2022 Scoping Plan Update

CALIFORNIA AIR RESOURCES BOARD

CALIFORNIA CROPLAND CARBON, CLIMATE, AND MANAGEMENT

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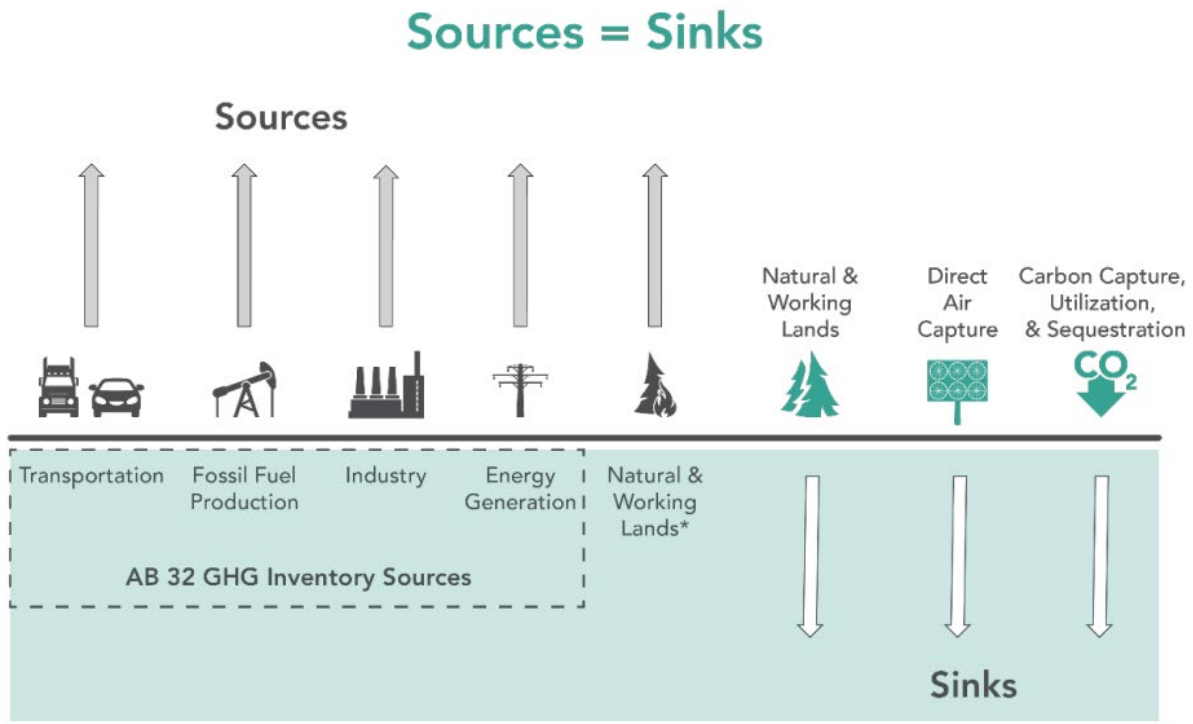
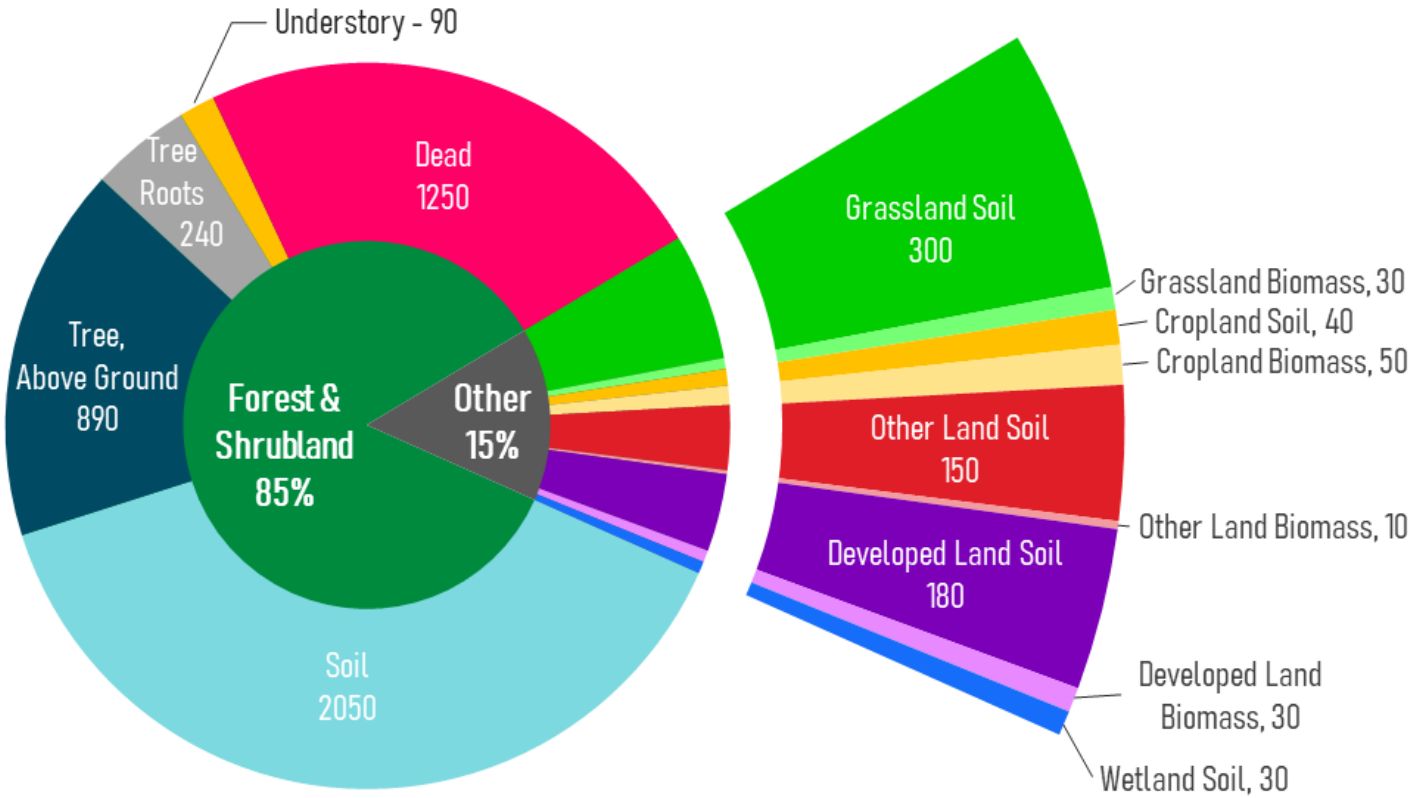
Carbon Neutrality

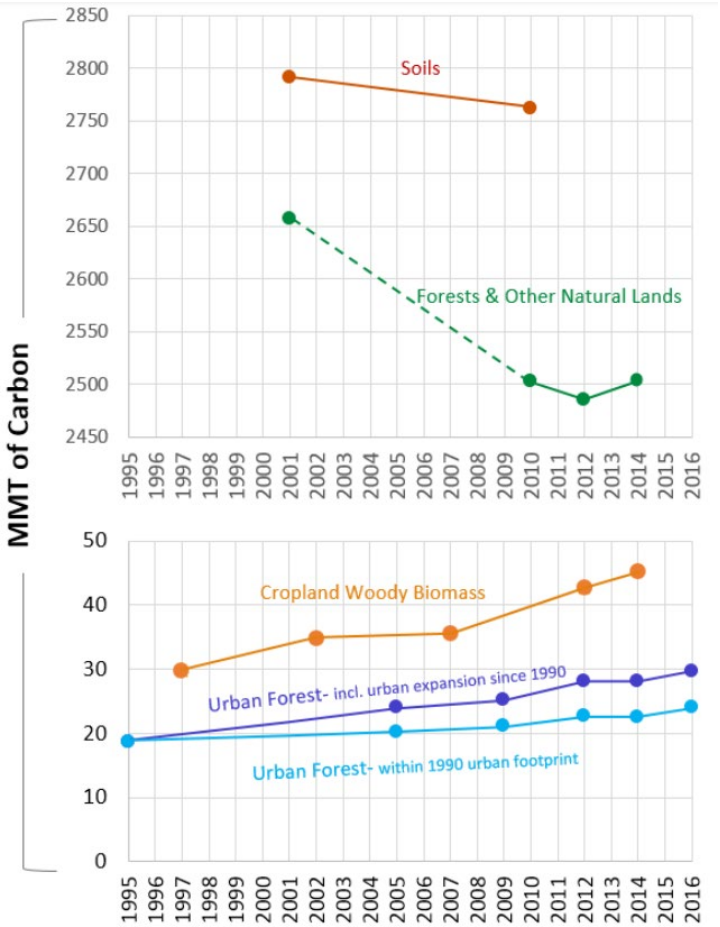
Figure 1-5: Carbon neutrality: Balancing the net flux of GHG emissions from all sources and sinks



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

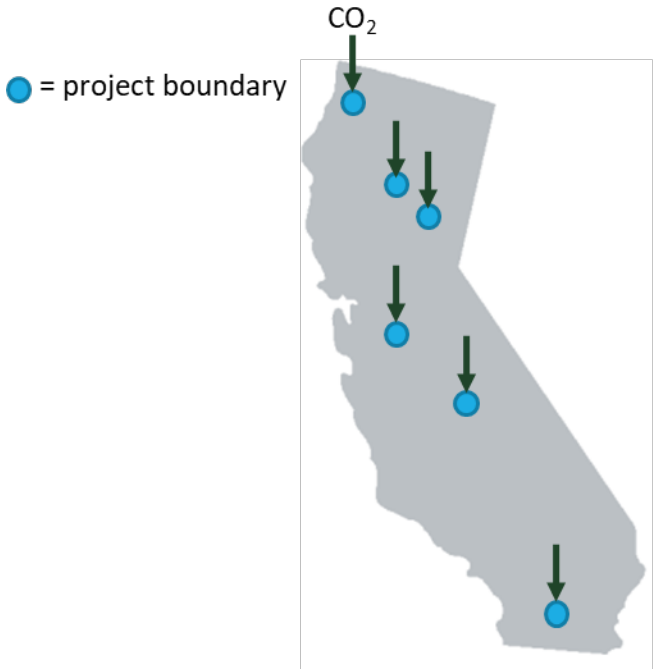
NWL Carbon Inventory



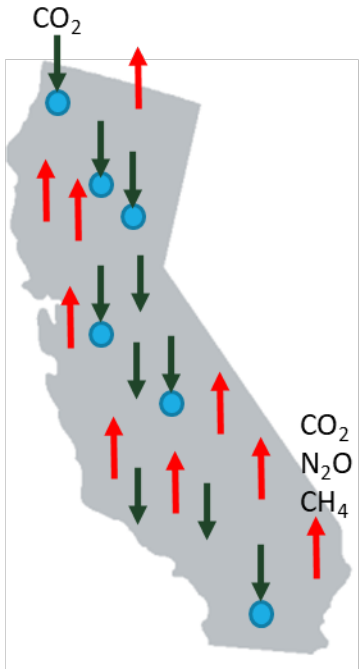


Objectives of NWL Modeling

Quantify statewide carbon dynamics (both where climate action is and isn't occurring)



But what about the cost of inaction and other areas where we don't do projects?



<u>Project level accounting (the benefit of climate action)</u>
Focus is on ensuring individual sites/projects provide GHG reductions or removals

<u>Statewide accounting (the entire carbon balance of the state)</u>
NWL may or may not be a sink from year to year

Modeling

Annual Agriculture

- Model: DayCent
- Algorithm: Biogeochemical with climate change and management impacts
- Method: Based on national inventory methods, and utilizes previous research from the development of Comet-Planner

Perennial Agriculture

- Model: CARB Orchard Carbon Model
- Algorithm: Allometric based utilizing the NWL inventory methods survey data
- Method: Aspatial planting and push rates based on past practices and adjusted with climate and land use projections

Rangelands covered in shrublands and grasslands

Modeling Scenarios

Why Model?

- Estimate the future trajectory of sources and sinks within the NWL sector
- Assess how action may change outcomes
- Cumulative impacts
- Custom scenarios (climate/policy/management)

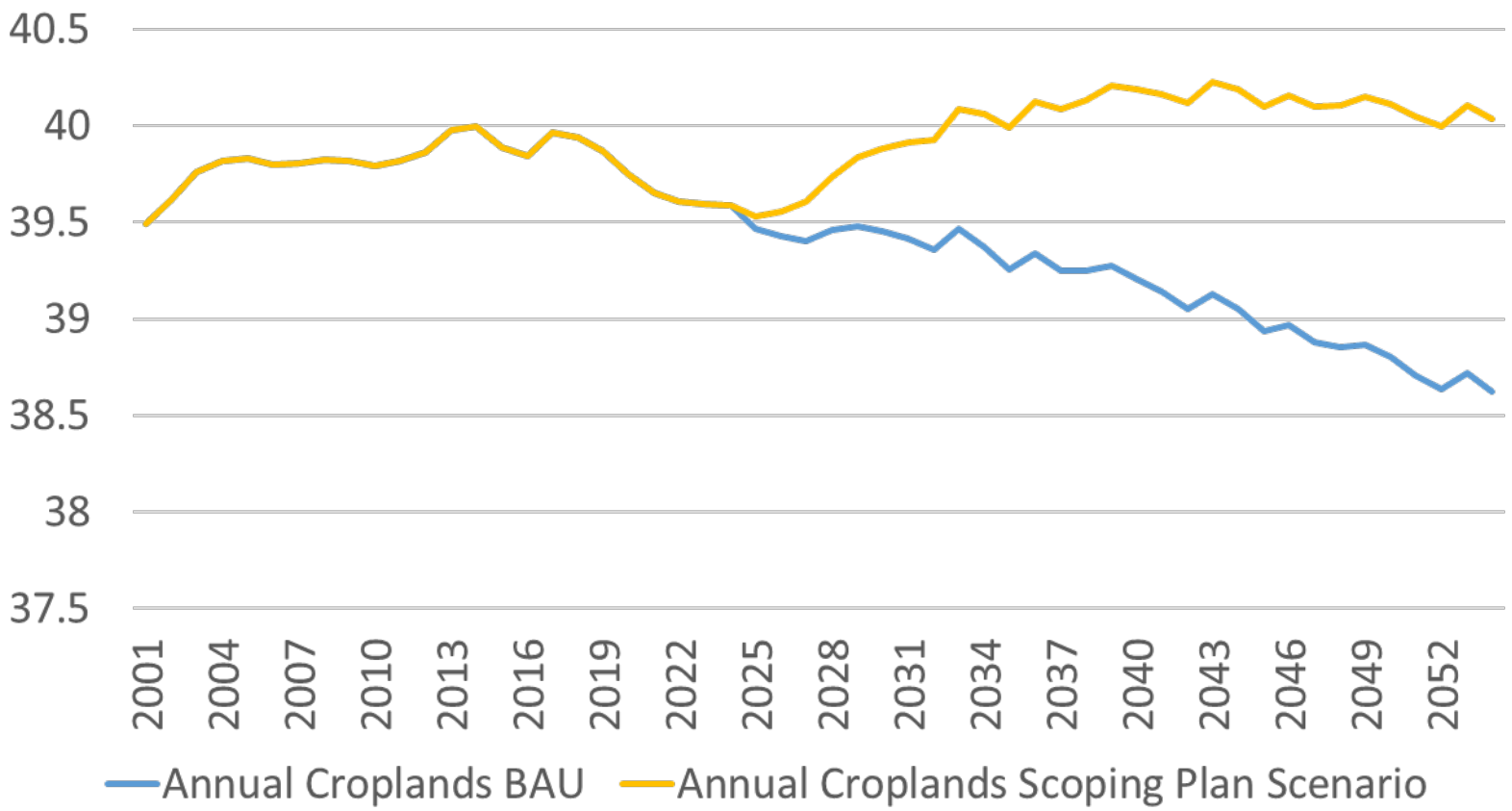
Modeled Multiple Scenarios:

- 4 global climate models (different climate futures)
- 2 RCPs (different assumptions for overall future emissions reductions)
- 1 Business-as-usual (management as if we do nothing different than today)
- 4 Alternative management (different management strategies)

Scoping Plan Scenario

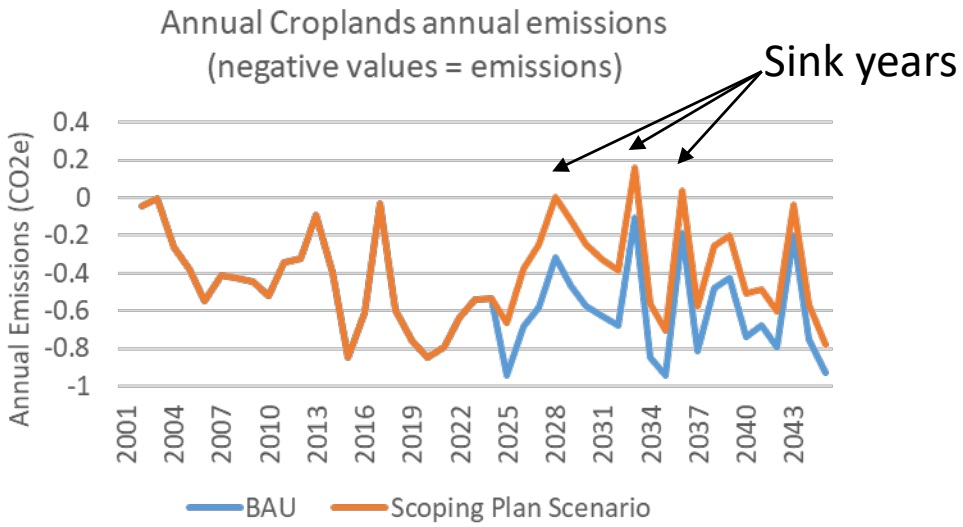
Practice	Scoping Plan Scenario (acres/year)	Scoping Plan Scenario Cost ($Thousands/year)
Cover cropping (legumes)	9,617	3,637
Cover cropping (non-legumes)	9,617	3,637
No Till	5,383	513
Reduced Till	13,830	1,174
Compost Amendment	40,142	8,029
Transition to organic farming	64,758	225,527
Conservation of Annual Cropland	8,340	58,380
Establishing Riparian Forest Buffers	56	508
Alley Cropping	17	36
Esablishing Windbreaks/Shelterbelts	17	519
Establishing Tree and Shrubs in Croplands	12	13
Esablishing Hedgerows	65	1,949
Establishing Hedgerows in Perennial Croplands	96	2,878
Establishing Windbreak/Shelterbelts in Perennial Croplands	36	1,098

Annual Cropland Carbon Stocks

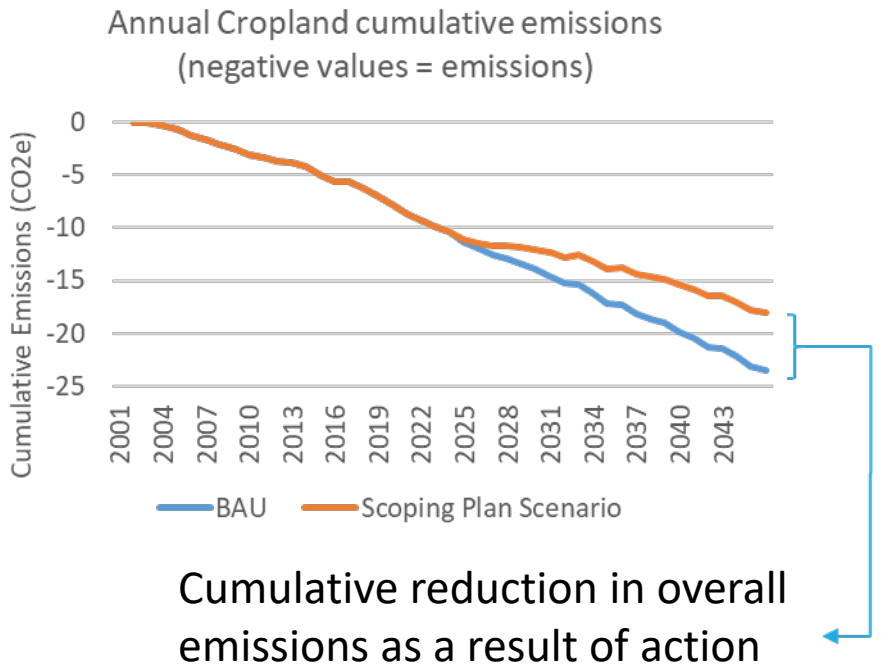


Annual Cropland CO2e

- Assess ecosystems through time

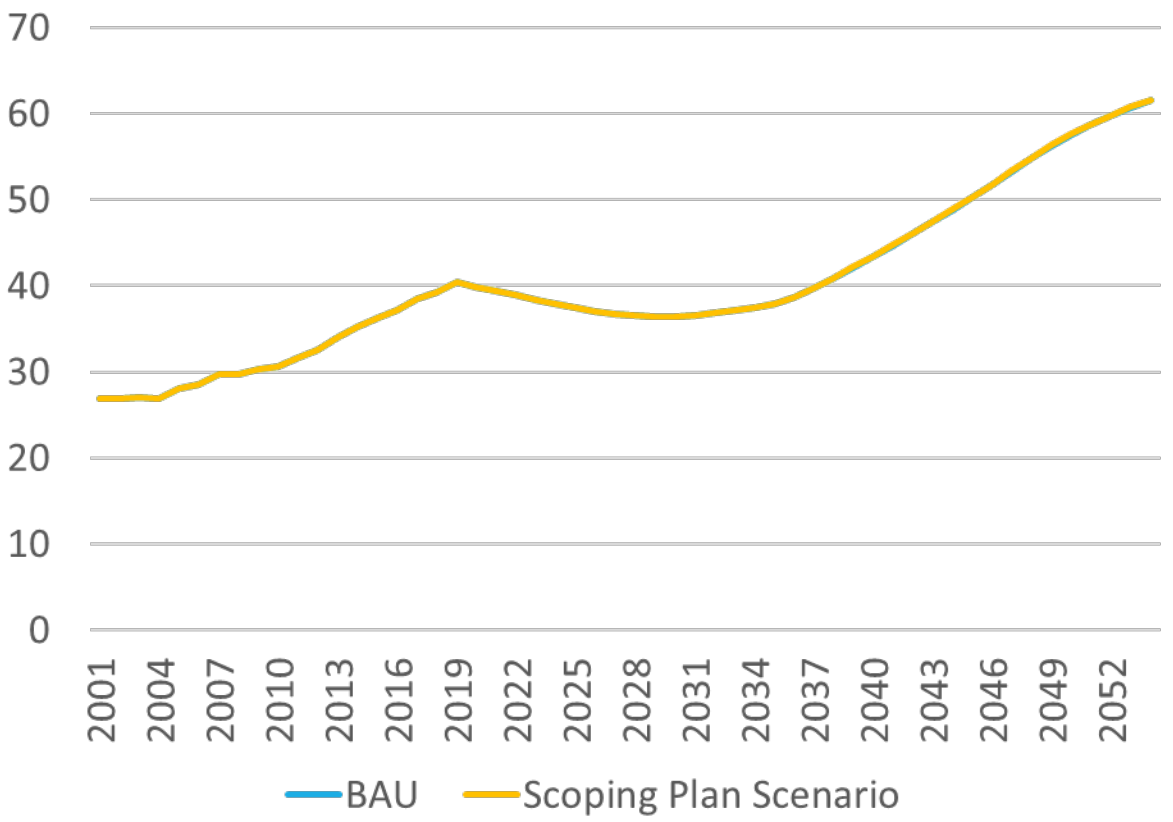


NWL are very variable from year to year

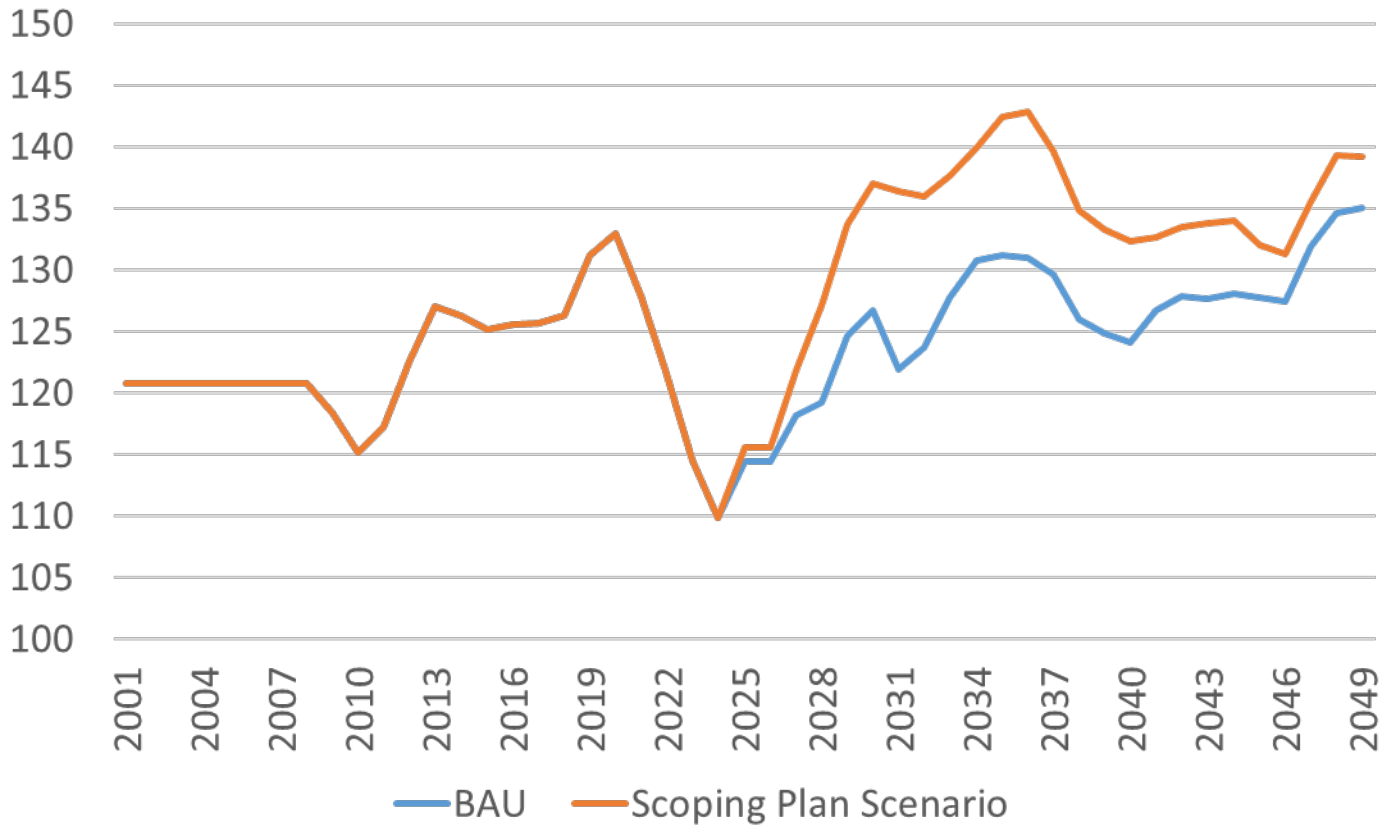


Cumulative reduction in overall emissions as a result of action

Perennial Cropland Carbon Stocks



Grassland Carbon Stocks



Future Developments

- Annual agriculture
  - Organic agricultural systems
  - Differing irrigation practices
  - Stacked practices
  - Farm idling
  - More control over timing of implementation
  - More simulations to better represent all agricultural lands
- Perennial Agriculture
  - Utilize biogeochemical model
  - Simulate more healthy soils practices
  - Better account for ground water
- Forests, Shrublands, Grasslands
  - More detailed fire and morality assessments
  - Include more management actions (e.g., grazing, composting)
  - More nuanced management implementation
  - More nuanced riparian management
- Overall
  - Better utilize remote sensing data to constrain modeling and monitor existing actions
  - Enhance co-benefit, health, and economic analysis

Limitations for monitoring/modeling

- Empirical Data
  - Management actions on all agricultural lands
  - Temporally and spatially consistent soil monitoring and sampling
  - Tracking and reporting of residues
- Large scale modeling and monitoring
  - Current science is focused on the farm scale
  - Scientific culture needs to shift to be climate policy relevant
- Open tools, code, and data
  - Most restricted to 1 or 2 groups that have access
  - This limits contracting options, innovation, and internal capacity

Questions/Comments?

Thank you.