# Climate and EPA's Multipollutant Assessment Efforts

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**Office of Research and Development**
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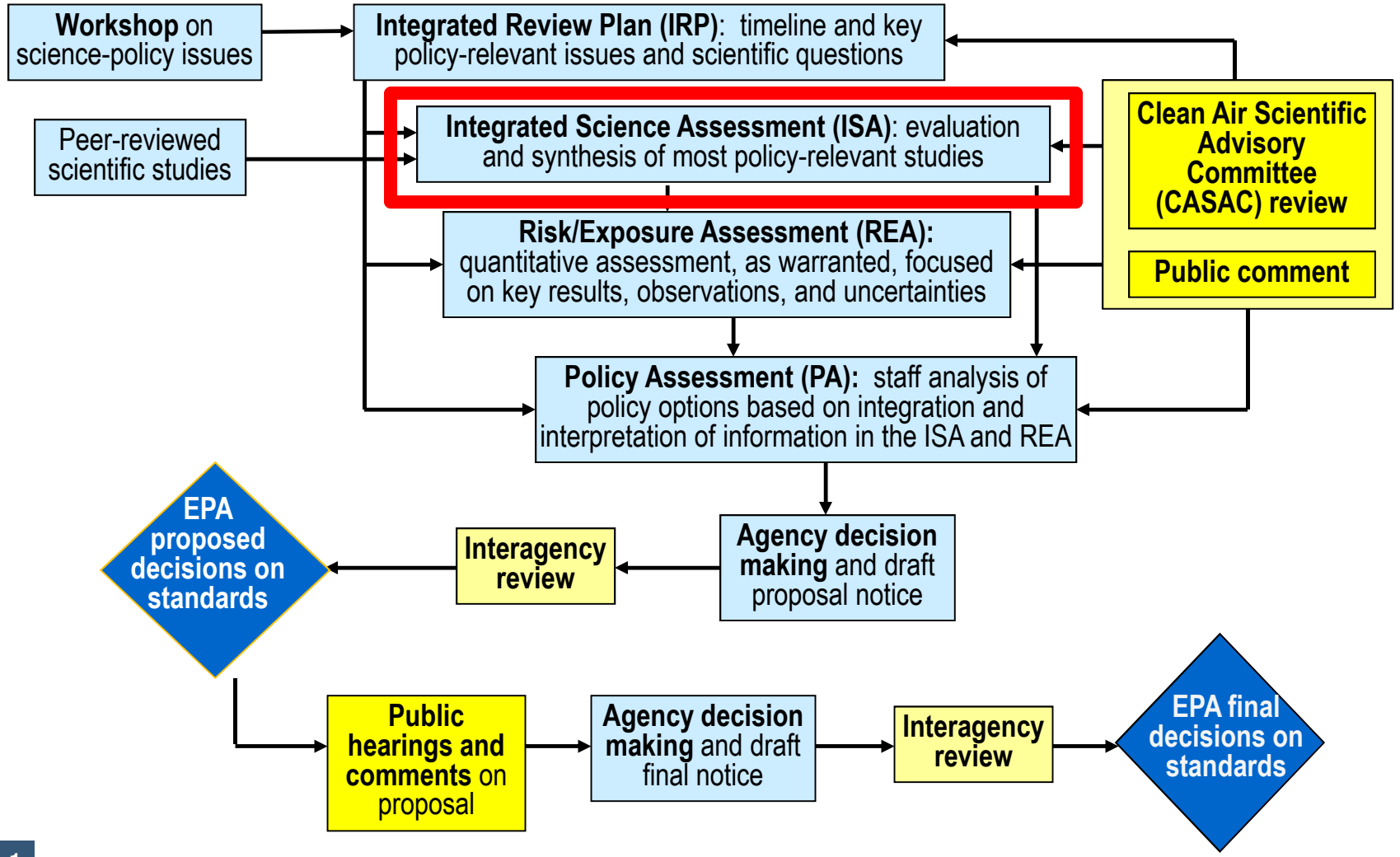
# NAAQS Review Process



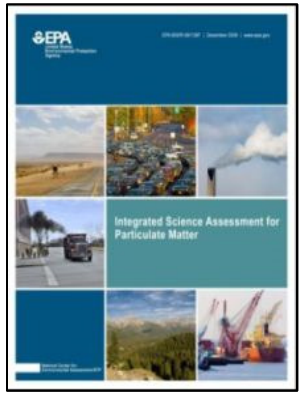
# Past Assessments

Integrated Science Assessments (ISAs)

- 2008 $NO_X$ Health Criteria
- 2008 $SO_X$ Health Criteria
- 2008 $NO_X/SO_X$ Ecological Criteria
- 2009 PM
- 2010 CO
- 2013 $O_3$ and Related Photochemical Oxidants
- 2013 Pb (2nd External Review Draft)

Climate

# Past Assessments

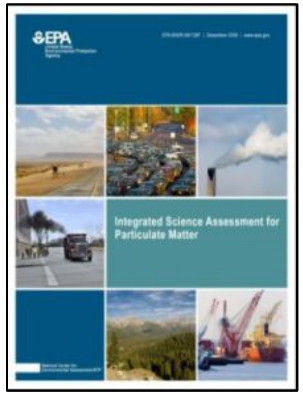



2009 ISA for Particulate Matter

Considerations

- PM direct effects through scattering and absorption
- PM indirect effects through cloud formation and lifetimes, and precipitation
- PM components
  - Sulfate, organic carbon, black carbon, biomass burning aerosols, nitrates, mineral dust
- Assessment based heavily on the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4)

# Past Assessments

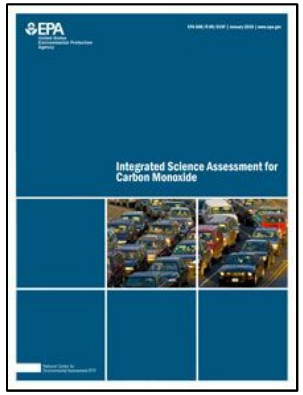



## 2009 ISA for Particulate Matter

Conclusions

- PM contributes to both warming and cooling
- Net climate cooling on a global scale with high degree of uncertainty
- Aerosol lifetimes and horizontal, vertical, and temporal distributions are very different from those of GHGs, so their effects do not simply off-set one another
- Radiative forcing from nitrates and dust are particularly uncertain
- Sub-global and regional effects of PM on climate are poorly understood

# Past Assessments




## 2010 ISA for Carbon Monoxide

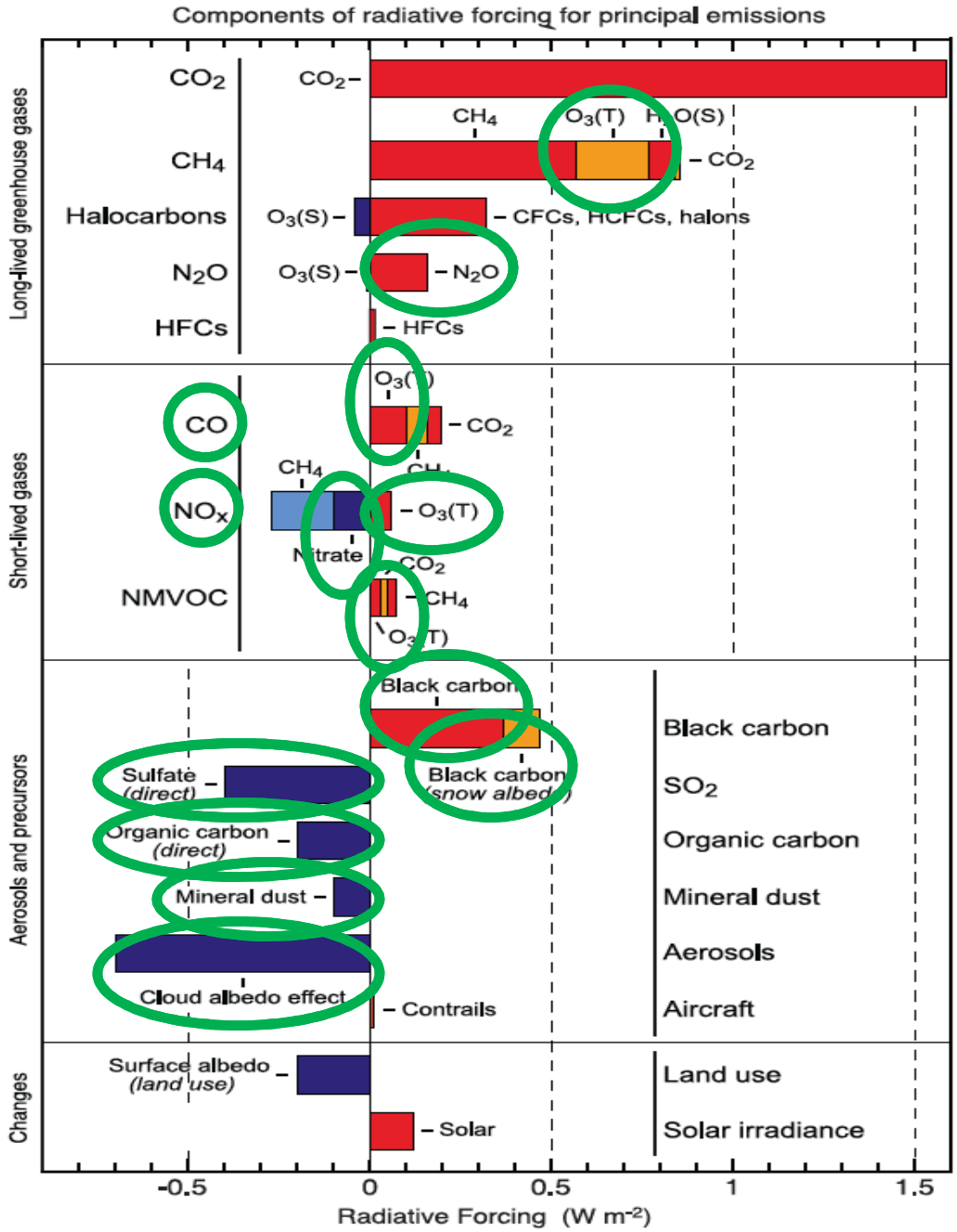
<u>Considerations</u>

- The effect of CO through longwave absorption
- The role of CO in the CO-$CH_4$-$O_3$-$NO_X$ atmospheric chemistry cycles which alter the global concentrations and lifetimes of greenhouse gases
  - CO is a major atmospheric sink for OH, which increases the atmospheric lifetime of $CH_4$ and other gases
  - CO effects are most often assessed together with $NO_X$ and volatile organic carbon (VOC) species

United States Environmental Protection Agency

The criteria pollutants play an important role in radiative forcing attributed to

- long-lived GHGs,
- short-lived gases,
- and aerosols




Source: IPCC AR4, Figure 2.21, http://www.ipcc.ch/publications_and_data/ar4/wg2/en/spm.html

# Multipollutant Motivation

2004 NAS Report:
"Air Quality Management in the United States"

## Recommendation: Address multiple pollutants in the NAAQS review and standard setting process

"Although the committee does not believe that the science has evolved to a sufficient extent to permit the development of multipollutant NAAQS, it would be scientifically prudent to begin to review and develop NAAQS for related pollutants in parallel and simultaneously"

## Note: There are currently no plans to attempt the development of multipollutant NAAQS for climate

# Multipollutant Motivation

## Multipollutant Science Documents (MSD)

- Serve as a companion document to inform the individual pollutant Integrated Science Assessments (ISAs)
- The ISAs have considered what information has been available on multipollutant interactions and the MSD will build on that; conceptually, not a major shift in the current NAAQS review process
- More explicit evaluation and formal review of the health and welfare effects of exposure to air pollutant mixtures

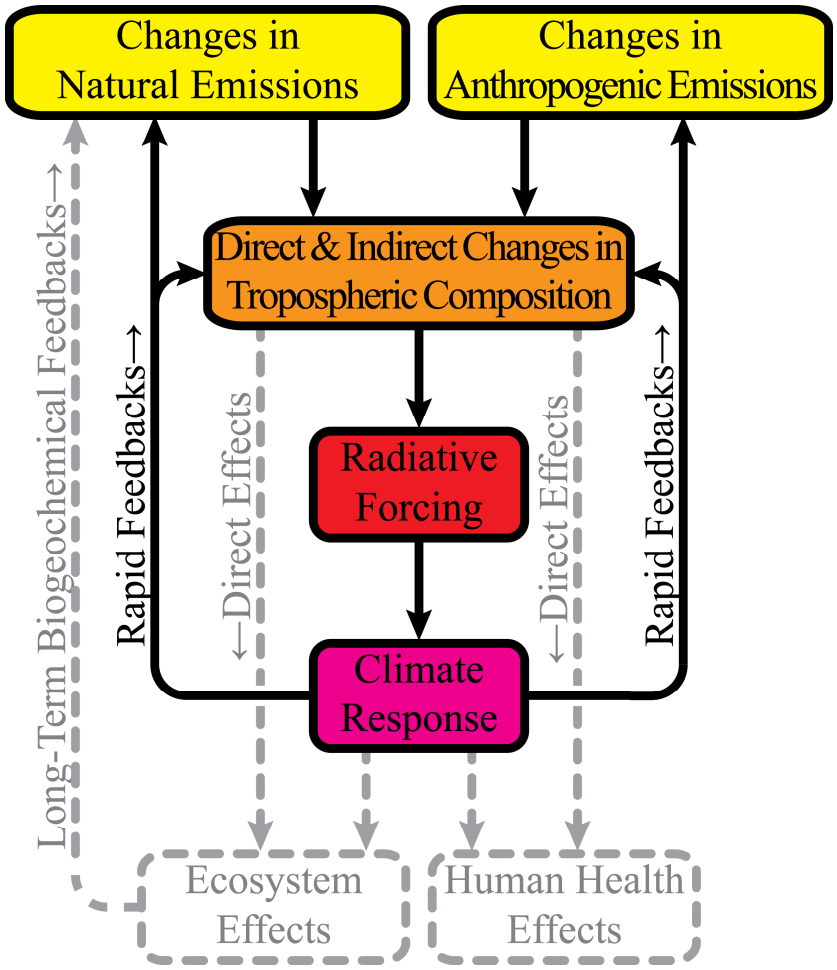
## Proposed MSDs

- Human Health Risk Assessment – Theme 2, Project 2
  - Ecology (Task 1)
  - Health (Task 2)
  - Climate (Task 3)

Early development and scoping stage; no formal timeline yet

# Climate MSD Scope

- Climate MSD will evaluate the effect of criteria air pollutants on global and regional climate
- Climate MSD would allow NCEA to address climate issues using a more 'one atmosphere' approach
- Material covered in the Climate MSD would be consolidated in one location, providing a concise source of material to help inform future ISAs



# Timeline and Current Status

- Expert Consultation held in May 2012
- Outside authors contributed chapters in summer 2013
- NCEA is integrating and editing draft chapters; will update to reflect IPCC AR5 and National Climate Assessment
- Anticipating peer input workshop for late 2015
  - New literature published through ~mid-2016
  - Literature reporting effects of multiple criteria pollutants
- Seek comment from Clean Air Scientific Advisory Committee and the public

# Climate MSD Team

United States Environmental Protection Agency

NCEA Staff

- Steve Dutton (task lead)
- Jeff Herrick
- Meredith Lassiter
- Tom Long
- Steve McDow
- Joe Pinto
- Kris Novak (multipollutant lead)
- Mary Ross (branch chief)

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- Jason West