Perspectives on the United States Environmental Protection Agency's Clean Air Scientific Advisory Committee: A Survey of State Air Agencies

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Executive Summary

The U.S. Environmental Protection Agency's (EPA) Clean Air Scientific Advisory Committee (CASAC) was created in 1977 under section 109 of the Clean Air Act (CAA). The role of CASAC is to provide technical and scientific advice to the EPA Administrator on National Ambient Air Quality Standards (NAAQS), required under the CAA. The standards themselves and the science upon which the standards are established for the six "criteria" pollutants included in the NAAQS are reviewed periodically by CASAC. The committee also exists to bridge new research developments to current environmental requirements.

Section 109(d) of the CAA requires the chartered CASAC to be composed of seven members appointed by the EPA Administrator. The CAA requires that membership include a chairperson, at least one member of the National Academy of Sciences, one physician, and one person from a state and air pollution control agency. Preliminary research regarding recent chartered CASAC panels suggests that there may be an underrepresentation of other stakeholder expertise including state air agencies, local governments and tribes.

To evaluate and analyze the role of CASAC, This project involved creating a survey to solicit feedback from state air agencies. Air Directors from all fifty states were contacted and provided the electronic survey through email. The survey included questions on the barriers individuals face in becoming an expert on the committee and whether CASAC performs its duties required by the CAA. The survey offered an opportunity for robust feedback through the use of open-ended and multiple response questions. This survey and its results represents an important contribution to the literature, as it allowed the top air quality officials in each state, or

their designee, an opportunity to voice any concerns or critiques to the CASAC process as well as to any barriers faced in participating as an expert candidate on the panel or subpanels. The goals of the survey are to analyze responses from state air agencies on their perspectives on the transparency, barriers for nomination and panel member representation. From the data gathered from the survey, several potential areas for reform and additional transparency became apparent.

Introduction

CASAC plays an important role in setting NAAQS as required under section 109(d) of the CAA. The members of CASAC are selected by the EPA Administrator and the operations are managed through a charter process and the work of the EPA Science Advisory Board (SAB) Staff Office. While CASAC and related panels were designed to provide independent advice to EPA, key Members of Congress have recently raised concerns that: "testimony and the current makeup of the panel reveal a number of problems, including: panelists reviewing their own work; a lack of turnover among CASAC Ozone Review Panel members; and, existing financial relationships between panelists and the Agency." (Smith, Lamar)

The CAA provisions related to the establishment of NAAQS have proven controversial and CASAC plays a key role in determining where NAAQS should be set in order to protect public health with an adequate margin of safety for susceptible populations. CASAC members recommend a standard or range for each of the six "criteria" pollutants based on their expertise; however, ultimately the EPA Administrator has final decision-making authority. Once a recommendation has been formulated into a rule, state air agencies are responsible for implementing a strategy to comply with the NAAQS. This survey intends to analyze whether

state air agencies who are responsible for carrying out and implementing the standards recommended by CASAC are adequately represented on the panel.

The electronic survey, “Perspectives on EPA’s Clean Air Scientific Advisory Committee” was accessed by a web link distributed via email to the Air Director of each state. Based on the observed results, suggestions for improving the transparency and process of CASAC can be recommended.

Literature Review

The literature on EPA’s CASAC provides background on the charter and contributes to the development of appropriate survey questions.

EPA’s CASAC is a scientific and technical advisory panel that originated in 1977 under section 109 of the CAA (*Charter,* 2015). In addition to the CAA, CASAC is also governed by the Federal Advisory Committee Act (FACA), passed in October 1972. FACA addresses the concern “that federal practices regarding the use of advisory committees were confused, inconsistent, and in need of clarification both to protect the public interest and to make full and effective use of outside advice”(Smith, 1992). FACA aims to ensure that memberships of advisory committees are balanced and that committees are open and operate in a transparent manner.

CASAC provides independent expert advice to the EPA Administrator on setting the NAAQS identified in the CAA section 108. The CAA requires that NAAQS be set for air pollutants that have negative effects at high concentrations and for emissions from mobile and stationary sources. The NAAQS primary standards intend to provide public health protection

toward “sensitive” populations including those with asthma, children, and the elderly. Providing public welfare protection against decreased visibility and damage to animals, crops, vegetation, and buildings are among the secondary standards. Under the authority of the EPA, the six “criteria” pollutants listed under the NAAQS are carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particle pollution (PM), and sulfur dioxide (SO_2) (United States Environmental Protection Agency, 2016).

Section 109(d)(2) of the CAA states:

(A) The Administrator shall appoint an independent scientific review committee composed of seven members including at least one member of the National Academy of Sciences, one physician, and one person representing State air pollution control agencies.

(B) Not later than January 1, 1980, and at five-year intervals thereafter, the committee referred to in subparagraph (A) shall complete a review of the criteria published under section 7408 of this title and the national primary and secondary ambient air quality standards promulgated under this section and shall recommend to the Administrator any new national ambient air quality standards and revisions of existing criteria and standards as may be appropriate under section 7408 of this title and subsection (b) of this section.

(C) Such committee shall also (i) advise the Administrator of areas in which additional knowledge is required to appraise the adequacy and basis of existing, new, or revised national ambient air quality standards, (ii) describe the research efforts necessary to provide the required information, (iii) advise the Administrator on the relative contribution to air pollution concentrations of natural as well as anthropogenic activity, and (iv) advise the Administrator of any adverse public health, welfare, social, economic,

> or energy effects which may result from various strategies for attainment and maintenance of such national ambient air quality standards.

In setting NAAQS, the EPA requires that the costs directly impacting industry and the public are not to be considered and there must be an adequate margin of safety to protect public health. The definition of "public health" and "adequate margin of safety" are not clearly defined, which creates difficulty in precisely objectifying appropriate standards. Adverse effects are regarded as insignificant when evidence shows a relatively small impact or are heavily considered in response to a large impact, based on scientific expertise. The EPA attempts to apply the recommendations of the scientific community, "however, at the margin where effects are often subtle and reasonable scientists disagree about their importance, the administrator must ultimately judge which effects are to be regarded as adverse for standard-setting purposes" (Jordan, Richmond & McCurdy, 1983, p. 234).

Financial and administrative support for CASAC is provided solely by the EPA, with an estimated annual operating cost of $1,500,000. CASAC operates pursuant to a charter that is refiled every two years (*Charter,* 2015). For reviews of individual NAAQS, U.S. EPA forms a supplemental panel or subcommittee, which includes the seven members of the chartered CASAC and additional experts.

The CASAC charter is composed of seven members required by the CAA section 109(d). The member composition is appointed by the EPA Administrator and must include a Chairperson, at least one member of the National Academy of Sciences, one physician, and one person from a state and air pollution control agency (*Charter,* 2015).

To become an expert on the Clean Air Scientific Advisory Committee, the EPA's Science Advisory Board (SAB) request public nominations through a Federal Register notice. The notice provides information on the mandatory qualifications needed and the type of expertise requested to serve on the committee. Nominations from candidates in scientific and research organizations, professional societies, and non-governmental organizations as well as direct contacts and letters from the EPA and current SAB are considered in the appointing process. Candidates may self-nominate or be nominated by the public through a web-enabled process or can be searched independently by the Scientific Advisory Board. A nominated expert is reviewed on whether they possess the scientific education, training, and experience to expertly evaluate basic and advanced science issues (*Frequently Asked Questions about SAB, CASAC, and Council Membership and Establishment of Ad Hoc Panels and Committees,* 2015).

CASAC chartered members chair panels and subcommittees as needed in order to provide further expertise on environmental science topics. The advisory reports drafted from these panels and subcommittees are sent to the EPA Administrator after being reviewed by the chartered CASAC and found to be appropriate (*Charter,* 2015).

The time commitment required for an expert serving on a CASAC panel typically requires an individual to participate in one two-day meeting as well as one or more teleconference meetings held over a four to six month period. Outside of meetings, there is normally 20 to 40 hours spent reading and writing (*Serving on the EPA Science Advisory Board,* 2012).

Although the CASAC is intended to provide unbiased advice on any adverse public health, welfare, social, economic or energy effects that could be potentially result from attainment and maintenance of the NAAQS , there is much debate on the ethics and efficiency of

this committee. Some of the concerns expressed, including by stakeholders, state environmental agencies, and members of Congress, include conflicts of interest involving EPA and the financial support of panelists. Member composition, peer reviews, and underrepresentation from state air agencies, local governments and tribes are among other concerns as well.

Underrepresentation of State Agencies

The member composition of CASAC "is staffed almost exclusively by public health researchers and officials, most frequently epidemiologists, and this presents and obvious conflict of interest: Their professional careers are inextricably linked to their recommendations" (Yeatman, 2014). In a report compiled by Lamar Smith, Committee on Science, Space, and Technology Chairman, "Among the current CASAC Ozone Review Panel, 16 of the 20 panel members are cited by EPA in the current versions of [three documents: The Integrated Science Assessment; the Health and Welfare Risk and Exposure Assessments; and the Policy Assessment]. Indeed, the Agency cites the work of these panel members more than 700 times in these regulatory science documents they are being asked to critically assess" (Smith, Lamar 2014). Smith also reports that "half of the current CASAC Ozone Review Panel members (10 out of 20) also served on the Agency's panel for the reconsideration of the 2008 Ozone NAAQS and five of these members served on both the reconsideration panel and the CASAC Ozone Review Panel for the 2008 NAAQS", despite that membership be rotated among qualified scientists in order to obtain fresh perspectives and reinforce the reality and the perception of independence from the agency stated in EPA's Peer Review Handbook. Without a diverse group of expert knowledge and perspectives represented from a variety of stakeholders, the decisions and recommendations made by CASAC can ultimately be considered biased and representing conflicts of interest.

An analysis of CASAC committee and Ozone Review Panel members over the past four chartered committees provides insight to the underrepresentation of state air agencies. The method to investigate underrepresentation used includes charts. Each chart provides the name, affiliation, state, and EPA region of each expert serving on the committee and are provided alongside with a map illustrating the geographic diversity of panel membership.

Of the seven chartered members serving on the 1987-1992, 1996, and 2009-Present committees, four have been from academic institutions and one member representing a state agency. The 2005-2008 CASAC committee held a total of five academic experts serving on the panel and one representing a state agency. Appendix B shows the comparison of each CASAC committee.

When further scientific expertise is required, subpanels can be authorized to provide secondary recommendations. The Ozone Review Panel provides additional scientific assessments for ozone, one of the six "criteria" pollutants established by the NAAQS. Over the past four chartered committees, less than 8% of experts have represented a state air agency. The comparison of the 1987-1992, 1996, 2005-2008, and 2009-Present Ozone Review Panel expert membership is shown in Appendix C.

Independence and Impartiality of CASAC

After an October 2011 hearing before the House of Representatives Committee on Science, Space and Technology Subcommittee on Energy and Environment, Dr. Michael Honeycutt responded to submitted questions from Congressman Andy Harris. Dr. Honeycutt, Director of the Toxicology Division at the Texas Commission on Environmental Quality (TCEQ), addressed questions regarding the independence and impartiality of CASAC. When asked, "What are major

the strengths and weaknesses of the current CASAC process?" Dr. Honeycutt stated that weaknesses of concern include;

- "Members are recommended by EPA staff and appointed by EPA Administrator
- Financial and administrative support given solely by EPA
- There are only 7 chartered members"

Dr. Honeycutt further explains that CASAC panels should be impartial, transparent, and allow for a balanced representation of all interested stakeholders as well as recommending that the CASAC review process be run by either a federal organization or independent group (Committee on Science, Space, and Technology, 2011).

It is imperative to investigate the potential underrepresentation of state agency experts, barriers candidates face when pursuing nomination to serve on CASAC, and the overall independence of the CASAC process. From the research gathered in the literature, the survey seeks insight from on-the-ground CAA practitioners into commonly asked questions about CASAC's membership and operations.

Research Design

As an Environmental Policy Graduate Fellow at the Association of Air Pollution Control Agencies (AAPCA), I had the opportunity to collect data for this study that focuses on the state environmental agencies (including from states that actively serve on AAPCA's Board of Directors ("AAPCA members' and other states (non-AAPCA members"). Currently, there are eighteen AAPCA member states including Alabama, Arkansas, Florida, Georgia, Indiana, Kentucky, Louisiana, Mississippi, Nevada, North Carolina, North Dakota, Ohio, South Carolina,

Tennessee, Texas, Virginia, West Virginia and Wyoming. The method used to analyze the policy problem on EPA's CASAC is an, anonymous, electronic survey.

I conducted the survey through creating an online format on surveymonkey.com. Each Air Director was sent an email with information on the participatory survey with a web link where they could access the survey. The Air Director has the option to participate in the survey themselves or select a designee to represent their agency. Participants were given a deadline of two weeks in order to analyze data in adequate time. After the initial survey invite, a reminder email was sent out within the seven days before the deadline.

Additional secondary data collected comes from public documents and academic resources. This data helps to support the investigation of CASAC and provide insight to the survey participants on the issues at hand. At the beginning of the survey, a brief introduction of the role and purpose of the CASAC is presented in addition to further details of the basic practices the committee is required to perform in setting the National Ambient Air Quality Standards. This allows information on the legal structure and goals of the CASAC to be transparent and equip participants with knowledge to assist in their responses.

The next portion of the survey provides further information on CASAC membership background. This brief description outlines the process for a candidate to be nominated, the required qualifications a nominated expert is reviewed upon and the breakdown of panels and subcommittees. Using secondary data collection, I compiled information on the current Clean Air Scientific Advisory Committee (Figure 1), the Particulate Matter Review Panel (Figure 2) and the Ozone Review Panel (Figure 3).The two review panels are subcommittee ad hoc panels in current use established to further provide expertise in these focus areas. The location of the

current CASAC membership panel is illustrated in Figure 4, which illustrates the geographic diversity of panel membership. Questions range in subject, but aim to supplicate the investigation of adequate representation, ethics of panels, overall efficiency and request for further advice of CASAC duties.

The purpose in acquiring and assembling this information is to present survey participants with information on the current members serving, their affiliation, and the state and EPA region they are located in. The full survey and components can be viewed in Appendix A.

The responses collected from this survey are analyzed and the information gathered provides adequate insight into the perspectives and barriers states face in regards to the CASAC. The knowledge and data compiled allows states and local agencies an avenue to present their perspectives and any advice on improving the efficiency on the CASAC.

Analysis

At the end of the deadline for submission, I closed the survey to ensure data could not be manipulated. Out of fifty states, twenty states responded before the deadline resulting in a 40% survey response rate. The responding state air agencies are categorized by EPA Region and illustrated in the Figure 5. The most heavily represented EPA Region is 4 which had six representative states responding. EPA Region 7, 6, and 1 each had three states participating in the survey. Figure 6 shows a map of the different EPA regions.

EPA Region	# of States
10	1
9	1
8	0
7	3
6	3
5	2
4	6
3	0
2	1
1	3

Figure 5

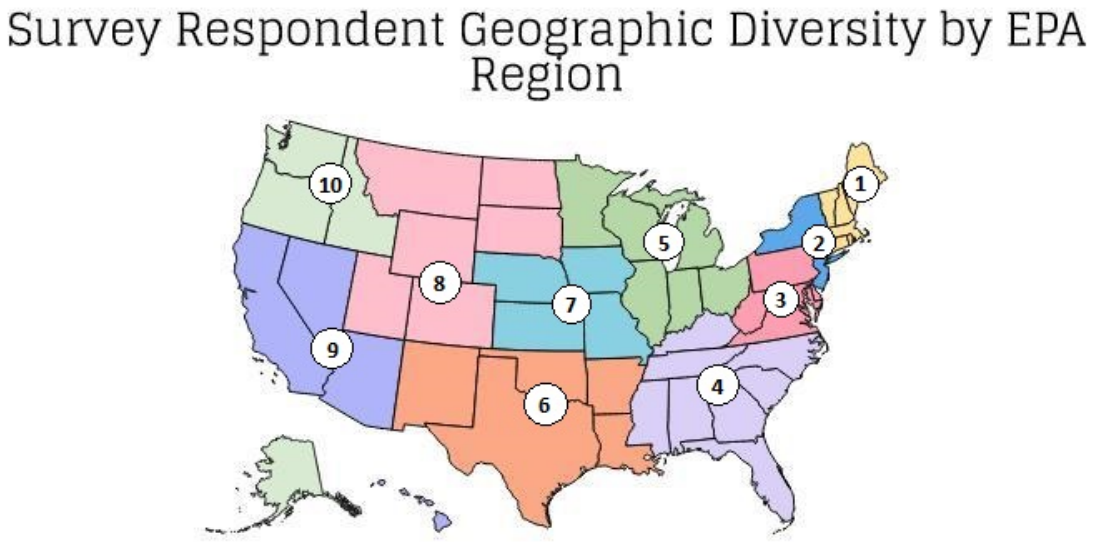


Figure 6

The survey questions two and three aim to analyze the overall background and familiarity with the surveyors. When asked, “Have you or anyone in your agency ever served on the chartered CASAC or on its subpanels since 2000?” The answer selection, “No one at my agency

has served on CASAC" received a response rate of 89%. Question three then asks, "Have you or anyone in your agency been nominated for the chartered CASAC or individual NAAQS subpanels since 2000?" This initiated a "No" response of 79% while 21% of surveyors chose "Yes". The data suggests that surveyors primarily have never served or been nominated on the chartered CASAC or its subpanels.

To analyze the overall transparency of CASAC and its process, question 5 asks, "Is the CASAC process for nominating and recommending expert candidates transparent and clearly understood?" There were a total of fifteen states responding and five states that skipped this question giving an overall response rate of 75%. Overall, eleven respondents (73%) agreed that the CASAC process is clearly understood while four subjects (26%) disagreed. This data shows that state agencies generally understand the process for nominating and participating as an expert on the panel.

The use of maps and charts in the design of this survey help to illustrate the overall geographic and diverse affiliation of chartered members on current panels. With this information, surveyors are provided with knowledge to support their answers when asked, "Do you feel that state and local agencies are adequately represented on CASAC and its subpanels?" With the answers gathered from eighteen responses (90%) of the total twenty survey pool, eleven (61%) answered "No" while seven (39%) agreed that there is adequate representation.

Another important research question that this survey looks to investigate are the barriers that state and local agencies face for serving on CASAC or any of its subpanels. The choices that surveyors can select are lack of expertise, lack of time to serve, lack of time to nominate, unaware of nomination, lack of interest, low likelihood of being selected, confusion on the

CASAC nomination process and conflicts with agency or institution policies. When analyzing the answer choices selected, the top three barriers selected include lack of time to serve (68%), low likelihood of being selected (47%), and lack of expertise (42%).

The question, “The Federal Advisory Committee Act requires advisory panels like CASAC to be fairly balanced in terms of the points of view represented and the functions performed by the advisory committee. Do you believe CASAC meets this requirement?” received a total response rate of 80% (16 of 20 states). Eleven of the states (69%) disagreed while five (31%) states agreed that CASAC meets the requirement for having balanced points of view represented.

Question nine asked whether state air agencies agreed if the chartered CASAC and its subpanels are geographically diverse and received an 85% total response rate. 35% of states agreed while 65% of states disagreed that there is sufficient geographic diversity.

The remaining four questions in the survey seek to gain information on whether CASAC is fulfilling its duties outlined in the CAA. 27% of states agreed that CASAC has carried out its duty to advise the Administrator on the relative contribution to air pollution concentrations of natural as well as anthropogenic activity while 27% selected the answer “rarely”. The remaining 47% requested that more information is needed in order to answer the question. 88% of states agreed that this CASAC advice on relative contribution to air pollution concentrations would be helpful to their agency.

On whether CASAC is fulfilling its duties to advise the Administrator of any adverse public health, welfare, social, economic, or energy effects which may result from various strategies for attainment and maintenance of NAAQS, 33% of states selected rarely, 17% chose

yes, regularly, 11% never and 39% requested more information be provided. However, 81% of states agreed that having this advice would be beneficial to their agency.

Conclusion

The survey, "Perspectives on the United States Environmental Protection Agency's Clean Air Scientific Advisory Committee: A Survey on State Agencies" provides data to supplement and contribute to primary research on the underrepresentation, barriers, and independence and impartiality issues of concern.

The EPA's CASAC serves an important role in advising and recommending NAAQS to the EPA Administrator. These maintenance and implementation of NAAQS is the responsibility among many stakeholders including state air agencies. Having adequate representation of state agencies, non-government and tribes is important to achieve diversity in scientific expertise. The survey finds that 62% of states do not feel that state and local agencies are adequately represented on CASAC and its subpanels and 65% disagree that CASAC is sufficiently geographically diverse. This supports the findings that CASAC should consider expanding expert panel membership to underrepresented entities such as state and local agencies, non-government and tribes.

Lack of time to serve, lack of expertise and low likelihood of being selected are among the top three barriers candidates face in serving on CASAC or its subpanels. Using this data collected from the survey, a better understanding on low participation from state air agencies can be determined.

Many concerns of CASAC's independence and impartiality are rooted from its direct involvement with EPA. The EPA Administrator ultimately selects the expert candidate to serve

on chartered committees and using the recommendations from experts, sets the NAAQS. To remove the potential for biases and conflict of interest, financial support should not be provided by EPA and CASAC, as discussed in congressional hearings, should be an independent entity. Experts serving on the chartered CASAC are primarily from academia which can result in conflicts of interest when recommending NAAQS using one's own research. 69% of states disagree that CASAC is fairly balanced in terms of points of view represented and functions performed by the advisory committee and supports the literature that there should be more than seven chartered members. Expanding the membership will provide more opportunities for stakeholders other than academics to serve and participate on a chartered committee.

Each question in the survey is designed to investigate concerns expressed in the literature and provide further support. Using the data, the perspectives of state air agencies can be better understood and implemented toward improving the overall CASAC process and efficiency.

Limitations

There are a few limitations to this research which may not represent all views and perspectives on EPA's CASAC. The major limitations include the relatively small survey population and focused on only state air agency's.

The survey, "Perspectives on the United States Environmental Protection Agency's Clean Air Scientific Advisory Committee: A Survey of State Air Agency's" aimed to gather a representative sample from each state. However, with only twenty states participating in the survey, results do not adequately represent all parties. Looking back at Figure 5, the geographic diversity of survey responders are heavily represented from EPA Region 4. There is a lack of representation from western states which could potentially affect the data.

The population sample targeted State Air Agency's for their feedback and solicited one response from each state. In order to improve this study, I would open the survey to non-profit, non-government and tribes in order to provide a more diverse and broad spectrum of perspectives.

Appendix A.

Perspectives on EPA's Clean Air Scientific Advisory Committee

* 1. State:

2. Have you or anyone in your agency ever served on the chartered CASAC or on its subpanels since 2000?

- [ ] I have served on CASAC
- [ ] Someone at my agency has served on CASAC
- [ ] No one at my agency has served on CASAC

3. Have you or anyone in your agency been nominated for the chartered CASAC or individual NAAQS subpanels since 2000?

- ( ) Yes
- ( ) No

Other/Comment(s)

4. Have you or anyone in your agency participated in the CASAC review process through attending in-person meetings, providing written or oral comments to CASAC, or joining teleconferences?

- ( ) Yes, often
- ( ) Rarely
- ( ) Never

5. Is the CASAC process for nominating and recommending expert candidates transparent and clearly understood?

- ◯ Yes
- ◯ No

Other/Comment(s)

6. What are the barriers to you or anyone in your agency serving on CASAC or its subpanels.Please select **all** that apply.

- ☐ Lack of expertise
- ☐ Lack of time to serve
- ☐ Lack of time to nominate
- ☐ Unaware of nomination openings
- ☐ Lack of interest
- ☐ Low likelihood of being selected
- ☐ Confusion on the CASAC nomination process
- ☐ Conflicts with agency or institution policies

Other (please specify)

Current Clean Air Scientific Advisory Committee Membership 2016				
Last Name	First Name	Affiliation	State	EPA Region
Diez Roux	*Ana*	*Drexel University*	*Pennsylvania*	*3*
Allen	George	Northeast States for Coordinated Air Use Management (NESCAUM)	Massachusetts	1
Chow	Judith	Desert Research Institute	Nevada	9
Fernandez	Ivan	University of Maine	Maine	1
Harkema	Jack	Michigan State University	Michigan	5
Sheppard	Elizabeth	University of Washington	Washington	10
Wyzga	Ronald	Electric Power Research Institute	California	9
**Italics indicates Chairperson				

Figure 1

Current CASAC Particulate Matter Review Panel (2015-2018)				
Last Name	First Name	Affiliation	State	EPA Region
Diez Roux	*Ana*	*Drexel University*	*Pennsylvania*	*3*
Adams	Peter	Carnegie Mellon University	Pennsylvania	3
Adgate	John	University of Colorado	Colorado	8
Allen	George	Northeast States for Coordinated Air Use Management (NESCAUM)	Massachusetts	1
Balmes	John	University of California, San Francisco	California	9
Boyle	Kevin	Virginia Polytechnic Institute and State University	Virginia	3
Chow	Judith	Desert Research Institute	Nevada	9
Dockery	Douglas	Harvard University	Massachusetts	1
Felton	Henry	New York State Department of Environmental Conservation	New York	2
Frampton	Mark	University of Rochester	New York	2
Frey	Christopher	North Carolina State University	North Carolina	4
Gordon	Terry	New York University School of Medicine	New York	2
Harkema	Jack	Michigan State University	Michigan	5
Kaufman	Joel	University of Washington	Washington	10
Kinney	Patrick	Columbia University	New York	2
Kleinman	Michael	University of California, Irvine	California	9
McConnell	Rob	University of Southern California	California	9
Peden	David	University of North Carolina at Chapel Hill	North Carolina	4
Poirot	Richard	Vermont Air Quality and Climate Division	Vermont	1
Polasky	Stephen	University of Minnesota	Minnesota	5
Sarnat	Jeremy	Emory University	Georgia	4
Schauer	James Jay	University of Wisconsin-Madison	Wisconsin	5
Sheppard	Elizabeth	University of Washington	Washington	10
Turpin	Barbara	University of North Carolina at Chapel Hill	North Carolina	4
Vedal	Sverre	University of Washington	Washington	10
Wyzga	Ronald	Electric Power Research Institute	California	9
**Italics indicates Chairperson				

Figure 2

Most Recent CASAC Ozone Review Panel (2009-2014)				
Last Name	First Name	Affiliation	State	EPA Region
Frey	*Christopher*	*North Carolina State University*	*North Carolina*	*4*
Allen	George	Northeast States for Coordinated Air Use Management (NESCAUM)	Massachusetts	1
Diez-Roux	Ana	Drexel University	Pennsylvania	3
Harkema	Jack	Michigan State University	Michigan	5
Suh	Helen	Northeastern University	Massachusetts	1
Weathers	Kathleen	Cary Institute of Ecosystem Studies	New York	2
Wyzga	Ronald	Electric Power Research Institute	California	9
Avol	Ed	University of Southern California	California	9
Bell	Michelle	Yale University	Connecticut	1
Brain	Joseph	Harvard University	Massachusetts	1
Chock	David	Independent Consultant	Michigan	5
Grantz	David	University of California at Riverside	California	9
Jacob	Daniel	Harvard University	Massachusetts	1
Kleeberger	Steven	National Institutes of Health	North Carolina	4
Miller	Frederick	Independent Consultant	North Carolina	4
Neufeld	Howard	Appalachian State University	North Carolina	4
Russell	Armistead	Georgia Institute of Technology	Georgia	4
Ultman	James	Pennsylvania State University	Pennsylvania	3
Vedal	Sverre	University of Washington	Washington	10
Woodbury	Peter	Cornell University	New York	2
**Italics indicates Chairperson				

Figure 3

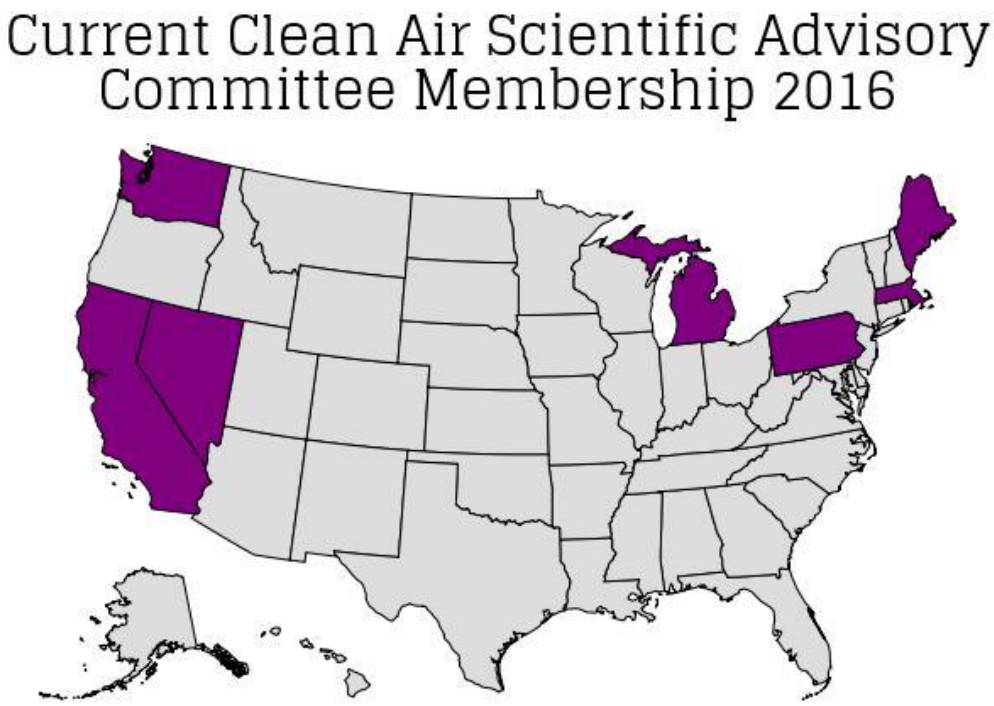


Figure 4

7. Do you feel that state and local agencies are adequately represented on CASAC and its subpanels?

- ◯ Yes
- ◯ No

Other/Comment(s)

8. The Federal Advisory Committee Act requires advisory panels like CASAC to be fairly balanced in terms of the points of view represented and the functions performed by the advisory committee. Do you believe CASAC meets this requirement?

- ◯ Yes
- ◯ No

Other/Comment(s)

9. Are the chartered CASAC and its subpanels sufficiently geographically diverse?

- ◯ Yes
- ◯ No

Other/Comment(s)

10. In addition to recommending "to the Administrator any new national ambient air quality standards and revisions of existing criteria and standards as may be appropriate," CASAC, under Section 109(d) of the Clean Air Act, "shall also...advise the Administrator on the relative contribution to air pollution concentrations of natural as well as anthropogenic activity."

Do you believe that CASAC has carried out this duty?

- ◯ Yes, regularly
- ◯ Rarely
- ◯ Never
- ◯ More information is needed

11. Would CASAC advice on the "relative contribution to air pollution concentrations of natural as well as anthropogenic activity," as part of the NAAQS review process, be helpful to your agency?

- ◯ Yes
- ◯ No

Other/Comment(s)

12. In addition to recommending "to the Administrator any new national ambient air quality standards and revisions of existing criteria and standards as may be appropriate," CASAC, under Section 109(d) of the Clean Air Act, "shall also...advise the Administrator of any adverse public health, welfare, social, economic, or energy effects which may result from various strategies for attainment and maintenance of such national ambient air quality standards."

Do you believe that CASAC has carried out this duty?

- ◯ Yes, regularly
- ◯ Rarely
- ◯ Never
- ◯ More information is needed

13. Would CASAC advice on "any adverse public health, welfare, social, economic, or energy effects which may result from various strategies for attainment and maintenance of such national ambient air quality standards," as part of the NAAQS review process, be helpful to your agency?

- ◯ Yes
- ◯ No

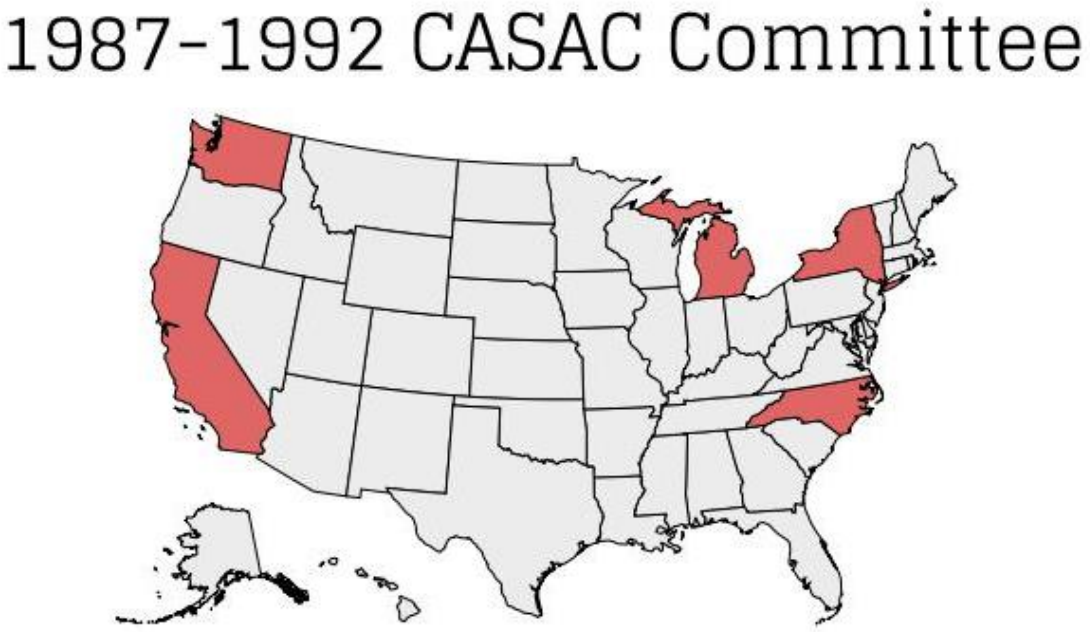
Other/Comment(s)

Appendix B.

1987-1992 CASAC Committee				
Last Name	**First Name**	**Affiliation**	**State**	**EPA Region**
McClellan	*Roger*	*Chemical Industry Institute of Toxicology*	*North Carolina*	4
Larson	Timothy	University of Washington	Washington	10
Omenn	Gilbert	University of Washington	Washington	10
Schenker	Marc	University of California	California	9
Utell	Mark	University of Rochester	New York	2
Wesolowski	Jerome	California Department of Health	California	9
Wolff	George	General Motors	Michigan	5

*italics indicated Chairperson

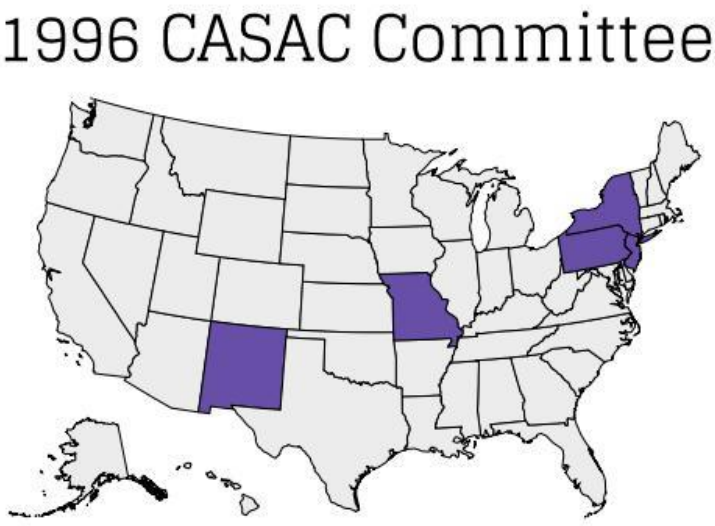
*yellow indicates academic affiliation



1996 CASAC Committee				
Last Name	**First Name**	**Affiliation**	**State**	**EPA Region**
Mauderly	*Joe*	*Lovelace Respiratory Research Institute*	*New Mexico*	6
Elston	John	Department of Environmental Protection and Energy	New Jersey	2
Hopke	Philip	Clarkon University	New York	2
Pell	Eva	Pennsylvania State University	Pennsylvania	3
Upton	Arthur	Environmental and Occupational Health Sciences Institute	New Jersey	2
Vedal	Sverre	University of British Columbia	Canada	
White	Warren	Washington University	Missouri	7

*italics indicated Chairperson

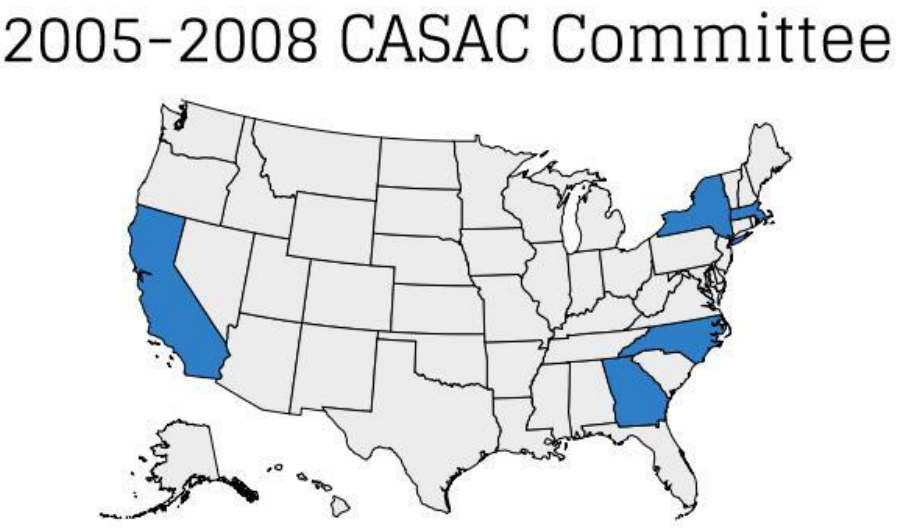
*yellow indicates academic affiliation



2005-2008 CASAC Committee				
Last Name	**First Name**	**Affiliation**	**State**	**EPA Region**
Samet	*Jonathan*	*University of Southern California*	*California*	9
Allen	George	NESCAUM	Massachusetts	1
Brian	Joseph	Harvard University	Massachusetts	1
Frey	Christopher	North Carolina State University	North Carolina	4
Russell	Armistead	Georgia Institute of Technology	Georgia	4
Suh	Helen	University of Chicago	Massachusetts	1
Weathers	Kathleen	Cary Institute of Ecosystem Studies	New York	2

*italics indicated Chairperson

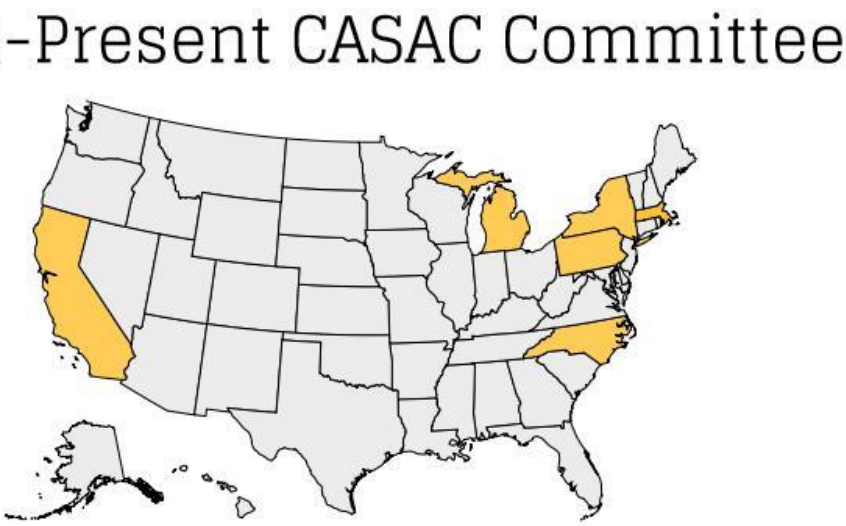
*yellow indicates academic affiliation



2009-Present CASAC Committee				
Last Name	**First Name**	**Affiliation**	**State**	**EPA Region**
Frey	*Christopher*	*North Carolina State University*	*North Carolina*	4
Allen	George	NESCAUM	Massachusetts	1
Diez-Roux	Ana	Drexel University	Pennsylvania	3
Harkema	Jack	Michigan State University	Michigan	5
Suh	Helen	Northeastern University	Massachusetts	1
Weathers	Kathleen	Cary Institute of Ecosystem Studies	New York	2
Wyzga	Ronald	Electric Power Research Institute	California	9

*italics indicated Chairperson

*yellow indicates academic affiliation



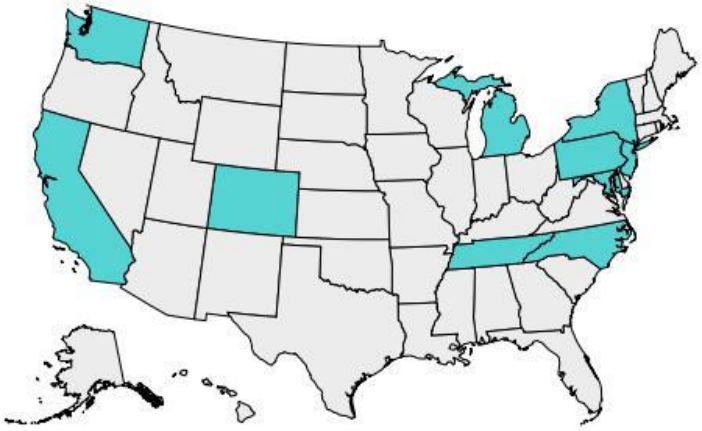
Appendix C.

1987-1992 CASAC Ozone Review Committee				
Last Name	**First Name**	**Affiliation**	**State**	**EPA Region**
McClellan	*Roger*	*Chemical Industry Institute of Toxicology*	*North Carolina*	4
Brennan	Eileen	Rutgers University	New Jersey	2
Crandall	Edward	Cornell University	New York	2
Crapo	James	Duke University	North Carolina	4
Frank	Robert	John Hopkins University	Maryland	3
Freeman	Myrick	Resources for the Future	Maryland	3
Jacobson	Jay	Boyce Thompson Institute	New York	2
Koenig	Jane	University of Washington	Washington	10
Larson	Timothy	University of Washington	Washington	10
Lippmann	Morton	New York University	New York	2
Morgan	Granger	Carnegie-Mellon University	Pennsylvania	3
North	Warner	Decision Focus Inc.	California	9
Omenn	Gilbert	University of Washington	Washington	10
Rowe	Robert	RCG/Hagler	Colorado	8
Schenker	Marc	University of California	California	9
Taylor	George	Oak Ridge National Laboratory	Tennessee	4
Utell	Mark	University of Rochester	New York	2
Wesolowski	Jerome	California Department of Health	California	9
Wolff	George	General Motors	Michigan	5

*italics indicated Chairperson

*yellow indicates academic affiliation

1987-1992 Ozone Review Panel

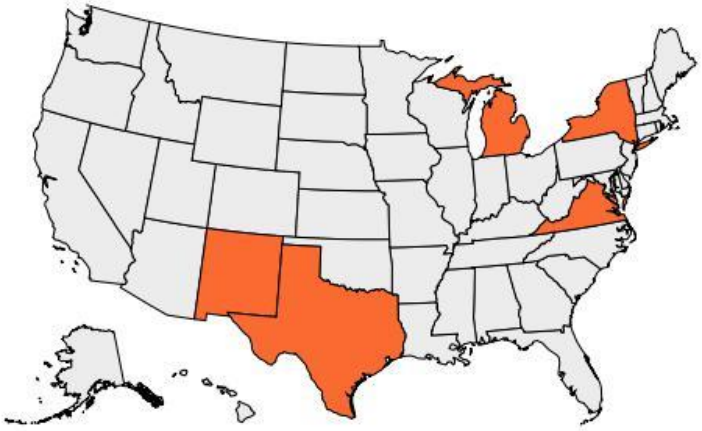


1996 CASAC Ozone Review Committee				
Last Name	**First Name**	**Affiliation**	**State**	**EPA Region**
Wolff	*George*	*General Motors*	*Michigan*	5
Ayres	Stephen	Medical College of Virginia	Virginia	3
Hopke	Philip	Clark University	New York	2
Jacobson	Jay	Cornell University	New York	2
Mauderly	Joe	Lovelace Biomedical Environmental Research Institute	New Mexico	6
Price	James	Texas Natural Resource Conservation Commission	Texas	6

*italics indicated Chairperson

*yellow indicates academic affiliation

1996 Ozone Review Panel

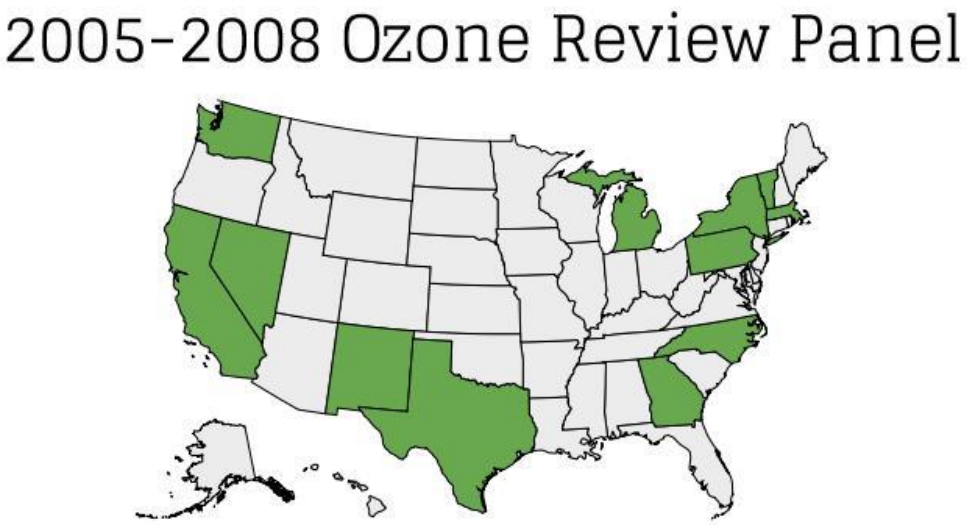


2005-2008 CASAC Ozone Review Panel				
Last Name	**First Name**	**Affiliation**	**State**	**EPA Region**
Samet	*Jonathan*	*University of Southern California*	*California*	9
Allen	George	NESCAUM	Massachusetts	1
Balmes	John	University of California	California	9
Brian	Joseph	Harvard University	Massachusetts	1
Cowling	Ellis	North Carolina State University	North Carolina	4
Frey	Christopher	North Carolina State University	North Carolina	4
Gauderman	William	University of Southern California	California	9
Harkema	Jack	Michigan State University	Michigan	5
Henderson	Rogene	Lovelace Respiratory Research Institute	New Mexico	6
Hopke	Philip	Clarkson University	New York	2
Kleinman	Michael	University of California	California	9
Legge	Allan	Biosphere Solutions	California	9
Lippmann	Morton	New York University School of Medicine	New York	2
Miller	Frederick	Independent Consultant	North Carolina	4
Morandi	Maria	University of Texas	Texas	6
Plopper	Charles	University of California	California	9
Poirot	Richard	Vermont Agency of Natural Resources	Vermont	1
Russell	Armistead	Georgia Institute of Technology	Georgia	4
Sheppard	Elizabeth	University of Washington	Washington	10
Speizer	Frank	Harvard University	Massachusetts	1
Suh	Helen	University of Chicago	Massachusetts	1
Ultman	James	Pennsylvania State University	Pennsylvania	3

Vedal	Sverre	University of Washington	Washington	10
Weathers	Kathleen	Cary Institute of Ecosystem Studies	New York	2
Zielinska	Barbara	Desert Research Institute	Nevada	9

*italics indicated Chairperson

*yellow indicates academic affiliation

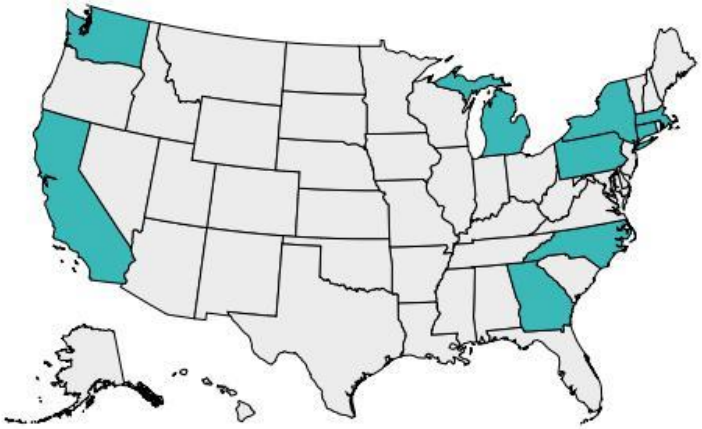


2009-Present Ozone Review Panel				
Last Name	**First Name**	**Affiliation**	**State**	**EPA Region**
Frey	*Christopher*	*North Carolina State University*	*North Carolina*	4
Allen	George	NESCAUM	Massachusetts	1
Avol	Ed	University of Southern California	California	9
Bell	Michelle	Yale University	Connecticut	1
Brain	Joseph	Harvard University	Massachusetts	1
Chock	David	Independent Consultant	Michigan	5
Diez-Roux	Ana	Drexel University	Pennsylvania	3
Grantz	David	University of California at Riverside	California	9
Harkema	Jack	Michigan State University	Michigan	5
Jacob	Daniel	Harvard University	Massachusetts	1
Kleeberger	Steven	National Institutes of Health	North Carolina	4
Miller	Frederick	Independent Consultant	North Carolina	4
Neufield	Howard	Appalachian State University	North Carolina	4
Russell	Armistead	Georgia Institute of Technology	Georgia	4
Suh	Helen	Northeastern University	Massachusetts	1
Ultman	James	Pennsylvania State University	Pennsylvania	3
Vedal	Sverre	University of Washington	Washington	10
Weathers	Kathleen	Cary Institute of Ecosystem Studies	New York	2
Woodbury	Peter	Cornell University	New York	2
Wyzga	Ronald	Electric Power Research Institute	California	9

*italics indicated Chairperson

*yellow indicates academic affiliation

2009-Present Ozone Review Panel



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