL Scenario #5 - Focused on resource utilization.





































NWL Type	Forests and Shrublands	Agriculture	Settlements	Grasslands	Wetlands	Deserts/Other lands
Objective and general climate action	Expand more sustainable harvesting; increase harvesting in ownerships with little commercial harvesting; increase biomass availability for bioenergy and wood products.	Same as BAU	<p>Large increase in urban forests. Protect WUI communities from fire.</p> <p>Increase urban tree cover as much feasible. Establish defensible space where legally feasible. (same as alt 1)</p>	Moderate conservation and management.	Same as BAU	Same as BAU

Scenario Development Overview



Alternative Scenarios assessments

Completely hypothetical outcomes for illustrative purposes only

Outcomes (vs. baseline)	BAU	NWL Alt. #1	NWL Alt. #2	NWL Alt. #3	NWL Alt. #4	NWL Alt. #5
Carbon stock change (MMT C)						
Carbon sequestration (MMT C/year)						
Water Quantity (m ³ /year)						
Fire emissions (CO ₂ /year)						
Cost (\$ Billions)						
Health Outcomes (multiple variables)						

Comments

- Environmental Justice Advisory Committee Comments
- Public Comments
 - Use the “**Raise Hand**” function in the GoToWebinar toolbar, which should be located to the right of your screen as shown
 - When staff call your name, please “**Unmute**” yourself by clicking the red button, and proceed to introduce yourself

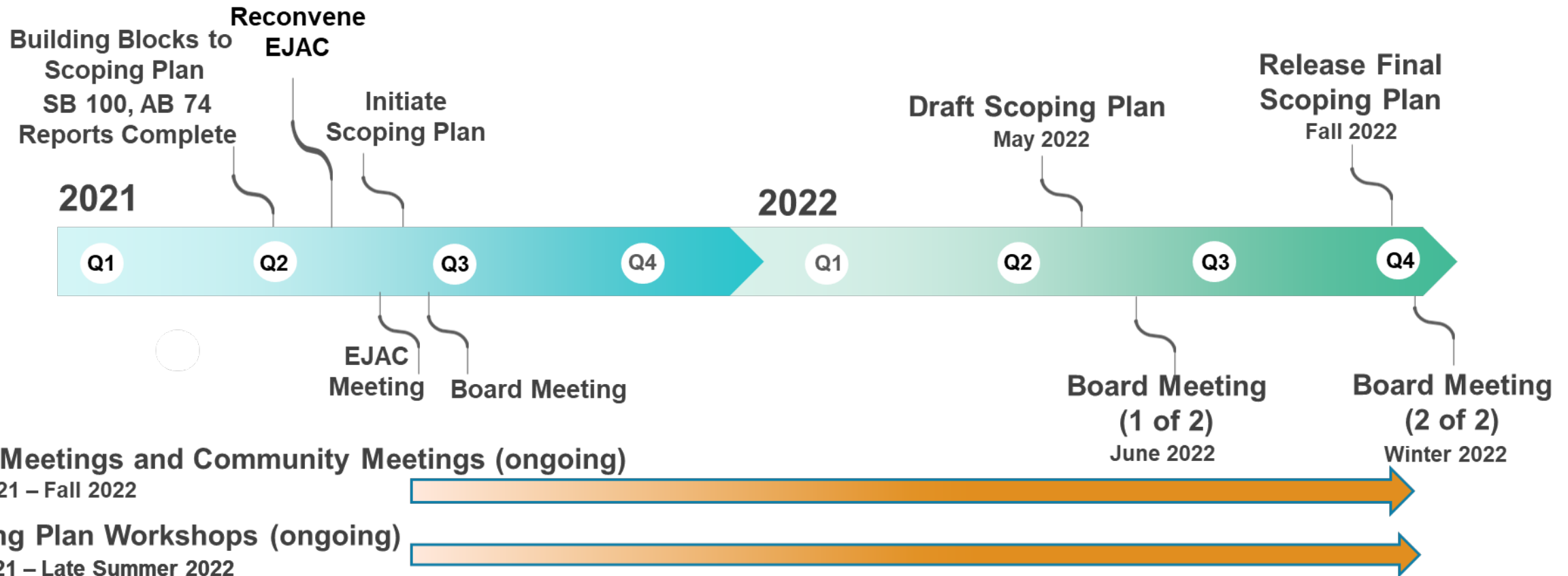


Submitting written comments

- Written comments

- https://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=nwl-2021-scen-ws&comm_period=1
- You can search: California Air Resources Board Scoping Plan workshops
- Comment closing date December 22, 2021 (11:59 pm)

2022 Scoping Plan Update Schedule



Closing Remarks
