

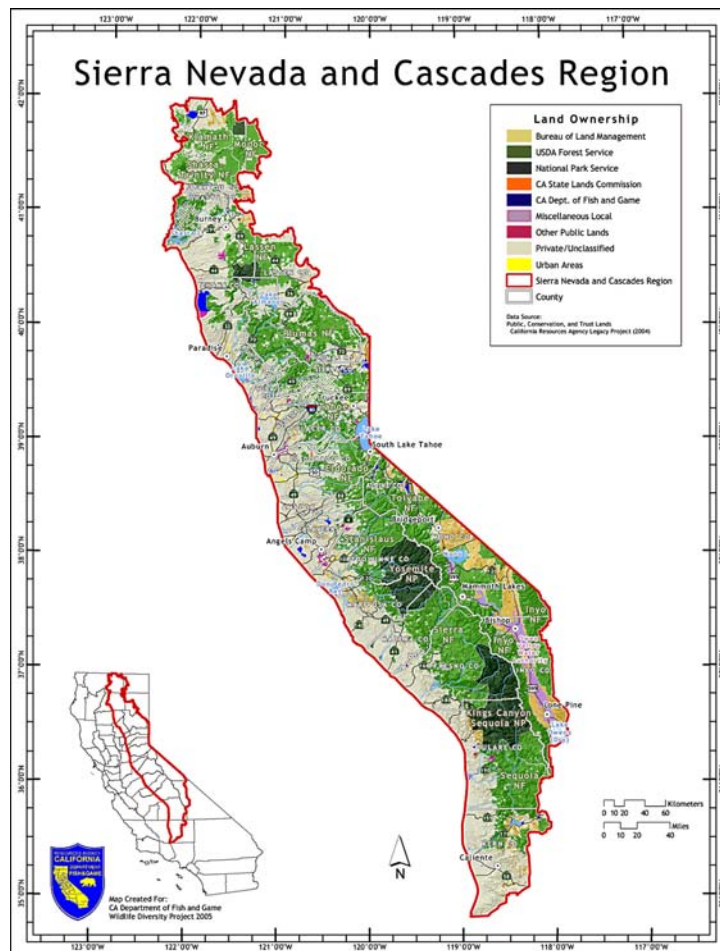
Sierra Nevada – Southern Cascades Contaminants (SNSCC) Workshop

Meeting Report A Strategy for Science and Outreach

Workshop held April 8 & 9, 2009
Sequoia and Kings Canyon National Parks
Three Rivers, California

Prepared by
Colleen Flanagan, NPS-Air Resources Division

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1. Executive Summary

1.1. Introduction

The *Sierra Nevada – Southern Cascades Contaminants (SNSCC) Workshop* was convened by the National Park Service (NPS) on April 8-9, 2009, at Sequoia National Park Headquarters. This meeting was a follow up to the release of the Western Contaminants Assessment Project (WACAP) final report and involved participants from federal, state, county, and Tribal agencies. WACAP assessed the extent of air contaminants (mercury, PCBs, current and historic use pesticides, and metals) found in high elevation and high latitude ecosystems in national parks of the Rocky Mountains, Sierra Nevada, Cascades, and Alaska. The study, released in spring 2008, provided a preliminary, regional overview of the contaminant situation at twenty western national parks, including California's Sequoia and Kings Canyon (SEKI), Yosemite (YOSE), and Lassen Volcanic (LAVO) National Parks (NPs).

Dr. Kathy Tonnessen, Research Coordinator for the Rocky Mountains Cooperative Ecosystem Studies Unit, facilitated the workshop, hosted by the NPS Air Resources Division, Pacific West Regional Office, and representatives from LAVO, SEKI, and YOSE. Presentations from WACAP scientists at the Environmental Protection Agency (EPA) and Oregon State University discussed and expounded upon study findings relevant to SEKI, YOSE, and LAVO. Additionally, briefings from the USGS, EPA, and State of California on current or past monitoring programs and/or research on toxic air contaminant distribution and effects in the SNSC region were presented.

Objectives of the Workshop were to:

1. **Provide** an overview of key Western Airborne Contaminants Assessment Project (WACAP) findings for California, and gain an understanding of contaminant distribution and human and wildlife health risks through discussion of current and future air toxics research and monitoring programs in California;
2. **Identify** gaps in research and monitoring, future assessment needs, and potential funding sources;
3. **Learn** about current health warnings and develop public outreach efforts; and
4. **Initiate** partnerships between the National Park Service, WACAP scientists and Tribal, Federal, State and Local agencies, collaborating on development of a Sierra Nevada – Southern Cascades Contaminants (SNSCC) science and education strategy.

The *SNSCC Workshop* webpage,

http://www.nature.nps.gov/air/Studies/air_toxics/wacap/snWorkshop/index.cfm, includes access to workshop-related information such as meeting logistics, workshop outcomes, workshop participants, and background materials pertaining to WACAP findings in California NPs.

1.2. Workshop Summary

Major conclusions and action items developed as a result of the Sierra Nevada – Southern Cascades Contaminants Workshop:

1. **WACAP and other EPA, USGS, and State of California air contaminants research and monitoring projects have documented the presence and effects of airborne contaminants to ecosystems in the Sierra Nevada – Southern Cascades (SNSC) region.**

- Results suggest that high elevation ecosystems in this region may have high contaminant (e.g., historic and current-use pesticides, PCBs, PBDEs, mercury) levels in fish, sediments and/or conifer needles.
- In the two lakes studied intensively in SEKI, there were high levels of dieldrin and PCBs in sediments (particularly at Pear Lake) as compared to other high elevation ecosystems. Concentrations of mercury, dieldrin and DDT in some fish (brook trout) exceeded EPA's consumption thresholds.
- Some amphibian population declines both in the Sierra Nevada and Southern Cascades may be linked to contaminant exposures.
- Multiple lines of evidence link the majority of pesticides found in high elevation SNSC areas to agricultural lands of the nearby San Joaquin and Sacramento Valleys.

2. Collaboration and partnership on contaminants issues between representatives from federal, state, and local agencies and Tribes in the SNSC must continue.

- Coordinating and enhancing efforts will enable us to leverage resources, share information and better understand the impacts of contaminants. Developing effective actions to reduce emissions, deposition, ecological impacts, and potential human and wildlife health effects will also be furthered by collaboration.
- **Action Item:** An interagency SNSC contaminants coordination group—with the proposed name SiNSCaT (Sierra Nevada Southern Cascades Toxics) Group—is currently forming to coordinate and facilitate science, education, outreach, and multiagency contributions related to SNSC contaminants work.

3. More research and monitoring is needed to determine which contaminants in which geographic areas pose the greatest risk to SNSC ecosystems (e.g., historic-use pesticides in fish, current-use pesticides in biota such as amphibians).

- While exposure of natural resources in the SNSC to contaminants has been documented, little is known about the spatial extent of risk and overall ecosystem exposure in the region.
- **Action Item:** NPS will help fund the development of a monitoring plan to assess the extent of contaminant exposure and impact in the SNSC region. The SiNSCaT Group can use the plan to solicit funding from a variety of partners for implementation of the inventory and monitoring recommendations.

4. We need a public outreach and education plan for the current science of contaminant exposure and effects to wildlife, human health, and ecosystem processes in SNSC protected areas.

- A communication strategy regarding contaminants exposure and effects, and associated public outreach efforts, would foster contaminants awareness, action and well-informed policy decisions by agencies in the SNSC region.
- **Action Item:** Organized efforts by the SiNSCaT Group will integrate contaminants awareness into fact sheets, brochures, lesson plans, and possibly podcasts. These products will raise public awareness of contaminants issues and assist in the development of personal responsibility. SiNSCaT will engage regulatory and agricultural agencies in the State of California, along with other land and resource managers, to promote information sharing and advancements in the science of contaminant exposure and effects.

2. Acknowledgements

Organizing Committee

Colleen Flanagan, Chair, NPS-Air Resources Division
Tamara Blett, NPS-Air Resources Division
Annie Esperanza, Sequoia and Kings Canyon National Parks
Nancy Nordensten, Lassen Volcanic National Park
Judy Rocchio, NPS-Pacific West Region
Lee Tarnay, Yosemite National Park
Kathy Tonnessen, NPS, Rocky Mountains Cooperative Ecosystems Studies Unit (RM-CESU)

Host

Annie Esperanza, Sequoia and Kings Canyon National Parks

Participants and Presenters

Please see Annotated Participant List for affiliations and addresses:

Ackerman, Luke	Flanagan, Colleen	Nunes, David
Blett, Tamara	Gordus, Andy	Segawa, Randy
Boiano, Danny	Hafner, Carol	Shaver, Chris
Bradford, David	Johnson, Cathy	Simonich, Staci
Brodberg, Robert	Karuzas, Jeremish	Sydoriak, Charisse
Deavours, Bill	Landers, Dixon	Tarnay, Lee
Dinger, Eric	May, Jason	Tonnessen, Kathy
Esperanza, Annie	McKenny, Heather	Vera, Kerri
Fellers, Gary	Nordensten, Nancy	Zamora, Celia

Meeting Facilitator

Kathy Tonnessen, NPS, RM-CESU

Meeting Report Review

Tamara Blett, NPS-ARD
Nancy Nordensten, LAVO
Judy Rocchio, NPS-PWRO
Randy Segawa, Cal/DPR
Kathy Tonnessen, NPS, RM-CESU

3. Agenda

**Sierra Nevada – Southern Cascades Contaminants (SNSCC) Workshop
April 8-9, 2009
Sequoia National Park, Three Rivers, CA
AGENDA**

Objectives:

1. **Provide** an overview of key Western Airborne Contaminants Assessment Project (WACAP) findings for California, and gain an understanding of contaminant distribution and human and wildlife health risks through discussion of current and future air toxics research and monitoring programs in California;
2. **Identify** gaps in research and monitoring, future assessment needs, and potential funding sources;
3. **Learn** about current health warnings and develop public outreach efforts; and
4. **Initiate** partnerships between the National Park Service, WACAP scientists and Tribal, Federal, State and Local agencies, collaborating on development of a Sierra Nevada – Southern Cascades Contaminants (SNSCC) science and education Plan of Action/Research Strategy.

Tues, 4/7 – 6:00pm Mixer at Annie Esperanza’s house.
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Wed, 4/8 – 9:00am-4:30pm Understanding Contaminant Distribution & Effects

	Topic	Presenter/Discussion Leader
9:00am	Welcome and Introductions from NPS – Sequoia (SEKI), Yosemite (YOSE), & Lassen (LAVO) NPs	Craig Axtell, Sequoia NP Kathy Tonnessen, NPS, RM-CESU, facilitator
9:15am	Overview of the WACAP Science and Issues for the SNSC Region	Dixon Landers, EPA
10:00am	WACAP Air, Snow & Vegetation Results: How SEKI/YOSE/LAVO compare to other parks studied	Staci Simonich, OSU
10:45am	BREAK	
11:00am	WACAP Contaminants in Fish: Human and wildlife health thresholds and ecosystem linkages at SEKI/YOSE/LAVO	Luke Ackerman, former OSU graduate student
11:30am	Questions & Answers with WACAP experts	
12:00pm	LUNCH	Sandwiches to order.
1:00pm	Invited Speaker Presentations: »Fish consumption guidance, public health issues, and use of WACAP results »Temporal and Spatial Patterns of Airborne Contaminants Relative to Amphibian Population Declines in the Sierra Nevada »Contribution of Atmospheric Deposition to Pesticide Loads in Surface Water Runoff	Robert Brodberg, Cal/EPA Dave Bradford, EPA Celia Zamora, USGS
2:30pm	BREAK	

2:45pm	Policy and Regulatory Options	Randy Segawa, CA Dept. of Pesticide Regulation
3:15pm	Participants will provide information on other data/programs on toxic air contaminants in California; plans for follow up monitoring, research and assessment	All
4:15pm	Set stage for Day 2	
4:30pm	ADJOURN for the day	

Thursday, 4/9 – 8:30am-12:00pm Develop SNSCC Plan of Action/Research Strategy		
	Topic	Presenter/Discussion Leader
8:30am	Morning bagels and coffee	
9:00am	Develop an SNSCC science and education Plan of Action/Research Strategy: Where do we go from here in California? Discussion of future research plans, monitoring locations, potential funding sources, health warnings, public info materials	All
10:00am	Breakout/small group discussions: 1) Research and monitoring 2) Health warnings and outreach materials 3) Partnerships and policy assessments	Breakout groups
10:30am	BREAK	
10:45am	Continue breakout groups: development of action items	Breakout groups
11:15am	Identify roadmap and Define goals: Outline SNSCC Plan of Action/Research Strategy	All
12:00pm	ADJOURN	

4. Power Point Presentations

Seven 30-45 minute electronic slide shows were presented during the workshop. They can be downloaded from the active links or from the SNSCC Workshop webpage at http://www.nature.nps.gov/air/Studies/air_toxics/wacap/snWorkshop/index.cfm.

4.1. *Review of WACAP Results for SNSC national parks: Sequoia and Kings Canyon, Yosemite, Lassen Volcanic*

4.1.1. Dixon Landers, EPA: [WACAP Overview](#) (45 min)

(1) Overview of the WACAP Project: Science and Issues for the SNSC Region; (2) Atmospheric transport patterns for SNSC; (3) Sediment data for info about contaminants change over time in the SNSC region; (4) What does the sediment data (metals, SCP, etc.) tell us about contaminant source areas and/or point sources in the SNSC area.

4.1.2. Staci Simonich, OSU: [WACAP Air, Snow & Vegetation Results](#) (45 min)

(1) Air (PASD), vegetation, and snow focus. Current use compounds in LAVO, SEKI, YOSE. Which contaminants are found at high concentrations? And how do patterns compare to the other WACAP parks? (2) Overview of the contaminants of concern: what they are and why do we care; (3) Elevational trends in SOCs in lichen; (4) Discuss WACAP links to agricultural sources.

4.1.3. Luke Ackerman, formerly OSU: [WACAP Contaminants in Fish](#) (30 min)

(1) Basic fish/ecosystem/pesticides linkages, and why do we care; (2) Human and wildlife health thresholds comparison with contaminant concentrations (dieldrin, DDE/DDT, Hg, etc.) in fish at SEKI, YOSE, LAVO; (3) Macrophage aggregate findings in SEKI fish; (4) Bioaccumulation data from WACAP; (5) Food web impacts.

4.2. *Review from other agencies on current or past monitoring programs on toxic air contaminant distribution and effects in the SNSC region*

4.2.1. Bob Brodberg, Cal/EPA: [Fish consumption guidance, public health issues, and use of WACAP results](#) (30 min)

Provide an overview of the CalEPA monitoring program on contaminants, and address whether CalEPA would consider adding NPS waters as study sites? Identify what is known on contaminants in fish and consumption advisories across the Sierra Nevada-Southern Cascades region. Describe how and what message the agency conveys regarding fish consumption and public health. Speak to the use of WACAP results in state advisories, and how to affect public information transfer.

4.2.2. Dave Bradford, EPA: [Temporal and Spatial Patterns of Airborne Contaminants Relative to Amphibian Population Declines in the Sierra Nevada](#) (30 min)

Present on the (1) temporal variation of pesticides in SEKI lakes (2003 study), (2) spatial variation across SEKI at high elevation, including correspondence between chemical concentrations and mountain yellow-legged frog population status (2005 study), (3) prevalence of pesticides in SEKI high elevation streams (2003 study), and (4) other amphibian data for elsewhere in the Sierra Nevada and Southern Cascades (YOSE, LAVO).

4.2.3. Celia Zamora, USGS: [Contribution of Atmospheric Deposition to Pesticide Loads in Surface Water Runoff in the San Joaquin Valley](#) (30 min)

Offer perspective on recent study regarding the atmospheric contribution of pesticides such as diazinon and chlorpyrifos from application to agricultural lands in the San Joaquin Valley.

4.2.4. Randy Segawa, Cal/DPR: [Policy and Regulatory Options](#) (30 min)

Describe regulatory measures considered by DPR to reduce air toxins and smog-producing chemicals from pesticide emissions and prevent pesticide contamination of surface water. How are pesticide products reformulated to reduce emissions and risks and what environmentally-friendly technologies are being promoted? How has industry responded? What policy options are available regarding concerns over historically-used pesticides (e.g. DDT, dieldrin) and what can be considered for known harmful current-use compounds? Particular interest in current use pesticides in Sequoia, Yosemite and Lassen NPs that were identified as concerns in the WACAP study due to increasing levels in the ecosystem, or at higher levels than other areas (endosulfans, dacthal, g-HCH, chlorpyrifos).

5. Workshop Results

The Sierra Nevada – Southern Cascades Contaminants Workshop provided the foundation for understanding the presence and effects of airborne contaminants on ecosystems in the SNSC Region. The four identified areas for progress include: (1) science, (2) collaboration, (3) awareness, and (4) outreach.

5.1. SiNSCaT Overview

An interagency SNSC contaminants coordination group—with the proposed name of SiNSCaT (Sierra Nevada Southern Cascades Toxics) Group—has formed to coordinate and facilitate science, education, outreach, and multiagency contributions to, SNSC contaminants work. This effort will continue work on the four areas of progress as identified above, and establish a communication method between WACAP participants and other interested parties.

SiNSCaT action items developed for 2009-2010:

1. Review of draft Request for Statements of Interest & Qualifications – SNSC Monitoring Plan (Fall 2009), see [Section 5.3.1](#)
2. Compile existing educational programs and other agency outreach venues (Winter 2009-2010), see [Section 5.3.2](#)
3. Provide informational materials and resources to integrate into identified audiences (Winter 2009-2010), see [Section 5.3.2](#)

5.2. Discussion Questions for Day 2

Developed by the steering committee and presenters in advance of the SNSCC Workshop, a straw-man list of questions was provided regarding what we know (e.g., WACAP) and what we want to know about airborne contaminants in the SNSC Region. The list of questions was refined by all participants during Day 1 of the Workshop, and provided the foundation for the Breakout Sessions on Day 2.

Each of the two breakout groups (Research/Monitoring and Policy/Communication) reviewed and prioritized the question listed below. Questions shaded gray were selected by each breakout group as the focus of discussion and action item development.

5.2.1. Research and Monitoring Questions

Given contaminants research findings for California from WACAP and other projects, what questions remained unanswered and where do gaps exist in research and monitoring efforts?

1. Why have **dieldrin in fish and PCBs in sediment** (at Pear Lake) increased in SEKI in the last decade? Are dieldrin and PCB levels following a similar pattern in other SNSC regional ecosystems? What is the **temporal** distribution of such contaminants in the SNSC region and why?
2. Given that the two lakes sampled at SEKI (Emerald and Pear) are only 1 km apart in the Kaweah watershed, how well do the WACAP findings represent the high elevation environment throughout SEKI? Throughout the SNSC region? What is the **spatial** distribution of such contaminants in the SNSC region and why?

3. Concentrations of **mercury** (Hg) in some fish at SEKI exceeded health thresholds. Is this consistent with other high elevation ecosystems in California? What are potential sources of Hg to the SNSC region? And what are the methylation dynamics for conversion of Hg to methyl Hg in freshwaters? Are there other wildlife endpoints correlated with Hg exposure?
4. Concentrations of **p,p'-DDE** (a byproduct of DDT most commonly found in fish) in some fish at SEKI exceeded subsistence health thresholds. What are potential sources of DDT to the SNSC region?
5. Given high toxicity compounds such as **PCB congeners, fungicides, dioxin, furans** that weren't measured by WACAP, how should such needs be prioritized?
6. To what extent might **pyrethroids**, or other current-use pesticide not measured by WACAP, be a concern in the SNSC region?
7. If we were to explore analysis of contaminants in higher trophic levels or more sensitive to contaminants (e.g., osprey eggs, chick blood), what would be the utility of that information? What are the **ecosystems components most at risk** from toxic air contaminants in the Sierra Nevada and the Southern Cascades?
8. What are **contaminant thresholds for toxic effects on native species**? What is the dose-response relationship for native species?
9. Why did high contaminant concentrations in SEKI fish not result in higher **vitellogenin (Vtg) and intersex** as in Rocky Mountain fish? Is there a relationship between Vtg and intersex and how does that translate to SEKI?
10. Why are **SCPs** (as markers of high temperature coal combustion) increasing?
11. How might **climate change** affect the levels of emissions, deposition and effects on ecosystems components?
12. If the interaction between contaminants such as **mercury, pesticides and fire** were to be further explored, what types of questions would be most relevant?
13. What type of **ongoing monitoring program** would be appropriate for the SNSC region?
14. How do we bridge the gap between **science and management** action?

5.2.2. Partnership, Policy, Public Outreach and Communication Questions

Given contaminants research findings for California from WACAP and other projects, what can we do to initiate partnerships and collaborate on a science and education strategy, and how can we develop public outreach efforts and share information about current health warnings?

1. Which federal, state, local and Tribal agencies are carrying out or **participating in contaminants work**? Who are the right people/organizations to expand on the WACAP results? And what work are they conducting? Who could take the lead in these issues, e.g. control of emissions, monitoring of deposition, monitoring fish tissue concentrations, providing health warnings?
2. What **funding opportunities** are available to pursue some of these research and communication questions?
3. How could coordination be accomplished with other people not involved in the workshop, such as **coordination with those from NGOs and industry**? And what would be gained by doing so?
4. How can we improve the **coordination between all the affected land managers** in the Sierra Nevada and the Southern Cascades?
5. How should all state, federal, local and Tribal agencies **coordinate messages** about contaminants and how would this be accomplished given different methodologies?
6. How can we best **communicate research results** to policy makers? When we have science that indicates an effect (e.g., endosulfans) what are the steps to regulatory action? How do we bridge the gap from science to management action? For example, application of an information clearinghouse regarding these issues?
7. How can we best **communicate research results** to the general public? Can we influence people to take action on the contaminant problem?
8. How can we best **communicate management actions** taken that involve pesticide application in the national parks and other protected areas?
9. What **information** from WACAP or the post WACAP workshop do parks need to share with staff/visitors?
10. What tools and approaches can be developed and implemented by SNSC interested parties to **reduce the contamination** being generated outside park boundaries?
11. Since mercury levels of concern have been documented in wildlife at SEKI what **policy or management options** can be explored?
12. Are there examples of land use **best management practices** (BMPs, e.g., “no-till” methods) that could reduce soil disturbance and/or re-volatilization of contaminants? Who could be approached to conduct research on BMPs?
13. How could a **strategic planning process** using multiple future scenarios help managers frame issues and develop solutions, e.g., scenario planning?

5.3. Breakout Sessions

In an effort to develop action items and define next steps for research and communication of the risk of contaminants for the Sierra Nevada – Southern Cascades Region, on Day 2 workshop attendees were divided into two smaller groups: 1) research and monitoring, and 2) policy and communication. Each breakout group identified questions to address, presented in [Section 5.2](#), and used the template at [Section 9.2](#) to resolve the issues addressed.

5.3.1. Research and Monitoring

Participants

Danny Boiano; Dave Bradford; Dixon Landers; Staci Simonich; Lee Tarnay (recorder); Eric Dinger; Andy Gordus; Kathy Tonnessen; Tamara Blett (facilitator)

Desired Future Outcome

The multi-agency partners believe that there is a need to develop a contaminant inventory/monitoring program for the SNSC region that explores the spatial extent of contaminant distribution along with thresholds for effects on ecosystems/species/human health.

Problem

This is an important issue for the SNSC Region because several studies suggest that ecosystems in this region have the highest exposure to contaminants of any area in the western US. The WACAP project indicated that among the eight western US parks in the study, SEKI had the highest pesticide exposures and mercury exceeded fish consumption advisory levels for some fish species. In addition, other research strongly suggests that frog species in the Sierra Nevada area are at risk from contaminants.

Summary of available resources and existing models

- The NPS Inventory and Monitoring program (I&M) has already laid out grid for sampling lakes in the three park units- we could use statistical design and field crews to add extra samples for contaminant analyses (Sierra Nevada and Klamath I&M networks).
- WACAP methods and indicators have been established.
- Other agency data are available: SEKI, YOSE; USGS-NAWQA, USGS-HBN (Hydrologic Benchmark Network); EPA-EMAP; SWAMP (State Water Monitoring Program- California).
 - Other peer reviewed literature on contaminants will need to be searched and incorporated into a reference list.
- Dave Bradford (EPA) has done amphibian/sediments work at 28 sites in SEKI
- Gary Fellers (USGS) has conducted dose-response work on contaminants and eggs/tadpole work at SEKI, with a reintroduction study in Tablelands (SEKI)

Challenges & Obstacles

- Finding sufficient funding
- Coordination among agencies
- Sampling consistency (Methods and Quality Assurance)
- Multiple objectives of agencies

Recommended Action(s)/Timeframes/Responsible parties

The strategy to develop a contaminants inventory/monitoring program for the SNSC region is envisioned as a 3 part process involving: (1) developing scoping and study design options, (2) development of full proposal/monitoring plan, (3) Implementing the monitoring plan.

Phase 1: Solicit ideas for scoping and study design via an “Expression of Qualifications and Interest” (similar to a Request for Proposals, RFP).

This would include a discussion of key pollutants to measure; current exposure in ecosystems, what can be monitored quickly; which systems are most sensitive; how to select indicators, etc).

Complete by October 2009. Kathy Tonnessen leads, with review assistance from Tamara Blett, and the SNSCC oversight group (SiNSCaT, with representatives from: NPS, USFS, USGS, State of CA, FWS, and EPA)

Phase 2: Select a principal investigator to develop a spatial (and temporal) design of a long-term contaminants monitoring program in the SNSC.

Desirable features of a contaminants monitoring program would:

- a) Include information useful for managers (all agencies);
- b) Address issues of highest risk (e.g. HUPs in fish and CUPs in biota);
- c) Connect stressors and effects over large spatial scales;
- d) Address how contaminants damage ecosystem function;
- e) Discuss a design that allows for change detection;
- f) Provide an overview of current SNSC status;
- g) Be feasible to undertake in terms of funding, partners involved, and expertise available;
- h) Include a statistically defensible design;
- i) Include multiple agencies;
- j) Evaluate utility of collecting fish, pine needles and sediments (WACAP found these most valuable), but also would prioritize or select other ecosystem components to monitor, if needed;
- k) Focus on exposure/effects as the endpoint; and
- l) Include opportunistic monitoring piggybacking on other studies; M) Emphasize impacts on native and/or threatened and endangered species.

Products of this design project will include a:

- Summary of agency data, peer-reviewed literature, and NPS (and others) reports on contaminants in the SNSC region;
- Map of sensitive resources and of the spatial extent of contaminant concentrations, including the corresponding GIS layers; and
- Comprehensive plan for what and how to monitor (severable, so that portions can be separately funded)

The Selection of Investigator will occur by December 2009. The estimated cost of the proposal is \$20,000 - \$50,000. (NPS-ARD can potentially fund \$20,000; other SNSC partners need to contribute remainder).

Need to create an expert panel of scientists to review proposals developed following the selection of interested groups:

Tamara Blett – NPS (lead)

Kathy Tonnessen- NPS

Carolyn Hunsaker- USFS (exclude if she'll compete for the project)

Dave Clow- USGS (exclude if he'll compete for the project)

Dixon Landers- EPA (exclude if he'll compete for the project)

Jim Herrington- Cal Fish and Game

Annie Esperanza – SEKI

Eric Dinger - LAVO & I&M

Lee Tarnay- YOSE

Phase 3: Team of investigators produce products requested, including an annotated reference list and a monitoring plan. Proposed due date: September 2010.

Phase 4: Once a monitoring plan is written, reviewed and approved by agency partners, efforts by SNSC members to secure funding for implementation can begin.

Additional Breakout Group Notes

Actions that could be taken now, to lay the foundation for future contaminants monitoring:

- I&M collect fish out of lakes and submit for contaminants analysis
- GIS map and literature review for the SNSC region done internally (6 month effort, GS-7 term employee?)
- Getting Dave Bradford's final synthesis of 28 sites in SEKI to inform spatial study design.

5.3.2. Policy and Communication

Participants

Cathy Johnson; David Nunes; Randy Segawa; Luke Ackerman; Bob Brodberg; Jeremish Karuzas; Chris Shaver; Annie Esperanza; Nancy Nordensten (recorder); Colleen Flanagan (facilitator)

Desired Future Outcome

Effective communication to the public and to policy makers regarding toxic air contaminant distribution and effects in the SNSC Region would increase public awareness, instill a sense of personal responsibility and foster individual and local group action and stewardship, perhaps including reduced use of pesticides. Possible venues include integration into educational curricula or public presentations. Similarly, communicating contaminant distribution and effects to policy makers would inform the regulatory approval process for pesticides and other substance use restrictions or bans.

Problem

Communicating contaminant science to policy makers and the general public is difficult because of the general lack of scientific literacy and awareness of air contaminant issues and threats. The topic's technical nature requires identification of a method by which to engage both audiences.

Summary of available resources and existing models

- Existing science including WACAP results, Dave Bradford's and Carlos Davidson's work on amphibians and contaminants, Gary Fellers' dose/response research on amphibian eggs and tadpoles; and current ongoing studies on contaminant deposition and accumulation in the SNSC region by Alisa Mast/Dave Clow
- Website/clearinghouse for literature documenting contaminants and amphibian declines: <http://bss.sfsu.edu/cdavidson/contaminants.htm>
- NPS brochures including WACAP Fact sheet, SEKI's 'What's in the Wind'
- Educational programs including curriculum programs by NPS ("Rangers in the Classroom"), State of CA (SJV communication project – D. Nunes), USFWS (FWS outreach section – C. Johnson)
- Technical meetings, scientific conferences for dissemination of new information to scientific audiences
- Previously established interagency linkages – who needs to know, how do we convey the information, and what is the information they need to know?
- Established ecological thresholds and EPA/State fish consumption warnings/advisories
- Environmental advocacy groups such as Pesticide Action Network, and Women's Voices for the Earth (<http://www.womenandenvironment.org/>)

Challenges & Obstacles

A. Communication to Public

- Difficult to coordinate messages from different agencies to various audiences
- Resistance and backlash to "negative impact only" messages – important to link the information with positive alternatives for example, NPS Integrated Pest Management (IPM)
- Lawsuits
- How do we explain/acknowledge pesticide use on federal lands?

B. Communication to Policy-makers

- Much of the work being done is litigation driven, reactive!
- How do we identify who the policy makers are (in some cases, these would be local agricultural commissioners, product distributors, users)
- Local groups have not developed a consistent, coordinated message that can move local information to regional and national levels

Recommended Action(s)/Timeframes/Responsible parties

A. Communication to Public

Balance the risk-benefit equation and instill awareness regarding items like the 'perfect fruit'. Provide information on effects of contaminant use and life of the product in the environment to audiences such as:

1. Industry sector and Agricultural interests (e.g., supply a briefing statement or language to insert on existing documents?)
2. General public (e.g., a simplified version of the WACAP fact sheet, and develop a NPS-Pacific West Region version of 'What's in the Wind', Glacier NP's Contaminants in Fish, etc. – which can eventually be translated to formats such as podcasts, YouTube)
3. Scientists (e.g., attend environmental toxicology conferences)
4. Schools or Educational settings (e.g., use existing programs like Rangers in the Classroom, high school curricula) –include a WACAP message that allows identification to issue (i.e., how does this affect your recreational areas, your kids, the fish you catch).

Identify and start coordinating among all groups with outreach materials and educational programs (i.e., DPR, NPS, State of CA., USFWS, SJVAPCD, CDFG) Tap available resources, refine what's available, and develop materials for use – Colleen Flanagan to Lead, with SiNSCaT, Dec 2009 – Dec 2010

- Draft briefing statement for PWR brochure 'What's in the Wind. (Colleen Flanagan, w/ SiNSCaT)
- Post links to contaminant information from other agencies to the web sites of each agency. (SiNSCaT)
- Develop partnership with the State of California Educators Association. (SiNSCaT)
- Compile a list of scientific/technical conferences where contaminant findings can be shared. (Cathy Johnson)

B. Communication to Policy Makers

Establish an information transfer mechanism among regulatory agencies, advocacy groups, and industry representatives, including:

- Direct dialogue and conference calls with EPA HQ pesticide program (Tamara Blett/Chris Shaver) and Office of Pesticide Programs (Cathy Johnson) – progress ongoing
- Attend annual meetings and conferences hosted by chemical companies and distributors (Randy Segawa, David Nunes to provide information) – by December 2009

Transfer 'cause and effect' data about CUPs to Cal/DPR and other agencies, including NGOs (e.g., SNA, YOSE fund, NPCA, PAN). Agencies cannot take action unless they have data that document the adverse effects of the pesticides (i.e., chlorpyrifos, endosulfans); SiNSCaT to identify timelines and responsibilities

- SiNSCaT (?) to identify who can conduct a literature review to get information/identify data gaps (?)
 - Find areas of particular concern, e.g., impacts to endangered species, personal impacts to kids or constituent groups, financial impacts
- Notify NGOs and regulatory agencies of peer-reviewed research on human and wildlife health

Additional Breakout Group Notes:

DPR gets funds from enforcement actions. Is it possible for the NPS/ other agencies to garner some of this enforcement money for research on contaminants and effects or for outreach efforts?

6. SNSC Air Toxic Contaminant Programs and Connections

There are several other planning and assessment programs by the Federal and State partners in the Sierra Nevada – Southern Cascades region. Coordination among agencies and programs is encouraged to streamline planning and implementation of projects, and to ensure resources are used on issues of highest priority. Some of these other efforts include:

- NPS Natural Resource Condition Assessments (NRCA)
- NPS Inventory & Monitoring Networks (I&M)
- Strategic Framework for Science in Support of Management in the Southern Sierra Nevada Ecoregion (April 2009)
- EPA Environmental Monitoring & Assessment Program (EMAP); includes National Lake Survey (NLS), National Rivers and Streams Assessment (NRSA)
- USGS National Water Quality Assessment Program (NAWQA)
- USGS Hydrologic Benchmark Network (HBN)
- USFS Inventory, Monitoring, and Analysis (IMA) [Assessment] Science Program
- USFS Forest Inventory and Analysis (FIA)
- FWS Strategic Habitat Conservation (SHC)
- Cal/EPA State Water Ambient Monitoring Program (SWAMP)
- Cal/EPA, CARB, Toxic Air Contaminant (TAC) Program

Additional venues and outreach programs will be provided by the SiNSCaT Group.

7. List of Abbreviations

ARD	Air Resources Division (NPS)
Cal/DPR	California Department of Pesticide Regulation
Cal/EPA	California Environmental Protection Agency
CARB	California Air Resources Board
CDFG	California Department of Fish and Game
CUP	current-use pesticide
EMAP	Environmental Monitoring & Assessment Program (EPA)
EPA	U.S. Environmental Protection Agency
FWS	U.S. Fish & Wildlife Service
HBN	Hydrologic Benchmark Network (USGS)
HUP	historic-use pesticide
I&M	Inventory & Monitoring Program (NPS)
LAVO	Lassen Volcanic National Park
NAWQA	National Water Quality Assessment Program (USGS)
NGO	non-governmental organization
NP	national park
NPCA	National Parks Conservation Association
NPS	National Park Service
OSU	Oregon State University
PAN	Pesticide Action Network
PCB	polychlorinated biphenyl
POP	persistent organic pollutant
PWR	Pacific West Region (NPS)
RFP	Request for Proposals
RM-CESU	Rocky Mountains Cooperative Ecosystem Studies Unit
SCP	spheroidal carbonaceous particle
SEKI	Sequoia & Kings Canyon National Parks
SiNSCaT	Sierra Nevada Southern Cascades Toxics
SJVAPCD	San Joaquin Valley Air Pollution Control District
SNA	Sierra Nevada Alliance
SNSC	Sierra Nevada – Southern Cascades
SNSCC	Sierra Nevada – Southern Cascades Contaminants
SOC	semi-volatile organic compound
SWAMP	Surface Water Ambient Monitoring Program (Cal/EPA)
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WACAP	Western Airborne Contaminants Assessment Project
YOSE	Yosemite National Park

8. Annotated Participant List

SNSCC Workshop attendees **bolded**; other invited participants included below in non-bold text.

Luke Ackerman, WACAP Researcher, formerly OSU, currently FDA Center for Food Safety and Applied Nutrition

Luke.Ackerman@fda.hhs.gov

301-436-2266
5100 Paint Branch Parkway,
College Park, MD 20740

Ross Bell, Air Quality District Manager, Shasta County Air Quality Management District

rebell@co.shasta.ca.us

530-225-5674
1855 Placer Street, Suite 101
Redding, CA 96001

Tamara Blett, Ecologist, Air Resources Division, National Park Service

Tamara.Blett@nps.gov

303-969-2011
PO Box 25287
Denver, CO 80225

Danny Boiano, Aquatic Ecologist, Sequoia and Kings Canyon National Parks

danny_boiano@nps.gov

559-565-4273
47050 Generals Highway
Three Rivers, CA 93271

David Bradford, Research Ecologist, US EPA, ORD, Landscape Ecology Branch

bradford.david@epa.gov

702-798-2681
PO Box 93478
Las Vegas, NV 89193

Robert Brodberg, Chief, Fish and Water Quality Evaluation Section, Cal EPA- Office of Environmental Health Hazard Assessment

rbrodber@oehha.ca.gov

916-323-4763
Mail Stop 12-B, PO Box 4010
Sacramento, CA 95812

Ricardo Cisneros, Air Resource Specialist, U.S. Forest Service

rcisneros@fs.fed.us

559-297-0706 x4904
1600 Tollhouse Road
Clovis, CA 93611

Carlos Davidson, Director and Associate Professor, Environmental Studies Program-SFSU

carlosd@sfsu.edu

415-405-2127
San Francisco State University
1600 Holloway Ave.
San Francisco, CA 94132

Bill Deavours, Deputy, Tulare Co. Ag. Commissioner

BDeavour@co.tulare.ca.us

559-685-3332
Tulare County Agricultural Building
4437 S. Laspina
Tulare, CA 93274

Eric Dinger, Aquatic Ecologist, Klamath Inventory and Monitoring Network

eric_dinger@nps.gov

541-552-8574
Southern Oregon University
1250 Siskiyou Blvd.
Ashland, OR 97520-5011

Jim Donnelly, Lassen County Agricultural Commissioner

lassenag@frontiernet.net

530-251-8110
Lassen County Agricultural
Commission
175 Russel Ave.
Susanville, CA 96130

Annie Esperanza, Air Resources Specialist, Sequoia and Kings National Parks

Annie_Esperanza@nps.gov

559-565-3777
47050 Generals Hwy
Three Rivers, CA 93271

Gary Fellers, Research Wildlife Biologist, USGS Pt. Reyes Field Station

gary_fellers@usgs.gov

415-464-5185
Point Reyes National Seashore
Pt. Reyes, CA 94956-9799

Colleen Flanagan, Ecologist, Air Resources
Division, National Park Service
Colleen_Flanagan@nps.gov
303-969-2806
PO Box 25287
Denver, CO 80225

Andrew Gordus, Senior Environmental
Scientist, California Fish and Game
agordus@dfg.ca.gov
559-243-4014 x239
1234 East Shaw
Fresno, CA

Mae Gustin, Professor, University of Nevada-
Reno, Department of Natural Resources &
Environmental Science
mgustin@cabnr.unr.edu
775-784-4203
UNR, MS370
Reno, NV 89557

Carol Hafner, Fresno County Ag.
Commissioner
FresnoAg@co.fresno.ca.us
559-456-7510
Fresno County
1730 S. Maple Ave
Fresno, CA 93702

Cathy Johnson, US Fish and Wildlife Service
Cathy_S_Johnson@fws.gov
916-414-6596
2800 Cottage Way Room 2605
Sacramento, CA 95825

Jeremish Karuzas, US Fish and Wildlife
Service
jeremiah_m_karuzas@fws.gov
916-414-6736
2800 Cottage Way Room 2605
Sacramento, CA 95825

Gary Kunkel, Tulare County Ag. Commissioner
gkunkel@co.tulare.ca.us
559-685-3323
Tulare County Agricultural Building
4437 S. Laspina
Tulare, CA 93274

Dixon Landers, Senior Research Environmental
Scientist, US EPA NHEERL, Western Ecology
Division
Landers.Dixon@epa.gov
541-754-4427
200 SW 35th Street
Corvallis, OR 97333

Lyle Lewis, US Fish and Wildlife Service
Lyle_Lewis@fws.gov
530-527-3043
FWS R8 Red Bluff

Mike Majewski, Research Chemist, USGS
majewski@usgs.gov
916-278-3086
6000 J Street, Placer Hall
Sacramento, CA 95819-6129

Alisa Mast, Researcher, USGS-CWSC
mamast@usgs.gov
303-236-4884 ext.314
Denver Federal Ctr.
Bldg. 53, MS 415
Denver, CO 80225

Jason May, Aquatic Ecologist, USGS
jasonmay@usgs.gov
916-278-3079
6000 J St., Placer Hall
Sacramento, CA 95819

Mac McDougall, Manager, Air Resources Board,
Special Purpose Monitoring Section
emcdouga@arb.ca.gov
916-327-4720
1927 13th St.
Sacramento, CA 95814

Melanie McFarland, Fisheries Biologist, Lassen
National Forest
mmcfarland@fs.fed.us
530-257-2151
2550 Riverside Drive
Sacramento, CA 96130

Heather McKenny, Aquatic Ecologist,
Yosemite NP, Division of Resource
Management and Sciences
Heather_McKenny@nps.gov
209-379-1438
PO Box 700, 5083 Foresta Road
El Portal, CA 95318

Nancy Nordensten, Biologist, Lassen Volcanic NP

Nancy_Nordensten@nps.gov
530-595-4444 x5172
PO Box 100
Mineral, CA 96063

David Nunes, Air Quality Specialist, San Joaquin Valley Unified Air Pollution Control District

david.nunes@valleyair.org
559-230-5808

George Ozanich, Air Pollution Control Specialist III, Northern Sierra Air Quality Management District

george@myairdistrict.com
530-283-4654
PO Box 3981
Quincy, CA 95971

Trent Proctor, Air Quality Program Manager, USDA Forest Service, Pacific Southwest Region

tprocter@fs.fed.us
559-784-1500 X1114

Judy Rocchio, Air Coordinator, Pacific West Region, National Park Service

Judy_Rocchio@nps.gov
510-817-1434
1111 Jackson Street, Suite 700
Oakland, CA 94607

Randy Segawa, Environmental Program Manager, Dept. of Pesticide Regulation, Air and Ground Water Programs

rsegawa@cdpr.ca.gov
916-324-4137
PO Box 4015
Sacramento, CA 95812-4015

Chris Shaver, Chief, Air Resources Division, National Park Service

chris_shaver@nps.gov
303-969-2074
PO Box 25287
Denver, CO 80225

Staci Simonich, Associate Professor, Oregon State University, Dept. of Environmental and Molecular Toxicology and Dept. of Chemistry

staci.simonich@orst.edu
541-737-9194
1141 Agricultural and Life Sciences
Corvallis, OR 97331-7301

Charisse Sydoriak, Chief, Division of Resources Management and Science, Sequoia and Kings Canyon NPs

charisse_sydoriak@nps.gov
559-565-3120
47050 Generals Highway
Three Rivers, CA 93271

Lee Tarnay, Air Resources Specialist, Division of Resource Management and Sciences, Yosemite NP

Leland_Tarnay@nps.gov
209-379-1422
Po Box 700, 5083 Foresta Road
El Portal, CA 95318

Patti TenBrook, Life Scientist, US EPA - Region 9, Pesticides/Water Quality

tenbrook.patti@epa.gov
415-947-4223
U.S. EPA Region 9, CED-5
75 Hawthorne St.
San Francisco, CA 94105

Kathy Tonnessen, Research Coordinator, Rocky Mountains-CESU, National Park Service

Kathy_Tonnessen@nps.gov
406-243-4449
Univ. of Montana, College of Forestry
Missoula, MT 59812

Kerri Vera, Environmental Department Director, Tule River Indian Reservation

tuleriverenv@yahoo.com
559-783-8892
PO Box 589
Porterville, CA 93258

John Wullschleger, Fisheries Program Leader, Water Resources Division, National Park Service

john_wullschleger@nps.gov
970-225-3572
1201 Oakridge Drive, Suite 250
Fort Collins, CO 80525

Celia Zamora, Hydrologist, USGS, CA Water Science Center

czamora@usgs.gov
916-278-3293
California State University
6000 J Street, Placer Hall
Sacramento, CA 95819-6129

9. Supplementary Resources

9.1. Invitation Letter



United States Department of the Interior

NATIONAL PARK SERVICE
Sequoia and Kings Canyon National Parks
47050 Generals Highway
Three Rivers, California 93271-9651
(559) 565-3341



IN REPLY REFER TO:

Dear Colleague,

You are invited to participate in a post-WACAP (Western Airborne Contaminants Assessment Project) Workshop, April 8-9, 2009 for the Sierra Nevada – Southern Cascade (SNSC) region, hosted by Sequoia & Kings Canyon National Parks in Three Rivers, CA.

The National Park Service conducted the multiagency WACAP study in 2002-2007 to evaluate potential threats to national park ecosystems from airborne contaminants and likely sources of those contaminants, addressing concerns about the persistence, toxicity, and bioaccumulative properties of airborne contaminants such as mercury and pesticides. Released in spring 2008, WACAP provided a preliminary, regional overview of the contaminant situation at twenty western national parks from the Arctic to the Mexican border, including California's Sequoia & Kings Canyon (SEKI), Yosemite (YOSE), and Lassen Volcanic (LAVO) National Parks (NPs).

Key findings from the WACAP report indicate that out of over 100 organic contaminants tested, 70 were found at detectable levels in snow, water, lichen, conifer needles, lake sediment, and/or fish in national parks. While concentrations of most of these contaminants were below levels of concern, others were found to have accumulated above levels of concern in sensitive resources such as fish. At SEKI, high concentrations of mercury and the pesticides DDT and dieldrin in fish exceeded fish-eating wildlife and/or human health consumption thresholds. (WACAP did not sample fish at YOSE and LAVO.) Vegetation samples at the 3 California NPs sampled exhibited elevated concentrations of many historic- and current-use pesticides. Given potential ecosystem and human health risks, a key question remaining begs to answer whether the SEKI results are representative of the rest of the SNSC region, including YOSE and LAVO.

To address this question, the National Park Service is hosting an agency-only Sierra Nevada – Southern Cascades Contaminants Workshop to discuss, clarify and expand on WACAP findings as they pertain to SEKI, YOSE, and LAVO, as well as other parts of the Sierra Nevada – Southern Cascade mountains.

Objectives of the Workshop include to:

1. **Provide** an overview of key Western Airborne Contaminants Assessment Project (WACAP) findings for California, and gain an understanding of contaminant distribution

- and human and wildlife health risks through discussion of current and future air toxics research and monitoring programs in California;
2. **Identify** gaps in research and monitoring, future assessment needs, and potential funding sources;
 3. **Learn** about current health warnings and develop public outreach efforts; and
 4. **Initiate** partnerships between the National Park Service, WACAP scientists and Tribal, Federal, State and Local agencies, collaborating on development of a Sierra Nevada – Southern Cascades Contaminants (SNSCC) science and education strategy.

Access meeting logistics, projected workshop outcomes, workshop participants, and background materials pertaining to WACAP findings in California NPs at the SNSCC Workshop webpage: http://www.nature.nps.gov/air/Studies/air_toxics/wacap/snWorkshop/index.cfm. Also visit http://www.nature.nps.gov/air/Studies/air_toxics/wacap.cfm for the WACAP report, fact sheet, key findings, and related publications, presentations, etc. Bring questions to the workshop or share them with us in advance.

Also, please come to the workshop prepared to provide information on other data/programs regarding toxic air contaminants in California; and agency plans, if any, for follow up monitoring, research and assessment.

Feel free to forward this information to colleagues working directly on specific aspects of the airborne contaminants issue in the Sierra Nevada – Southern Cascades region, with whom you think might be interested in attending. However, since workshop space is limited, we need to hear from everyone regarding attendance. Please RSVP to Annie Esperanza, Sequoia NP, annie_esperanza@nps.gov, ASAP.

A block of rooms are reserved at the Comfort Inn in Three Rivers, CA, available at the government rate of \$69.99 (single) and \$79.99 (double). Reservations must be made by March 30, 2009. Call 559-561-9000 and ask for the block of rooms under the “Air” group.

We hope you and/or your colleagues can join us and we look forward to seeing you in April. If you have questions or comments please call or e-mail one of the steering committee members listed below.

Sincerely,

/s/

Annie Esperanza
Air Resources Specialist
Sequoia & Kings Canyon National Parks

Steering Committee:

Annie Esperanza, Sequoia and Kings Canyon National Parks, Annie_Esperanza@nps.gov 559-565-3777
Lee Tarnay, Yosemite National Park, Leland_Tarnay@nps.gov 209-379-1422
Nancy Nordensten, Lassen Volcanic National Park, Nancy_Nordensten@nps.gov 530-595-4444 x5172
Colleen Flanagan, NPS, Air Resources Division, Denver, CO, Colleen_Flanagan@nps.gov 303-969-2806
Tamara Blett, NPS, Air Resources Division, Denver, CO, Tamara_Blett@nps.gov 303-969-2011
Kathy Tonnessen, NPS, Research Coordinator, University of Montana, Kathy_Tonnessen@nps.gov 406-243-4449
Judy Rocchio, NPS, Pacific West Region, Oakland, CA, Judy_Rocchio@nps.gov 510-817-1431

9.2. Breakout Session Template for Day 2

Refer to Agenda at [Section 3](#), and results of breakout groups at [Section 5.3](#).

BREAKOUT SESSION TEMPLATE: Sierra Nevada – Southern Cascades Contaminants (SNSCC) Workshop

Please use this template in your breakout group a) research & monitoring, b) partnership & policy, or c) outreach & communication, to identify the following:

1. Prioritize the top three issues addressed that pertain to the breakout topic and develop a concise statement related to those issues and airborne toxics in the Sierra Nevada and Southern Cascades.
2. The desired future outcomes, e.g. what kind of research, monitoring or outreach products might come out of the current WACAP results in the Sierra Nevada and Southern Cascades?
3. A summary of the available resources and existing models available to reach the desired outcomes, e.g. what are the current programs of research, monitoring and education for toxic air contaminants in the Sierra Nevada and Southern Cascades?
4. An examination of the challenges and obstacles to meeting the desired outcomes, e.g. what are the easiest and the more difficult future activities related to this issue?
5. The recommended activities to reach the desired outcomes, e.g. what research, monitoring and outreach products should we pursue following this workshop?
6. The responsible individuals to move the issue towards the desired outcome.
7. An assessment of the level of involvement to resolve this issue, e.g. how much time and effort will be needed to procure funding for additional research and monitoring? And how much time to come up with additional outreach products? And how will this follow-up be accomplished?

9.3. Background materials: [SNSCC Workshop webpage](#)

9.3.1. [Sequoia Contaminants Overview](#)

9.3.2. [Sequoia National Park – WACAP Announcement](#)

9.3.3. [Yosemite National Park – WACAP 1-pg Summary](#)

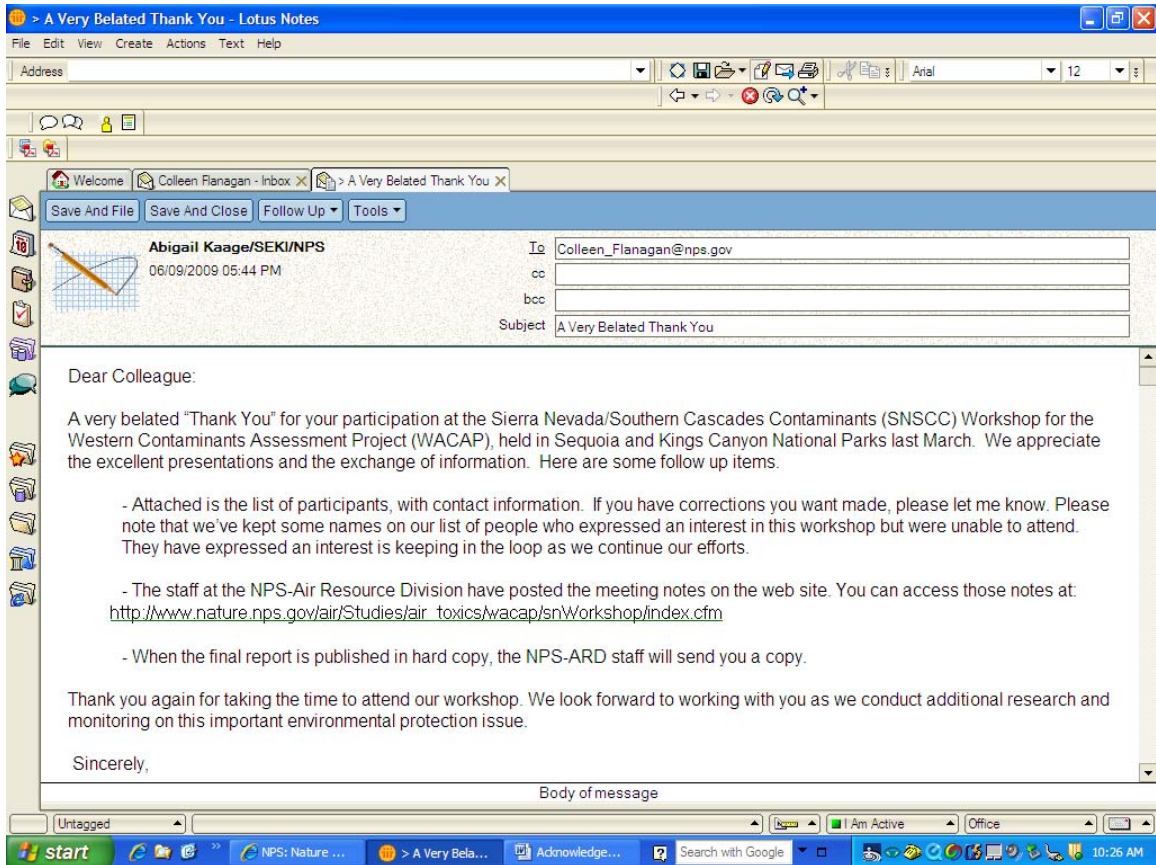
These informational materials and more, such as graphical WACAP summaries of results specific to the SNSC region and information on the human health perspective provided by the NPS Office of Public Health, available at SNSCC Workshop webpage (http://www.nature.nps.gov/air/Studies/air_toxics/wacap/snWorkshop/index.cfm).

9.4. Workshop Logistics

The below provide example additional information headers worth addressing by electronic email or hard copy to the participants in advance of the Workshop:

- Lodging
- Driving Directions
- Directions to Mixer (*if held*)
- Parking
- Conference Room
- Map of Workshop location
- Lunch and Snacks
- Cell Phone Service
- Weather
- Local Weather Link
- Restaurants
- Contact information

9.5. Workshop “Thank You” to Participants



Corrections to the above memo, worth noting:

1. The SNSCC Workshop was held in April, not March.
2. Posted on the web site at the time of this memo were the Workshop's major conclusions, not the meeting notes.
3. The final report was published in advance of the SNSCC Workshop, and 10 copies were made available to attendees at the Workshop. NPS-ARD staff will not be sending copies of the report.