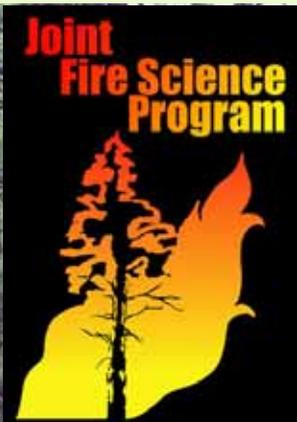


Field Training Workshops for Field Demonstrating the Use of the JFSP-Sponsored Photo Series and Fuel Characteristic Classification System

Final Report
JFSP Project #05-4-1-14
May 28, 2007

Roger D. Ottmar

Fire and Environmental Research Applications Team
Pacific Northwest Research Station
Pacific Wildland Fire Sciences Laboratory
Seattle, Washington



Southwest Regional Fuels Workshop
Sandia Ranger District, New Mexico
May 1-3, 2007

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Field Training Workshops for Field Demonstrating the Use of the JFSP-Sponsored Photo Series and Fuel Characteristic Classification System

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**Roger D. Ottmar
May 15, 2007**

ABSTRACT

The Fire and Environmental Research Applications Team (PNW) completed a total of eight 3-day regional fuels workshops and six ½-day “mini-workshops” that demonstrated the use of the Natural Fuels Photo Series, Digital Photo Series, Fuel Characteristic Classification System, and Consume 3.0. Each workshop brought together 12 to 50 land managers from the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, Department of Defense, The Nature Conservancy, state forestry departments, university faculty and students, and private company and consultant employees. The workshops provided hands-on experience in a train-the-trainer curriculum approach. At each of the regional fuels workshops, a 1-to-4 ratio of instructors to students was exercised to provide the best learning atmosphere. Products were introduced during the first day, applied in the field the next day, and applied during a wrap-up exercise on the last morning so participants could demonstrate they understood how to use the tools together or individually. All four products presented were developed with support from the Joint Fire Science Program. The mini-workshops introduced each product using demonstrations and guided computer exercises.

The regional fuels workshops were held in Alaska, California, Georgia, Hawaii, Idaho, New Mexico, Ohio, and Oregon; the 6 mini-workshops were held in California, Florida, Oregon, and Tennessee. Two of the regional fuels workshops and six mini-workshops held were beyond the scope of the original proposal. Workshops were considered excellent by most students and participants. Evaluations and comments received by participants were used to make critical adjustments to the course curriculum and product line throughout the duration of this project.

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Introduction

The Joint Fire Science Program funded the development of four products that enable managers to better estimate fuelbed parameters, assess fuel treatment options, and predict fuel consumption and wildland fire emissions. The products are

- (1) Natural Fuels Photo Series (Ottmar 2007c; JFSP # 98-1-1-05; 01-1-7-02; 03-3-3-46; 06-1-1-11), which provide a quick, easy means for quantifying and describing existing fuel properties for selected sites across a landscape;
- (2) Digital Photo Series (Wright 2007; JFSP #04-4-1-02), a user-friendly interface to the large, detailed database of fuels information and high quality photographs from the Photo Series;
- (3) Fuel Characteristic Classification System (FCCS) (Ottmar et al. in press; Ottmar 2007b; JFSP #98-1-1-06), which provides a database of fuels information for the operation of fire models and landscape assessments; and
- (4) Consume 3.0 (Ottmar 2007a; JFSP # 98-1-9-06), which enables managers to predict fuel consumption, smoke, and heat release by fuelbed component and combustion phase.

These tools are the cornerstone in assessing fuels, fuel consumption, emissions production, and for fuel treatment prioritization and fire hazard analysis (fig. 1). Fuel parameters are also the basic front-end to the BlueSky smoke modeling framework (Pouliot et al. 2005), the Fire Emissions Production Simulator (FEPS) (Sandberg 2007), Consume 3.0 (Ottmar 2007), FOFEM (Reinhardt et al.1997), and the Fire Effects Tradeoff Model (FETM) (Schaaf et al. 1998).

Because these products were complete, it was time to distribute the products to the user.

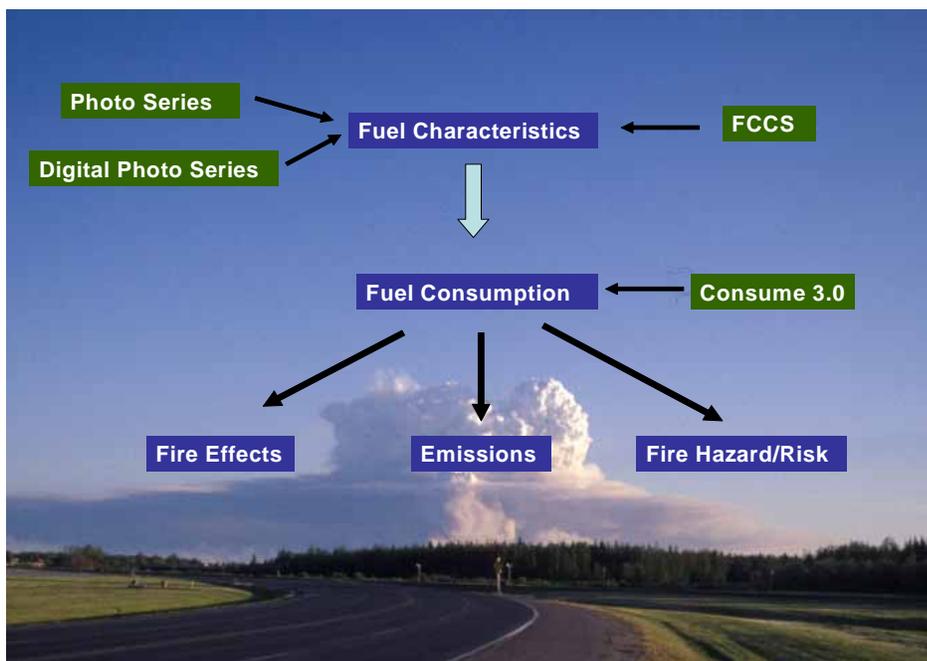


Figure 1. Relationship of the Natural Fuels Photo Series, FCCS, and Consume 3.0 in assessing fire effects, emissions, and fire hazard/risk.

Eight 3-day workshops to train-the-trainer teaching these four products were completed; one additional workshop is scheduled for September 2007. The workshops were held in Alaska, California, Georgia, Hawaii, Idaho, New Mexico, Ohio, and Oregon (fig. 2). Our workshop schedule surpassed the original proposal with two additional workshops and the inclusion of the Digital Photo Series and Consume 3.0 in our training curriculum. In addition, six ½-day mini-workshops were completed.

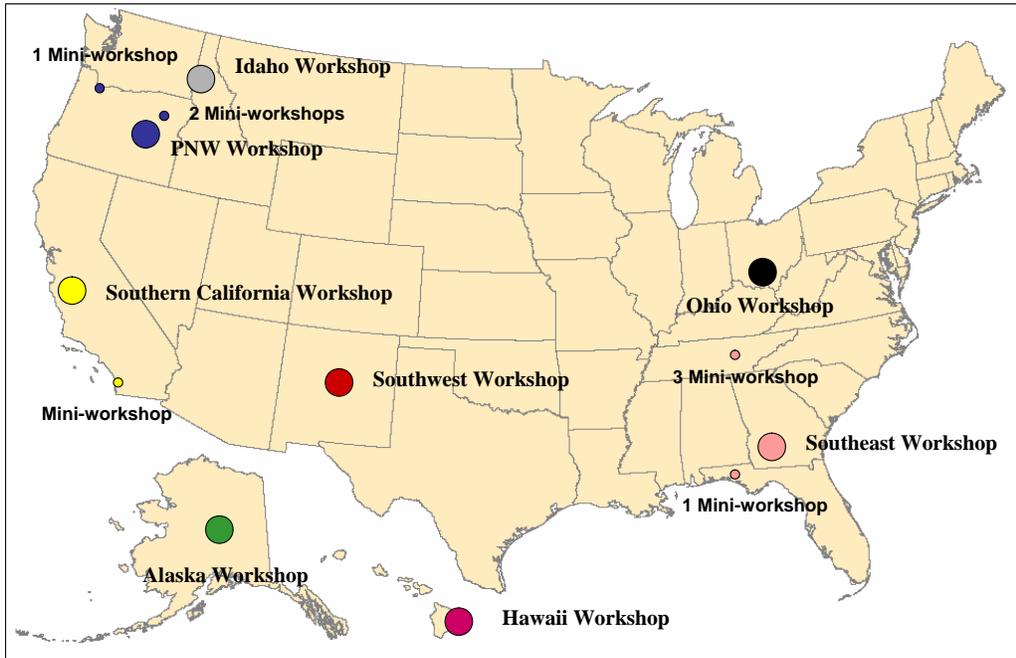


Figure 2. Location of 3-day- and mini- regional fuel workshops.

Background on Tools Presented

Fuel Characteristic Classification System (FCCS)

The FCCS is a user-friendly software program that allows users to access fuelbeds from a nationwide database or create their own custom fuelbeds. FCCS fuelbeds were compiled from published and unpublished literature, fuels photo series, fuels data sets and expert opinion. Users can modify FCCS fuelbeds to create a set of customized fuelbeds representing a particular scale of interest. When a user has completed editing fuelbed data, FCCS reports assigned and calculated fuel characteristics for each existing fuelbed component, including trees, shrubs, grasses, woody fuels, litter, and duff. The system calculates surface fire behavior, crown fire, and available fuel potential indices on a scale from 0-9 for each FCCS or customized fuelbed. Surface fire behavior algorithms use a reformulated Rothermel spread equation to calculate reaction intensity, rate of spread, and flame length for benchmark environmental conditions. Finally, the system assigns the FCCS or customized fuelbed a best match to the original 13 and new standard 40 fire behavior fuel models. FCCS software is available for download from the FERA website (<http://www.fs.fed.us/pnw/fera/fccs/>).

Consume 3.0

Consume v 3.0 is a decision-making tool designed to assist resource managers in planning for prescribed fire, wildland fire for use, and wildfire throughout the United States. It predicts fuel consumption, pollutant emissions, and heat release based on fuel loadings, fuel moisture, and other environmental variable inputs. Using these predictions, resource managers can determine when and where to conduct a prescribed burn or plan for a wildland fire to achieve desired objectives, while reducing the impact on other resources. Consume 3.0 software is available for download from the FERA website (<http://www.fs.fed.us/pnw/fera/research/smoke/consume/>).

Natural Fuels Photo Series and Digital Photo Series.

The Natural Fuels Photo Series is a source of high quality fuels data and images designed for field use in a wide variety of forest and range ecosystems throughout the United States. The Digital Photo Series is a user-friendly portal to the large, detailed database of fuels information and high quality photographs. The Digital Photo Series contains a searchable and sortable data and images for over 350 sites, describing fuels in a wide range of ecosystems from across the United States.

Objective

Science delivery for practical applications requires transferring of products to clients in a very user-friendly format. Many times, scientific products are buried in obscure and difficult to read journal articles or developed into products that are not useful or difficult to interpret. This project supported the science delivery of four JFSP products and transferred those products to land managers through a series of field-oriented, train-the-trainer workshops coupled with field exercises, tutorials, and instructor guides. The objectives of this project were to:

- 1. Plan and hold 6 field-oriented Regional Workshops to demonstrate how to use the Natural Fuels Photo Series and the FCCS, two products developed with support from the Joint Fire Science program.**
- 2. Locate and inventory a minimum of three areas at each workshop site for demonstrating the photos series and FCCS that can be used for future training opportunities.**
- 3. Package the training materials for future workshops.**

We worked closely with land managers and the national training centers to design a train-the-trainer workshop to field demonstrate the use of the FCCS and the Photo Series. The training center managers strongly suggested we take this opportunity to demonstrate the Digital Photo Series and Consume 3.0, two new products supported by the JFSP that became available. They also suggested we transfer the tools and knowledge in at least six regions of the country.

Methods

The regional fuels workshops were designed and implemented in five phases: (1) coordination, (2) development, (3) implementation, (4) evaluation, and (5) transfer. During the coordination phase, we located potential workshop sites where land managers are willing to assist in logistical support of each workshop. During the development phase, we built an agenda and located and inventoried areas for the field portion of each workshop. During the implementation phase we conducted the workshops. During the evaluation phase we compiled written and oral comments during a 90 minute evaluation session during the workshops. During the transfer phase, we compiled and distributed workshop curriculum material. A more detailed description of each phase follows.

Coordination Phase

In this phase, land managers from the National Park Service, U.S. Forest Service, Bureau of Indian Affairs, Bureau of Land Management, The Nature Conservancy, Department of Defense, and U.S. Fish and Wildlife Service were contacted for assistance in locating the optimal sites to hold each workshop. We also discussed procedural requirements with the National Training Center to determine the best approach for developing the agenda

and implementation of the workshops. Several land managers endorsed the train-the-trainer concept and offered their services and support. Other managers and conference leads contacted us to put on several mini-workshops at national and international meetings and at regional prescribed fire and burn boss workshops. Tables 1 and 2 display the location, date, and support received for each workshop.

Development Phase

Led by Roger Ottmar, the initial design, curriculum content, lessons, and guides were developed through consultations with land managers, Forest Service training specialists, regional fuel committee members, University of Idaho faculty and students, and FERA team members. Regional fuels committees and prescribed fire academies generally provided the list of participants and suggested locations for the workshops. Lessons and guides were coordinated with land managers, the University of Idaho, and prescribed fire training academies. A curriculum notebook custom designed for each workshop contained PowerPoint presentations, overview and fact sheets about the products, presentations, exercises, literature, and evaluation forms. FERA also developed a booklet with an accompanying CD that provided program downloads, user's guides, tutorials, and fact sheets, and literature. The FERA field crew located and inventoried several sites for each workshop that were used as photo series demonstration and testing sites.

Implementation Phase

Led by Roger Ottmar, a total of eight 3-day regional fuels workshops and six ½-day mini-workshops were completed during the project (fig. 3). A teaching cadre was assembled from a selection of scientific and technical experts on the Photo Series, FCCS, and Consume. At various times, this cadre included team members Roger Ottmar, David Sandberg, Cynthia Riccardi, Susan Prichard, Bob Vihnanek, Clint Wright, and Ellen Eberhardt.

Each workshop brought together 12 to 50 land managers from the Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, The Nature Conservancy, state forestry departments, Department of Defense, university faculty and students, and private company and consultant employees (appendix A). Four JFSP-supported products were demonstrated.

At each of the regional fuels workshops, a 1-to-4 ratio of instructors to students was exercised to provide the best learning atmosphere. An overview of FCCS and Consume were presented on the first day with a series of demonstrations and exercises (figs. 4 and 5). The second day was spent in the field learning how to use the Natural Fuels Photo Series in the field (figs. 6, 7 and 8). Photo series assessments were compared with actual inventory data to help participants evaluate their own estimates and help calibrate their future estimations. During the last day of each workshop, a minimum of 60 minutes was set aside to evaluate the course and tools presented. Participants filled out evaluation forms, and an open forum discussion followed. These evaluations were used to improve the products and future workshops. A 3-hour exercise based on the previous day's field exercise concluded the workshop. This exercise required students to use the data they collected during the field day,

build several fuelbeds and calculate surface fire behavior and fire potentials in FCCS, and estimate fuel consumption and smoke emissions using Consume 3.0.

Table 1. Location and contacts for each of the 3-day regional fuels workshops.

| Region | Date | Location | Contact/Support |
|-------------------|----------------|--|--|
| Alaska | August 2006 | Fairbanks, AK | Randi Jandt/ BLM Alaska Fire Service |
| Hawaii | February 2006 | Hilo, HI/Volcanoes National Park | Wayne Ching/ Hawaii DNR |
| North Central | November 2006 | Portsmouth, OH | Matt Dickinson/ FS Northern Research Station |
| Pacific Northwest | May 2006 | Bend, OR | Tim Rich/ FS Region 6 |
| Pacific Northwest | April 2007 | U of Idaho, Moscow | Chad Hoffman, Penny Morgan/ University of Idaho |
| Southeast | November 2005 | Joseph W. Jones Ecological Research Center, Ichauway, GA | Kevin Heirs/TNC David Brownlie/ USFWS |
| Southeast | September 2007 | Joseph W. Jones Ecological Research Center, Ichauway, GA | Kevin Heirs/Jones Center |
| Southwest | March 2007 | San Luis Obispo, CA | Chris Dicus/ Cal Poly |
| Southwest | May 2007 | Sandia Ranger District, Albuquerque, NM | Sam Amato/ FS Region 3 |

Table 2. Location and contacts for each of the 4-hour mini-workshops.

| Region | Number | Date | Location | Contact/Support |
|-------------------|---------------|---------------|------------------|---|
| Pacific Northwest | 1 | March 2006 | Portland, OR | 1 st Fire Behavior and Fuels Conference ¹ |
| Pacific Northwest | 2 | March 2007 | Redmond, OR | Tim Rich/ FS Region 6 ¹ |
| Southeast | 3 | October 2006 | Johnson City, TN | Clint Cross/ FS Region 8 ¹ |
| Southeast | 1 | March 2007 | Destin, FL | 2nd Fire Behavior and Fuels Conference ¹ |
| Southwest | 1 | November 2006 | San Diego, CA | 3 rd International Fire Ecology and Management Congress ¹ |

¹ Invited to present



Figure 3. Ohio Regional Fuels Workshop participants and instructors.



Southwest Regional Fuels Workshop
 May 1-3, 2007
 Sandia Ranger District, New Mexico
 Day 1



| TOPIC | Comments | Participant | Timeframe |
|------------------------------------|---|--------------------|------------------|
| Load Software | Load the FCCS onto laptops as needed | Eberhardt/Prichard | 0700-0800 |
| Welcome/Introductions | | Ottmar | 0800-0815 |
| FCCS Overview | Description and potential application of the FCCS | Ottmar | 0815-0845 |
| Fire Potential Overview | Description of calculated characteristics and fire potentials in the FCCS | Prichard | 0845-0930 |
| FCCS Demonstration | Simple demonstration, introducing the program, screens, inputs, and reports | Ottmar/Prichard | 0930-1000 |
| <i>Break</i> | | | <i>1000-1015</i> |
| FCCS Practical Exercises | Fuelbed building exercise demonstrating the influence of change agents (e.g., fire exclusion, thinning from below, prescribed burn, and wildfire) on pine forest fuel characteristics and fire potential. | Ottmar/Prichard | 1015-1130 |
| Questions | | FERA | 1130-1200 |
| <i>Lunch</i> | On your own | | <i>1200-1300</i> |
| Consume 3.0 | Consume overview/consumption physics/data collection | Prichard/Ottmar | 1300-1330 |
| Consume 3.0 Demonstration | Demonstration introducing the program, screens, input, and reports. | Prichard | 1330-1500 |
| <i>Break</i> | | | <i>1500-1515</i> |
| Consume Practical Exercises | Series of exercises to calculate consumption and emissions from FCCS fuelbeds and custom fuelbeds created in the FCCS | Prichard/Ottmar | 1515-1630 |
| Days Wrap-Up | Synthesis of the first day and field trip logistics. | Ottmar/Prichard | 1630-1700 |

Available to each participant: 3-ring notebook with accompanying CD containing (1) agenda, (2) invitation letter and attachments, (3) attendees, (4) cadre bios, (5) tool summaries and user's guides (w/glossary), (6) practical exercises, (8) Powerpoint presentations, (9) publications, and (10) other miscellaneous information.

Figure 4. Agenda for Day 1 of the Southwest Regional Fuels Workshop.



Figure 5. Classroom exercises at the Hawaii Regional Fuels Workshop.



Southwest Regional Fuels Workshop

May 1-3, 2007

Ranger District, New Mexico
and 3



Day 2

| TOPIC | Comments | Participant | Timeframe |
|---|--|----------------|-----------|
| Recap/Days events/Questions | | Ottmar | 0800-0815 |
| Photo series | Overview/discussion at AFS | Vihnanek/Cadre | 0815-0845 |
| Photo series field exercise 1 | | Vihnanek/Cadre | 0845-1200 |
| Lunch | In the Field | | 1200-1300 |
| Continue Photo series field exercises 2 & 3 | | Vihnanek/Cadre | 1300-1630 |
| <i>Day 3</i> | | | |
| Recap/Days Events/Questions/Evaluation | | | 0800-0845 |
| Exercise/Wrap-up | Simple exercise using the three tools and data collected from field day. | Cadre | 0845-1000 |
| Break | | | 1000-1015 |
| Continue Exercises | | Cadre | 1015-1130 |
| Questions and Wrap-up | | | 1130-1200 |

Figure 6. Agenda for Days 2 and 3 of the Southwest Regional Fuels Workshop.



Figure 7. Natural Fuels Photo Series exercise during field day at the Northern Idaho Regional Fuels Workshop.



Figure 8. Participant using a stereo scope and Natural Fuels Photo Series to assess fuels during the field day at the Southwest Regional Fuels Workshop.

Evaluation Phase

On the last day of the 3-day Region Fuels Workshops, participants filled out evaluation forms with an open forum discussion with the cadre. The evaluation comments are presented in appendices B and C. They were used to improve the products and future workshops. We also encouraged the students to e-mail or contact any cadre with further comments, suggestions, or any questions they might have while using the products.

Comments were arranged into two categories. The first category included comments related to the workshops. The second category included comments related to the tools presented.

Workshop: appendix b

Tools: appendix c

Transfer Phase

The products, user guides, tutorials, and literature have been presented at the regional fuels workshops and mini-workshops. The curriculum workbook, software tools, and fact sheet booklet were handed out at the workshops and are also available on the FERA website: <http://www.fs.fed.us/pnw/fera>. The fact sheet booklet was distributed to RX 410 Smoke Management, Rx 310 Fire Effects, and to several training coordinators at the National Interagency Fire Center and to the Prescribed Fire and Fire Use training academies. Finally the curriculum workbook and fact sheet booklet were sent to the University of Idaho and the curriculum was incorporated into their 401 series FOR 451 Class, Fuels Inventory and Mapping.

Deliverables

The primary deliverable from this project is the completion of eight 3-day train-the-trainer workshops demonstrating the use of four JFSP supported products including the Fuel Characteristic Classification System (FCCS), Consume 3.0, Photo Series, and Digital Photo Series (table 3). A curriculum notebook was custom designed for each workshop with product overviews, PowerPoint presentations, and literature, exercises, and evaluations forms. A compact booklet was designed that included fact sheets and a CD with the software, user guides, tutorials, and literature. This booklet was distributed to RX 410 Smoke Management, Rx 310 Fire Effects, and to several training coordinators at the National Interagency Fire Center and to the Prescribed Fire and Fire Use training academies. The regional fuels curriculum notebook has also been incorporated into the University of Idaho 401 Series FOR 452 class, lesson 5 on Fuels Inventory and Mapping. Additional products and technology transfer have been completed that exceeded the scope of the project (table 4).

Table 3. Comparison of proposed and actual deliverables.

| Proposed | Delivered | Status |
|-----------------------|---|---------------|
| Workshops | Completed 6 regional workshops (Alaska, Hawaii, Midwest, Pacific Northwest, Southeast, and Southwest) | Done |
| Publications | Completed final package of training materials and evaluation assessment for publication and transfer to training center. Curriculum notebook custom designed for each regional fuels workshop and distributed to participants, RX National training classes, and to the University of Idaho 401 series | Done |
| JFSP Progress Reports | JFSP progress reports were completed for each year starting in 2003 and ending in 2005 | Done |

Table 4. Deliverables exceeding the scope of the JFSP proposal.

| | |
|------------------|---|
| Workshops | Completed 2 regional fuels workshops (northern Idaho and southern California) |
| Workshops | Conducted 6 mini-workshops: one at the 1 st Fire Behavior and Fuels Conference in Portland, Oregon; three at the Region 8 Prescribed Fire Workshop, Johnson City, Tennessee; one at the 3 rd International Fire Ecology and Management in San Diego, California; two at the Region 6 Burn Boss Workshop, Redmond, Oregon; and one at the 2 nd Fire Behavior and Fuels Workshop, Destin, Florida. |
| Additional Tools | Presented the digital photo series and Consume 3.0 at each workshop |
| Website | Developed a webpage describing the workshops. |
| Booklet | Developed a fact sheet for each tool, bound together and accompanied by a CD that contained the software, user guide, tutorial, and literature. |

WEB PAGE

A web page describing the Regional Fuels Workshops and presenting the 4 software products, fact sheets, downloadable programs, user guide, tutorial, and literature was established at <http://www.fs.fed.us/pnw/fera/>

WORKSHOPS

Eight regional fuels workshops were conducted in Alaska, California, Georgia, Hawaii, Idaho, New Mexico, Ohio, and Oregon. In addition, 6 mini-workshops were conducted at the 1st and 2nd Fire Behavior and Fuels Conferences in Portland, Oregon and Destin, Florida, and at the 3rd International Fire Ecology and Management Congress in San

Diego, California.

TRAINING

The principal investigator teaches the suite of fire management tools including the FCCS, Consume 3.0, and the photo series 12 times a year at national training courses including Rx 300 Burn Boss, Rx 310 Fire Effects, Rx 410 Smoke Management, and Technical Fire Management. The fact sheet booklet was distributed and software tools demonstrated with follow-up exercises.

CONSULTATIONS

The principle investigator consults with several land managers, regulators, and scientist each year with regard to the best available tools for estimating fuels and fuel consumption. Consultations with the Department of Defense, Department of Energy, Forest Service Region 8, National Park Service, Forest Service Region 6, and private entities have also been introduced the suite of tools for assessing fuel management options.

TUTORIAL

A web-based self-taught tutorial along with an instructor's guide and student workbook for the FCCS, Consume 3.0, Photo Series, and Digital Photo (JFSP Project #04-4-1-19) were distributed to each participant the workshops.

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Contents of CD

Final Report:

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Photographs:

eberhardt_workshop photos

jfsp_southern_workshop

jfsp_hawaii_workshop

jfsp_pacific_northwest_workshop

jfsp_alaska_workshop

jfsp_ohio_workshop

jfsp_southern_california_workshop

jfsp_northern idaho_workshop

jfsp_southwest_workshop

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jfsp_southern_california_workshop

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jfsp_southwest_workshop

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Appendix A—List of Participants by Workshop and Agency

List of Participants by Workshop and Agency/Affiliation

Forest Service

| | |
|-------------------------------|---|
| Eastern Region (R9) | Ann Acheson, Mike Buchanan, Chuck Sams, and Derrick Williams |
| Pacific Northwest Region (R6) | Maurice Evans, Steve Garza, Ken Higle, Bill Johnson, Laura Mayer, John Orbeton, Dave Owens, and Tim Rich |
| Pacific Southwest Region (R5) | Mark Borchert, Clint Isbell, Byron Kimball, Mark Lemon, Larry Peabody, Denise Tolmie, and Kip Van de Water |
| Southern Region (R8) | Clint Cross, Bill Jackson, Mitch Gandy, Cindy Huber, Elizabeth Bunzendahl, and Jim McCoy |
| Southwestern Region (R3) | Sam Amato, Dana Bagnoli, Dana Carter, Emily Irwin, Diane Jakich, Brian Maier, Dan Mindar, Harold Riggs, and Walker Thornton |
| Research Stations | Alison Ainsworth (PSW) and Matt Dickinson (N) |

Fish and Wildlife Service

| | |
|---|-----------------------------------|
| Alligator River National Wildlife Refuge | Greg Suszek |
| Alaska Regional Office | Karen Murphy |
| Florida Panther National Wildlife Refuge | Josh O'Connor |
| Hawaii | Andy Kikuta |
| Kenai National Wildlife Refuge | Dianne MacLean |
| Klamath Basin Refuge Complex | Ruth Johnson |
| Koyukuk-Nowitna, Innoko, and Selaik NWRS | Robert Lambrecht |
| Lake Woodruff National Wildlife Refuge | Michael Ward |
| Mid-Columbia NWR Complex | Kurt Thompson |
| Mississippi Sandhill Crane NWR | Jeff Twiss |
| Savannah Coastal National Wildlife Refuge | Jan Tripp |
| Tetlin National Wildlife Refuge | Peter Butteri and Kirk Warrington |

National Park Service

| | |
|--|----------------------------------|
| Big Bend | John Zubia |
| Denali | Charley Reynar and Larry Weddle |
| Everglades | Rick Anderson |
| Hawai'i Volcanoes | Jeanette Gilbert and Joe Molhoek |
| Mesa Verde | Brad Harris |
| Nachez Trace Parkway | Lisa McInnis |
| Yukon-Charley Rivers/Gates of the Arctic | Jennifer Allen |

Bureau of Land Management

| | |
|--------|--|
| Oregon | Steve Harbert, John Larson, Charley Martin, and Dave Reed |
| Alaska | Mike Butteri, Jason Dollard, James Higgins, Kato Howard, Mike Roos, and Skip Theisen |

States

| | |
|------------|--|
| Alaska | Sharon Kilbourn-Roesch, Wade Wahrenbrock, and John Winters |
| California | Denny O'Neil |
| Hawaii | Steve Bergfeld, Wayne Ching, Pat Costales, Jay |

| | |
|------------|---|
| | Hatayama , Miles Nakahara, Earl Pawn, Don Yokoyama, and Kawika Smith |
| Kentucky | Joyce Bender |
| Ohio | Mike Bowden, Bob Boyles, Mark Hassel, Aaron Kloss, Rick Maier, and Jennifer Windus |
| Washington | Dale Swedberg |

Municipalities

| | |
|---|--------------------------|
| Honolulu Fire Department | Eric Adams and Ed Suzuki |
| Maui Fire Department | Peter Vanderpoel |
| Kenai Peninsula Borough Planning Department | Bobbi Jo Lay |
| Kern County Fire Department | John Smith |

Universities

| | |
|-----------------------------|-----------------|
| Ohio University | Valerie Young |
| University of Idaho | Chad Hoffman |
| Western Kentucky University | Lane Linnenkohn |

Other

| | |
|--|---|
| Joseph W. Jones Ecological Res. Center | Mark Melvin |
| National Weather Service | Julia Ruthford |
| U.S. Army | Dan Rees |
| Tall Timbers Research Station | David Brownlie and Caroline Noble |
| The Nature Conservancy | Kevin Hiers, Sam Lindblom, Dave Minney and David Schmidt |

Alaska Workshop Attendees

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Appendix B—Comments and Suggestions on the Workshop

Selected Evaluation Comments from the Workshops

1. Did the workshop meet your expectation? How could we improve the format and/or material in the future?

Southeast Workshop

“Yes, but honestly I wasn’t totally sure what I would learn because I didn’t know much about Consume and FCCS. I have worked with the photo series before, and I found that section of the workshop especially helpful.”

“The workshop did meet my expectations. You might want to think about moving the field day to the first day. This might help the class flow better.”

“Yes. All materials were helpful and well-organized. Agenda well thought-out and the class ran on schedule.”

“Yes, this course met my expectations. Changes that I see as necessary are small items such as a follow-along walk-through for both software packages. Also, on the day of field exercises, members of the cadre could work with large groups during the first exercise then allow individuals to work separately.”

“Absolutely. Will need to spend some additional time with Consume 3.0, going back over practicums. Though I never got “lost” during them, I did feel a little rushed. Perhaps adding half a day to make a full 3-day course will help.”

Hawaii Workshop

“I thought the work was quite adequate. More exercises (practicums) would have been good to determine whether the student got the concept or not.”

“Yes. I didn’t exactly know what to expect but feel I have a basic understanding of these programs. At least I know what parts of this course are important to us.”

“Yes it did – most beneficial to me was learning about FCCS (since it was very new to me), as well as the photos series field day. I can see I’ll be using the photo series in various ways.”

“The field exercises exceeded my expectations because I now understand the uses and purpose of the photo series for Hawaii. The instructors all did a fine job. Thanks for taking time away from your families to come out and help us out.”

“Yes. I enjoyed the workshop. I do feel that I need more time now to play around with the programs on my own, but it was great to be introduced to them and who to contact with questions in the future.”

“Yes. Excellent format, material, and visual aids were pertinent and clear. Have a

botanist to help with plant identification.”

Pacific Northwest Workshop

“This workshop more than met my expectations. I learned a lot, and learned there is more to know. I thought the format and material were excellent.”

“The workshop met my expectations. The hands-on exercises were particularly helpful and generated some good discussion.”

“It did meet my expectations. It’s nice to come to a workshop as a continuing education type and actually get something out of it. Please open the workshop to silviculturalists, especially in R6 – they are usually our biggest advocates.”

“The workshop was a well-balanced combination of hands-on working with several complex tools and the theory and physics behind the system. I was amazed that the software and computer functioning went so well.”

“Yes. Not having used the program before, I would have liked doing a few more exercises to get more comfortable with it.”

“Yes. It was informative and involved the attendees, providing real practice in the use of the tools. The analysis of the 3 scenarios on a single piece of ground was good.”

Alaska Workshop

“This was my first experience w/fuels characteristic classification, so I learned a lot about the in-depth thinking and analysis of fuels and fuelbeds. Even as a first-timer, I was able to completely understand the reasoning and direction behind and of the FCCS. This is a great program. From my fire experience, I can understand the issues with accuracy in spread predictions, but the evolution of the program should accommodate those nicely.”

“It was wonderful to actually have Alaska data in FCCS to do the lecture!”

“Yes, it met my expectations. For me, I would like to know a little more on minimum standards used to develop one of your “standard” fuelbeds. It is so easy for folks to develop custom fuelbeds that I worry people will apply custom fuelbeds to large landscapes with little data to back it up.”

“I thought the software and presentations were very helpful. We could have used more hints and maybe a walk-through of how to use the photo series in the field, e.g. what do you look at, the photos, the tree #s, the size class, etc. It was very tough on the first site for some who have never done this.”

“Yes, short and to the point. The FCCS and Consume software is easy to use. The field exercise on the photo series was the most useful.”

“YES! And thank you to all for doing such a good job! If this workshop is given to individuals with limited experience and/or exposure to such models, you’d want to devote more time to the actual training portion of the workshop.”

Midwest Workshop

“Yes, totally. This is such a polished course, I can’t think of any improvements except to have a flow diagram of how all the models fit together. And perhaps a discussion/brainstorming session on how people already apply the models or think they will be able to when they leave the session.”

“The workshop met my expectations. Since I am not a forest management person, my needs are probably quite different from the needs of others. I think that having the “field” portion is essential. I like using the photo series and then having the sampling data for comparison. I would also have liked to have seen the range of “answers” from photo series developers. If you have time, it would be nice for you to assess by the photo series before sampling.”

“Overall the workshop was very informative as this was my first introduction to FCCS and Consume 3.0. All of the materials presented were well defined. There were questions and concerns raised by the audience, which were noted. With everything, needs some adjustments to fit a targeted subject. The same situation applies to me; I realize with this program, it’s going to take some practice to become comfortable with it.”

“Not exactly. I wasn’t really sure what FCCS/Consume did so my expectations were more along the lines of getting better smoke dispersion information. Learning about the FCCS/Consume programs was helpful and they appear to be useful but I was disappointed that they, like most everything in the fire world, are western-based. I feel if the work is done to better understand the eastern/oak litter, the programs will be useful. The time spent using the photo series was helpful – I’ve had one for years but had no idea how it was to be used. I probably need to do a few more courses in the East once the programs have equations developed that work better for our fuels. Many more folks in the area need the information.”

“Overall good presentation of the three tools. Handouts were appropriate to material covered. PowerPoints contained lots of good information. Good instruction on how to plug inputs into models and navigate through digital photo series – use of live link was helpful. Good use of dual projectors.”

Southern California Workshop

“Yes, I liked the format. It moved quickly without going into too much detail but enough depth to make the tools usable later. Following along on our computers with the example exercises was also useful. At times, it seemed like the slideshows went a little too quickly, but it was good to keep things moving along. I would recommend getting bugs worked out of the demonstrations ahead of time and then discussing them all at once if necessary. They tend not to inspire confidence in the software.”

“The workshop was above and beyond what I expected (in a good way). More field time (a full day) with more site visits (I realize this is difficult in San Luis Obispo) would have been good. I lack experience in estimating fuel loading using photos, so it would have been nice to spend more time on that. The guidance and tips I did get from our group discussion were very helpful.”

“Workshop fully met expectations. It was well set-up and organized to focus on the prevalent fuel types for the workshop area. I was very glad to see an acknowledgment of lack of info for shrubs and an attempt to solve the problem.”

“Very useful workshop. These tools will help future management and met my expectations. The format of the course was great through PowerPoint presentations and hands-on experience. The field trips are necessary to apply this in real life situations, Also, great discussions.”

“Course content and format are excellent. It’s a great suite of applications.”

Southwest Workshop

“Definitely met my expectations – this was perfect! Was looking of the latest, greatest tool to redefine my fuel models, improve my smoke analyses, and get back into fuel assessments. Maybe just a little more ‘keyboard time’ – a quiz or two.”

“The workshop did a good job meeting my expectations. I shouldn’t have any problems tutoring district employees on the FERA approaches. The material was very helpful.”

“Yes, my goal was to learn more about fuels. The introduction of FCCS was placed in that category. Also, it had been quite a while since I’ve seen Consume, so the update was good.”

“The workshop was very beneficial. Software can be overwhelming at times, but both programs introduced appear to be user friendly and their information valid. It was great to see the field portion on how one could utilize the photo series. It would be nice to have the evaluation after the final exercise so that we could evaluate every aspect.”

“Yes, it did meet my expectations. Good format. I’m pretty green at using these tools and have little to no practical experience applying them yet. This workshop was an introduction for me and a good one at that. Because I arrived so “green” I didn’t expect to walk away with a complete understanding. Great workshop – great instructors. Thank you.”

“The workshop was well worth the time. It is very beneficial when high level instructors participate that have knowledge, background, and education to answer the “techie” questions.”

Northern Idaho Workshop

“The workshop far exceeded my expectations. I would like to have more time, both in the

field and in the classroom portions. This will really improve my fuels work both qualitative and quantitatively.”

“Yes! Met every expectation, I really enjoyed the hands on training with the computer programs and thought the field trip was a great idea, it help w/inputting data and how the data was collected. Very good instructors!”

“Very good and well balanced. I think the format and structure works well and wouldn’t change that.”

“Workshop was well organized and the material supported the instruction. Need to have more time built in for questions.”

“It was really well done. I feel much more comfortable with these tools. Perhaps on the field day we could look at some areas with different fuel loading. No data collection, just visualization. There would be data collected for each of the areas before hand (fuel photos would work) and then we could enter a few different cover types and see the difference while knowing what the area looks like on the ground.”

“Exceptional workshop. Instructors were very informative and highly approachable. The “happy hour” gave instructors/students time to chat and I was very impressed by their depth of knowledge.”

“Get people to bring their own data and do exercises for input. Do more exercises working with the computer program. Provide participants with a hard copy of the user’s handbook. Let us know beforehand what data we can collect and bring in and analyze for exercises – see if it is consistent with our expert opinions.”

“Yes, actually, it exceeded my expectations. All the material you handed out made it hands on and very easy to follow. Since we did cover so much information, having printouts of the power points and other notes will be helpful when I try to use the program again. Field day a must!”

“Exceeded expectations. Another day in the field would give folks more opportunity to learn from the experts. It would be great to start with field data collection and finish with a project proposal for a small unit.”

“Yes, and then some. I learned a great deal. I’ll use this in teaching. I appreciate learning where all the PowerPoints, references, etc. are. The website is very well designed as are all the materials. Change one for the exercises – you say wildfire biologist when I think you mean wildlife biologist.”

2. Do you have any feedback on the course logistics, including accommodations, pre-course instructions, and the workshop agenda?

Southeast Workshop²

“Thanks again to the Jones Center -- very nice rooms and food! Roger did a good job with the email notifications.”

“All were great. Jones Center is always a great location and retreat-like atmosphere for teaching smaller classes.”

“Accommodations were great. Agenda suggestions: (a) FCCS, (b) Photo Series, (c) modify FCCS output (from photo series exercise), (d) Consume 3.0, (e) how to feed results into dispersion model or fire behavior, (f) students spend more time on photo series, FCCS, or Consume 3.0, and (7) practicum – start building your own fuelbed.”

“Logistics fine, accommodations fantastic. Pre-course instructions were good. The agenda was fine.”

“Logistics, format, pre-course, etc. were all excellent and I wouldn’t recommend any changes.”

Hawaii Workshop³

“Everything was good. I do think that having the class, or at least the field trip, in Kona (more dry fuels) would be appropriate.”

“I’m impressed on how smoothly everything went – instruction and location of training were excellent.”

“Maybe this workshop could be held on the west side of the island where it is drier and more realistic in terms of wildfire (fountaingrass fuelbeds or gorse fuelbeds).”

“Logistics were great. Having a separate email with coursework instructions would have been good instead of combining it with the hotel information.”

“Good classroom and great diversity of students. You should probably have had some pre-work or reading, and required student biographical information to better understand audience.”

“Course was well put together and stuck to the agenda. Classroom and accommodations were excellent. I would have liked to see a more comprehensive description of the course material in the pre-course instruction portion.”

“Accommodations were comfortable. Pre-course instructions were clear. Workshop

² Held at the Joseph W. Jones Research Center in southwestern Georgia.

³ Held at a large hotel in Hilo, Hawaii

agenda was clear and time schedule was adhered to. Social hour for a small class, as this one was, was excellent and a great networking opportunity.”

Pacific Northwest Workshop⁴

“Sunriver was an excellent location and facility for a workshop. I felt that everything went very smoothly.”

“It was a long drive here, but well worth the trip. All arrangements were excellent. Roger’s idea of the “social hour” for further discussion in an informal setting was excellent.”

“The course logistics were great. Sunriver is a wonderful facility, pre-course instructions were thorough, and the agenda first appeared to be too ambitious but turned out to be just right.”

“Accommodations were outstanding; the after-class functions were one of the best ways to get further information in a non-formal and comfortable atmosphere.”

“Location/accommodations were very nice. Instructions were clear. It might have been nice to give an estimated download time for the programs we installed prior to arriving.”

“Sunriver was a nice place, highly recommended. Pre-course instructions were clear. The agenda covered the ground and wasn’t so aggressive as to leave no time for questions/discussion.”

Alaska Workshop⁵

“That all seemed to be fine (I stayed downtown and ate at the PX). The account code for Alaska Fire Service dining hall is not a good means to pay for meals – the cash option is much preferred, and is much cleaner paperwork-wise.”

“The only suggestion, which I may have missed in the pre-course materials, is have folks that are using their own computer come in 1-2 hours early to check their computers.”

“All good -- excellent computer setup, room size, and lunch option.”

“Everything was fine. A 9:00 start is nice.”

“You’ve done a great job with this aspect of the workshop. I particularly appreciate the cadre’s willingness to answer questions and respond to the user!”

“Instructions (and map!) for reaching Alaska Fire Service after entering Ft Wainwright could have been a bit more detailed/explicit to help those (me!) who hadn’t been on the base before. It could have been just me – maybe I should ask for my money back for that

⁴ Held at Sunriver Resort near Bend, Oregon

⁵ Held at the Alaska Fire Service Headquarters in Fairbanks

geography degree!”

“The logistics seemed well-organized.”

“It would be nice to have this course off of Ft. Wainwright.”

“Possibly hold blocks of rooms in the future? Off base/on base may not make that feasible here, though.”

Midwest Workshop ⁶

“All this worked out fine but I learned the lesson of not having reliable Internet services.”

“No problem. Thank you for sending the info more than once. It would be good to have a listserv for each package (FCCS, Consume, photo series) or maybe just a single one, to share information after the workshop.”

“I enjoyed everything...’To My Liking’ (*southern phrase*).”

“Things were great. The communications void was inconvenient but a nice change.”

“Arrange for lunches to expedite process – don’t need 1.5 hour lunch breaks. Good job of providing information prior to course. Stuck to agenda fairly well.”

“I thought the workshop went well; it certainly met my expectations. Working with the data from the field exercises worked well I think, particularly because people were familiar with the fuels and the particular fuels we worked on were pertinent to participants' work. Some of us did some pre-work on the fuels data we did have. Maybe there would be some way to work that into the workshop. If several groups (one from each National or State Forest, for instance) each worked up a FCCS fuelbed and CONSUME run, it would lead naturally to practicing exporting projects and transferring them among the group. I hope we can post some of these regional fuelbeds on the project website.”

Southern California Workshop ⁷

“Absolutely the finest training location I’ve ever attended. Agenda was well-phrased. Pre-course instructors could include ‘pre-course’ exercises. As with any new process, practice will aid retention and understanding.”

“All’s well. I found the pre-course instructions especially useful.”

“...The facilities were excellent. It might be useful to recommend reading some of the Canadian Journal of Forest Research drafts before the workshop.”

⁶ Held at Shawnee State Park Resort near Portsmouth, Ohio

⁷ Held at the Embassy Suites Hotel in San Luis Obispo, California

“Everything was very well organized from start to finish. The agenda kept things moving, but all aspects were addressed in sufficient detail. I wish I had downloaded the programs on my home computers earlier to gain some familiarity before the workshop, but I didn’t get too lost.”

“Every time was good; even the preloading of the programs was painless.”

“Logistically, course was well-supported. Hotel provided an excellent facility.”

“Good location and logistics. Also, it was nice having the agenda and expectations prior to coming to the course. Great instructors and I feel that another workshop should be held. I feel that there is an interest and will be expanded in the future.”

“I think the logistics were great. I found out about the class early, received the logistical material early, and the classroom was great.”

Southwest Workshop⁸

“No problems – good facility and good location – especially in regard to field trip areas.”

“Good location, close to field a plus! Pre-course materials were comprehensive and simple to follow.”

“It would have been nice to see one more site on the field day – there appeared to be plenty of time remaining.”

“Good facility for short session (just a few days); lunch opportunities were sufficient. Sorry I missed social hour but it seemed too far from my hotel. Perhaps that’s an advantage of having everyone at same hotel and using hotel conference facility!”

“It helped that the class was held at a sub-unit (field) location. Office politics were minimal at that level and visiting the field was easy to do. I received the instructions twice (hard copy and email). I think they were both useful, but it might be nice for your time to do this once.”

“Everything went well – except my accommodations were too close to noisy I-40. This was time very well spent. I think you need to offer even more of these workshops.”

Northern Idaho Workshop⁹

“Logistics could have been better as to lodgings, things to do is Moscow/Pullman, etc. Easy fix and wouldn’t take too long to develop and could be used for any of these classes that take place here. Otherwise, things went pretty smooth. Agenda was just right.

Logistically, I think you should just have people use your computers like we did on the

⁸ Held at the Sandia Ranger District office of the Cibola National Forest, just east of Albuquerque, New Mexico

⁹ Held on the campus of the University of Idaho, Moscow. Logistics were handled by university personnel.

field day morning. It would have been much easier than getting administrative rights for everybody, which wasn't possible for most of us.

I think it was laid out very well. I appreciated the packet that was sent over a week before so I could be more prepared. Everything we needed to know before the workshop was in there and very helpful.

Everything went smoothly. If it could be done earlier in the season would get more people interested. Maybe somewhere low elevation. Puerto Vallarta? Even Riggins, ID. Catch would be internet access, but maybe a portable server could fix that.

3. Please comment on the FCCS portion of the workshop. Do you feel you can teach others how to use and apply the FCCS? If you have specific comments about the program, please include them on the FCCS evaluation form.

Southeast Workshop

“I don’t feel comfortable enough yet to teach it. I’ll need more practice to develop enough confidence. That will come with time and I anticipate incorporating FCCS into The Nature Conservancy’s training programs.”

“I believe after I use FCCS more I could teach others. But I feel that I will need to spend some time learning the program.”

“FCCS is very user friendly – easy to learn. I could teach others to use FCCS.”

“Yes, and I will be doing it the last week of November.”

“Yes. This was the most productive part of the course.”

“Yes, I feel I can help teach other peers how to use this program. I will come away from this training with knowledge and a drive to use this system for local fire planning.”

“With another 3-4 hours practicing with software and perhaps 1-2 days review of instructional materials should be ready to teach my first students. FYI, I’ve been including the basics of FCCS structure/purpose and uses in fuel treatment effects monitoring and U. GA Maymester segments on fuelbed characterization.”

“If I can get back to the District and present this training within the next month or two I should be able to present this information clearly enough. I need more time working with the programs to get better acquainted with them.”

Hawaii Workshop

“Yes, yes, with practice. To apply the FCCS, I would need to develop applications and uses for the FCCS as they relate to fire department.”

“In state forestry, I can use and apply FCCS so it makes sense. Roger and Bob, I expect to form a cadre of foresters, meet for a week on one of the islands and develop fuelbeds that we all can use. I’ll keep you folks informed and perhaps you folks might want to get involved in the fieldwork.”

“I could teach FCCS with some refresher training on my part (review notes) prior to the training.”

“At this point I wouldn’t be able to teach others. I think I would have to run through this more before I can have the confidence to present it.”

“Not really. I would have to use it more before I tried to teach someone else to use it.”

“The ability to customize fuelbeds makes fuels management decisions easier and more objective. You can show managers ways to mitigate fire potential. Yes, I could be able to teach others how to use FCCS.”

“No. Lot of the terminology was foreign to me, again due to my background in suppression versus forest management. The most valuable portion to me was the fire potential risk and what steps can be done, or communicated to stakeholders, to reduce the risk.”

Pacific Northwest Workshop

“I feel that I can teach others how to use FCCS. I think that once we can input environmental conditions, it will become even more useful.”

“I would have liked to have spent more time learning the FCCS. I think this still a work in progress and not ready for tech transfer. I am interested in the collective wisdom of users of FCCS.”

“I think that, after some more hands-on work developing some fuelbeds on my home unit, I would be comfortable teaching others FCCS.”

“I think working with the software products alone would be something I could take back and demonstrate. The general information about fuelbed construction could be something I could talk about but without having the background of constructing fuelbeds in other regions and areas; it could get confusing if there were some questions.”

“I feel I could give a general overview and lead other down the path of self education with the program. With increased use, I’m sure I could provide more assistance.”

“I will have to take time to review the workshop material prior to teaching it. I believe I have all the information necessary to do this.”

“Yes – but no where near the quality of this cadre. It may be challenging with some of the proposed changes that were discussed in class.”

“I think so. Referring back to a PowerPoint presentation or two will help. I will give it a shot soon.”

Alaska Workshop

“Yes, the interface is simple and class demonstrations were good.”

“FCCS sounds interesting. At least now I can explain what it is and what it does. I’m still unclear as to how ubiquitous this program will become in fuels work (ala Behave, etc.).”

“With a little more practice, I feel I could teach FCCS.”

“Teaching others will require more familiarity and program use before I could adequately instruct others.”

“I think with some more use, I’d feel comfortable starting folks with FCCS – giving them the basics of the system. At this point I’d like to run several actual examples to build my confidence in using the system.”

“Instruction of the software allowed me to become comfortable troubleshooting and instructing others in its use.”

“I would need to complete some projects using FCCS before I could comfortably teach others how to use it.”

“Yes, the program is very self-explanatory. I think the main variables are the data-gathering techniques and interpretation.”

“I am comfortable in showing someone else how to use FCCS. I would hesitate to do this until I had version 2.0, though.”

“Yes. I will have to evaluate the tutorial to verify that.”

Midwest Workshop

“FCCS seems fairly easy to use and once I am more familiar, it won’t be difficult to explain it to others (I hope). If not, I’m sure I can find your phone number☺.”

“I feel I can now teach others to use and apply FCCS (we will see!). I am excited about sharing with a broad array of folks (ecologists and biologists as well as fire managers) and see how they might use it.”

“Yes, I think I could show someone how FCCS works. I am not qualified to teach the application because I lack the forest management background. It seems straightforward to use. I may have other comments after the “final exam.” Want output to Excel file.”

“I’m not sure I’m ready to teach FCCS but do find it to be a useful program. The data needs to be adjusted for the oak fuels to include the “new” bulk density. Need a few more oak/mixed oak fuelbeds.”

“Yes. The program interface is user friendly and intuitive. I feel confident that I can produce fuelbeds and teach others about the program. Situations such as greenbrier/honeysuckle ladder fuels were not really addressed and they are critical in this area.”

“I do feel that I could help someone learn FCCS. I suspect that in the East, the potentials will be of less interest than fire behavior numbers with units associated with them. Part of the reason is that hazardous fuels aren’t such a problem out here. At some point, more oak-hickory options would be useful. I suspect (hope!) that the variability in that group could justify a handful of fuelbeds.”

Southern California Workshop

“I think I am now familiar enough with FCCS to teach others how to use it. My lack of experience prevents me from truly realizing all of its applications, but I’m sure this will change soon enough. The program was well explained by the cadre, and the exercises were very helpful.”

“FCCS seems to be a straight-forward program and will be easy to show others how to use.”

“I see FCCS being a tool that perhaps has more application to current processes I use in evaluating fuel conditions for environmental documents than what I use now. I’m a visual person, so perhaps photos incorporated for each fuelbed that is currently built-in to the system, pre- and post-treatment, even SVS digitized photos, would be good.”

“Good tool, please keep developing.”

“I feel I can teach the course but may have problems explaining some of the nuts and bolts about the program. For example, some of the modeling put into this is tough to explain when you are not the one who did it. Also, the fire behavior/prediction modeling is complex. However, there is a user guide that can help mitigate some of this.”

“I don’t feel I could teach it yet. It will take some practice and practical application first.”

“Yes, I believe that most of my questions were answered and the material gave me a good (x) of knowledge. I think a four hour class is a minimum for using FCCS. Prior to the class I had the right idea about using it, but there were a lot of things I had missed.”

“I really enjoyed FCCS. I like the way fuels are broken down into categories and what kind of data are needed for each category. With more experience I might be able to teach it.”

Southwest Workshop

“The FCCS was very good. I believe I can teach others how to use the basics. I like it much better than Landfire for quick analyses.”

“I could teach basics how to push buttons. FCCS would be useful for evaluating complex fuelbeds.”

“I don’t think it will be a problem teaching. It seemed pretty straight forward. I see the .bat file a bit confusing to someone that has a computer problem, but using shortcuts and reading instructions should resolve this.”

“Maybe not teach yet, but given some practice I would feel comfortable giving an overview of the FCCS. I like the idea of having either the scientific name or common name displayed and having the other appear when you run your mouse over it. Make the final worksheet available in a spreadsheet as well as a .pdf.”

“I am excited about using FCCS and feel that I could teach others how to use it; however many of the folks in Fire Management are reluctant to use any new “complex” programs. In fact, most folks I work with are still using DOS-based programs for planning (i.e. old Rx Windows (BEHAVE)).”

“I could probably teach the mechanics of the program – I hope to feel better about the application of the program after the final exercise and more exposure/experience.”

“I believe I can walk people through FCCS, but could not explain all the equations and/or processes occurring in the black box. Answering questions like cadre received could be difficult to answer. Reviewing and reading the users guide may be helpful. It might be good to have students bring a copy of the user’s guide to highlight items as needed. With one-on-one instruction, I would be more comfortable.”

Northern Idaho Workshop

“FCCS provides a much more detailed analysis of a fuel type than fuel model. I will definitely be teaching this to the prescribed fire class.

“Even with my less than expert computer skills I should have no problem teaching folks how to use this program.

“Yes, absolutely, especially with tutorials.

“I do believe I could teach people how to use this system or at least get started. When going through scenarios go just a little slower so people can keep u. There were times when people got behind and were playing catch-up and missed some of the good info Roger was giving.

“I feel I could explain FCCS, but only to people who already have a working knowledge of the currently available models.”

“Yes, I feel I could, the program is very user friendly, Roger and Susan did a very good job teaching the program.

“I have to work with the program a few times myself – then I would like to collect a dataset of my own to use. If I do this in the next weeks I’ll probably be able to let others know how I would use the program.

“I really liked that you developed it and instead of training others to teach the workshop you’re all out here teaching it. Your knowledge of the program really shows and your reasoning behind developing it really came through. I appreciated the “lecture”/background to the program prior to discussing it!

“I feel I know enough about the software to set someone up and provide the basic information to gather additional help and information.

“I feel I could give a rundown of FCCS and how it’s used. I would be less confident in

choosing a fuelbed at this point in time. I feel I could use more practice in that area.

“I think you should help people realize they can use this for biomass estimation for carbon credits, biofuels, etc. I think that would broaden utility and support for the fools. Yes, I’ll be able to teach and answer many questions. I know where to go for additional info if I need it.

4. Please comment on the Consume portion of the workshop. Do you feel you can teach others how to use and apply Consume 3.0? If you have specific comments about the program, please include them on the Consume evaluation form.

Southeast Workshop

“Yes, much improved from the last version. I’m still a little foggy on the difference between FOFEM. For example, how are the models different?”

“If I can get back to the District and present this training within the next month or two I should be able to present this information clearly enough. I need more time working with the programs to get better acquainted. Having the instructions CDs and PowerPoint will help.”

“This is going to take some more practice as well. Though not user of version 2.1, I was an early user of Consume 1.0, EPM, and SASEM family since the early 1990s. Basic concepts were learned during that period, now more a matter of familiarizing myself with new version.”

“Yes, I can use what I have learned at this class to teach others.”

“No. More time needed to use Consume, and the instructor should take more time during presentation of material to explain how to use the program.”

“I believe after I use Consume more I could teach others. But I feel that I will need to spend some time learning the program.”

“I don’t feel comfortable enough yet to teach it. I’ll need more practice to develop enough confidence. That will come with time and I anticipate incorporating Consume into The Nature Conservancy’s training programs. I know that the instructors felt that the Consume portion instruction could have gone better, but after the final exercise, everything came together very nicely.”

Hawaii Workshop

“With practice, yes.”

“Consume was a bit more detailed than and not as easy to grasp as FCCS.”

“I will need more experience using Consume before being able to teach or explain its use effectively.”

“Because this has a few more technical terms associated with it, I think it would be difficult to teach. I don’t think that this is very beneficial to fire departments.”

“Because I had a glitch in my computer, I was unable to follow along. Again, I think I

would need to run this through a few times before I can be confident to present this.”

“No. I have little familiarity with terminology.”

“Consume was not as easy to learn.”

“No way could I teach someone to use it. I think that it is pretty difficult to use and, like I said before, it will just take practice before I actually get it down. I think that it seems really easy but that is because we were following along step-by-step, but with practice it should be pretty easy.”

“Pretty straight-forward. I like the interface with FCCS. Consume is great for measuring objectives of a project. No real smoke issues here in Hawaii.”

“I am not comfortable enough with the program to teach others to use it yet.”

Pacific Northwest Workshop

“I think I will have to play around with this model a little more to feel more comfortable. I feel that we just scratched the surface on what its capabilities are.”

“I do feel I can teach others how to use and apply Consume. Presentation was clear, concise, and well-done.”

“I was okay with Consume 2.1, but 3.0 is a great improvement. It’s more user-friendly, and the hands-on exercise was well done. This was a very valuable workshop. I would be able to teach others to use and apply Consume 3.0.”

“I use Consume a lot in all burning and pile burning I do – so this was not new to me.”

“I would need to work with it a bit more but generally yes.”

“No, but I like the program, and with time I should become more familiar to teach others.”

“I feel I could give a general overview and lead others down the path of self-education with the program. With increased use I’m sure I could provide more assistance.”

“Yes – that portion seemed fairly straight forward.”

“Sure, can and will.”

“I could show them how to get started and how to use the program. I don’t have the fuels knowledge to give too much advice beyond how it might be theoretically used, though.”

Alaska Workshop

“Since I am less familiar with smoke issues, I would be uncomfortable explaining the outputs of this model. I could lead someone through the software.”

“Yes. Good that it is straightforward.”

“This training segment went well. I couldn’t teach people to estimate the tons/acre, but could teach the basics of running and developing reports and graph.”

“Teaching others will require more familiarity and program use before I could adequately instruct others.”

“Yes, because I’ve used the earlier versions of Consume. It has been a very useful tool for me over the years! Again, with any new version, one needs to use it to become proficient at using the system. We are all covering so many bases these days that this takes up a relatively small portion of one’s overall work.”

“Instruction and exercises were sufficient to introduce the program. It is refreshing to be in a workshop where the instructor is directly involved with the program and can troubleshoot easily. I do feel able to demonstration the use of the program to others.”

“Consume was pretty quick. A little more practice with application and I will feel more comfortable with using the program.”

“I can teach the basics I think. I need to use it more before I would be comfortable and confident.”

“Yes. It is much better than past versions.”

Midwest Workshop

“I appreciate your willingness to listen to the suggestions of the group. The woody fuels consumption needs some work, but this is the program we need and I will be excited to apply it to our prescribed fire program.”

“Not sure if I’m ready to teach it. The error messages the program generates are a bit frustrating. The equations need work! The East is very different than the West, and needs specific work. This is critical – even though we don’t produce lots of PM from wildfires, we do produce it from prescribed burns. In many years, we burn more acres than in wildfires. The huge population base in the East makes it important that we accurately predict emissions and concentrations produced by our burns. This is the most important issue facing the East prescribed fire operations.”

“I feel I could teach Consume 3.0 and I will have to do that. I am concerned about the issues related to large woody fuels, and will need to consider how I can accurately reflect consumption for smoke dispersion modeling. But the interface is great and allows you to do a lot – I like it. If we can get the consumption adjusted to reflect our eastern situation, Consume will be more useful.”

“I need to be able to take Consume outputs and explain and articulate how they best work, and compare with VSmoke and other dispersion models. I will do that on my own but maybe that could be a break-out session for the course.”

“I would want to work with Consume 3.0 more before I would feel comfortable teaching, but don’t believe it will take long to grow comfortable. I would have liked to spend more time with Consume and FCCS during the course. More time needs to be spent on bringing fuelbeds into Consume from the FCCS. I am still a little uncertain how that is done but will hopefully figure it out.”

“This was my first experience with fuelbeds. For me it was an introduction and do not feel at this time I am well enough versed in Consume to teach it. At this time, I don’t believe Consume 3.0 would be useful in this area because of its inaccuracies.”

Southern California Workshop

“Yes I do. It might have been useful to see some sort of validation of the Consume emissions and consumption output or maybe some background on the output values.”

“The Consume demonstrations and exercises were great. I learned a lot, and think I could teach others to use it. My computer wouldn’t generate emissions summaries and reports for some reason, but I’m sure I will be able to figure it out now that I’ve seen it demonstrated.”

“Consume is a little more involved than FCCS. I will have to go back home and play with the program before I try to explain it to others. Mostly, it is the copying of example units that was hard to follow.”

“Yes. Very important and useful tool in regard to emissions since it is a constant battle in our area with the Air Pollution Control District.”

“I like the factor that Consume takes into account pile burning and deals with some of the main problems were encounter in Region 5 (i.e., smoke). It is a little more complex to use than FCCS, but still user-friendly. It seems like there are a few kinks to work out in all these models, but overall, great tools. Yes, I can teach this to others.”

“I don’t feel I could teach it yet. It will take some practice and practical application first.”

“I was trained adequately in this program. I primarily came to the class for FCCS, but learned a lot about Consume and will probably use it for projects.”

“Not sure I could teach it. Program still has some idiosyncrasies that might stop the flow of teaching, if the instructor was not familiar with its unresolved problems. The program appears very useful.”

“Well presented. Exercises prior to the class may be helpful.”

Southwest Workshop

“Yes. I felt the consume portion was a little easier because you could import your data. I feel that I could teach folks how to use Consume. Again, though, there is reluctance to learn more modeling software. Naturally, the state of Arizona requires and will only

accept SASEM runs. I will use Consume to narrow prescribed fire windows to achieve consumption objectives but will probably stick to SASEM for smoke since that's what the state requires."

"I can get them started. I don't feel very confident until I have used it for a fair amount. Course was well laid out. I especially appreciated the detail of how fire potentials were derived and the comparisons of flame length and spread rates."

"No, but I need more practice. I think it would be nice to have printed copies of the user guide for those would like to have a printed version and take notes in it and whatnot."

"Yes, at a sub-unit level. I see some managers getting overwhelmed with reports. But this can be resolved with adequate teaching skills."

Northern Idaho Workshop

"Again, the same goes for Consume: you know your program, you were effective in conveying the need and motives behind the program, thank you for the background section prior to using the program, and your ability to trouble shoot was exceptional. I'm looking forward to using these applications."

"Yes, I'm already doing this with earlier versions of Consume. We'll use this extensively in our new BS program."

"May take a bit of practice but I think I will be able to teach this program."

"Consume 3.0 is much nicer, as you can input fuelbeds without having to spend twice as much time enter data."

"Consume was not as complicated as FCCS so I think I could teach people to use the system very well."

"We already use 2.1.... I feel that we can easily transition into 3.0."

"Consume I would need more time with. The training portion was good; the program is harder to navigate. I feel that there is room for improvement."

"Again, I'll have to run through it a few times myself. The report features are excellent since they are easy to read and export."

"Enough to get someone started. I would need more experience to become a teacher."

"I would feel confident in showing someone else how to run Consume 3.0."

"Yes - not as well as FCCS; I am still figuring Consume out in terms of the equations, etc. but, yes, I can teach it."

5. Please comment on the photo series portion of the workshop. Do you feel you can teach others how to use and apply the photo series? Do you understand the field methods and concepts required to reliably use the digital and printed photo series?

Southeast Workshop

“I do feel confident teaching photo series, mostly due to prior experience. The digital series will be very helpful due to its inherent flexibility (ability to add, subtract, or edit data over time).”

“I would need lots of practice using the photo series, but I understand the field methods and concepts. We came up with such varying answers – it seems very subjective.”

“I believe I know how to correctly use the photo series and can teach to others. I just need to use them more in different fuel types to raise my comfort level.”

“Yes. However, it would be more helpful if the information and layout of photo series were consistent.... It’s a little confusing comparing photo series.”

“I believe that, with this class, I have gained a better knowledge on how to use the photo series. I am very confident that I can use the digital photo series to enhance my burn plans and better identify loading.”

“This segment was GREAT. I have used current and older editions for years, and encouraged our field stations to do likewise. The field exercise revealed how overly simplistic my own approach to their use was – humbling. But also, I now have more confidence in own ability to “get closer” by using more photos in the series and take one stratum at a time.”

“Excellent tool. I’m going to be able to show others how to use it.”

Hawaii Workshop

“I have seen the photo series before, but never really understood its uses until now. This portion was really good, especially the field trip where we were able to practice using it.”

“I do feel much more confident with the photo series now and would be able to much better use the series. Using the photo series still seems somewhat subjective to me at first glance, so the information in the pictures and data for each will be necessary for me to adequately use it. As stated before, we need more mature forest photo series – lower elevation mature forests to ohia/tree fern, ohia/lava forests.”

“I think that using this as a guide to help us calculate loading is good. Teaching others how to use it should be easy.”

“If you took 10 people in the field to assess the site, you will get 10 different results. In

other words, there are many variables and is there one right or wrong answer? Perhaps, these should be arranged whereby a factor or number is assigned. For example, if you have a range, say, 3-5 tons/acre, you could assign it a number. Also, will 1/10 of a number make a difference in the calculation? (0.1 ton/acre as opposed to 0.2 ton/acre).”

“Absolutely. Yes. It would be interesting to see how the instructors would set up a survey site from the beginning.”

“Yes. This as the easiest portion for me to understand and apply. The digital online portion is something that I think I would continue to use.”

“Photo series was good review and great field exercise – good prep for that! Hands-on practice would be nice for digital photo series.”

Pacific Northwest Workshop

“Photo series are a great tool and, even though there is so much room for individual interpretation, our outputs were all very close.”

“What about fuelbed depth? Or, if the vision is that the photo series would be input to FCCS, then provide a process. Digital photo series needs an output format for FMA and FVS/FFE.”

“I have taught others to use the Photo Series so I was already comfortable with that. The field exercise did bring in some new concepts that should improve my own application of the photo series and in teaching others.”

“I have a better understanding of the use of the photo series now – without the training I think they have been misused a bit in the past. For us, a combination of data collection and photo series use for a while is what I think we will do.”

“Yes to all. I do have questions as to how well the true fuels amounts can be estimated. Is there any literature evaluating this?”

“Yes. I could teach this. Some of what I struggled with in the field was a lack of familiarity with the photo series data layout. Perhaps a pre-field “walk through” before turning us loose in the woods would be useful.”

“Yes. The field was good to get your eyes tuned in. I think the digital photo series will be great when it gets up and running. The ability to query thru sorts will be extremely helpful.”

Alaska Workshop

“I am much more comfortable making cover estimates than bulk density estimates. Is there a way to provide the “cheat sheet” guidance? I would like to see the duff plugs photos on the digital series. It would also be good to have a tundra and shrub photo series so we can better inform the FCCS and Consume.”

“Yes and yes, though if more field trips were possible the first trip would be good to have folks follow and expert through the process (small groups).”

“This was very helpful for me. I don’t have much experience estimating fuel loading.”

“Digital photo series – Yehaw.”

“I feel I could have used a little more time with the photo series. I am fairly new to the fuels management field so I struggle with gathering the characteristics of a stand. I understand most of the concepts but could have used a little more guidance with the methodology.”

“The photo series is valuable in providing forest fuel attributes and associated info. This portion of the course was valuable and fully provided understanding of methods and concepts of uses of this tool. Digital photo series access is great idea!”

“This was great! This 2 practice sessions were so useful to me. I’d not been optimally using the series in the past. THANKS for the time spent with it! The discussion following each example was very useful along with the background information.”

“I felt the photo series session/field exercises were definitely geared toward those who had previous experience with the products. That, however, was not unexpected given the audience and I did not feel I could not learn with others and complete the tasks. MANY thanks to Susan for walking me through the first one.”

“The photo series is the most useful part of this class. There are a lot of potential uses for this.”

Midwest Workshop

“It was very beneficial to get out in the woods and use the photo series. I found out that it is more difficult to assess loading appropriately than I thought it would be. However, I noticed that veteran field foresters seemed to be right on in their estimates. I would like to use a photo series in the oak-pine (mixed) type that is prevalent in the mid-Atlantic area. I could teach the concept, but would be unable to accurately select appropriate types without measuring.”

“It was exceedingly helpful the way it was taught including the field exercises. I now have a much better sense of how to apply this tool and how the results are carried forward throughout consumption, emissions, and dispersion modeling.”

“Not sure what the “methods and concepts” required are. I know that reliability requires walking over a large enough area of the site to be representative. My strategy with down woody (counting pieces and using table to convert to t/a) was quite different from that of experienced foresters. I know I could not have come anywhere close at all without the photo series. It seems to me that the photo series could be used to train committed volunteers to collect data for fire risk evaluation.”

“The photo series seems user friendly to a point. Instructions on its use were not very clear in the field portion. I felt most people were confused in tackling the first plot. The second was easier, due to more explanation. There were no series that came close to matching our ice damage and heavy greenbrier loadings. I would like to see a series of quick measurements/sample tests that could estimate loadings. Matching pictures is too subjective.”

Southern California Workshop

“I think so. I’m not so keen on the Photo Series. I think they are useful to find out the range of loadings for a type, but I’m unconvinced they are accurate for individual sites.”

“I was trained adequately on how to teach others how to use the photo series. The class definitely filled some knowledge gaps that I was missing.”

“The printed and digital photo series are fairly informative. Practice will bring more confidence.”

“I feel I can teach this to others. I do understand that you can get as precise as you want, but it was tough getting accurate or even close to accurate total loading readings. Perhaps this is from the complexity of brush systems. The digital photo series will help users by making readily available new photo series as they come out. I do see a benefit from the photo series and feel that fuel managers can use them in many applications. Mixed conifer in Southern Cascades or Sierra would be nice to add to this in more depth.”

“Yes, I have always felt the photo series is a valuable tool for rapid field assessments. The stereo portion of these new series is great; the increased amounts of information etc. are good. If old photo series books could be taken and the same depth of information added it would be great. We still have activity fuels, but now have natural fuel build-up in them. Digital photo series is something to utilize now that I know it is available.”

“The photo series is a good tool. Chaparral series could be expanded. Break line between communities maybe on aspect rather than loadings.”

Southwest Workshop

“Field methods are vague. I feel it would have been better to teach more rigid methods and then encourage adaptation. This would prevent many misconceptions about photo series use.”

“The photo series was the least new, but probably because I have used them in the past, but not well. The online digital series will be very helpful due to the search function. Create a new ponderosa pine series.”

“Even though I have some experience with these items; I learn more tricks. These have always been a good tool.”

“Yes. I have used it in the past and it’s nice to know I used it correctly. I do think it

would be good to state somewhere that the fuels data only comes from behind the marker pole. When I had used it in the past, I didn't realize that."

"Learning a little history was good. The digital version is exciting. I'm looking forward to that, but won't replace need for field-going book. I had been using the book appropriately and it's good to have that confirmed in class."

"I like the photo series for the pinyon-juniper. I am more comfortable measuring fuels in the pine type since we put in monitoring plots anyway. In the pine I will probably use a combination of field measurements and photo series."

"I realized yesterday that I am out of practice on utilizing the photo series. I would benefit from some additional field measurements/plot inventories to "re-calibrate" my eye. I do not feel really comfortable about my end results utilizing the photo series – even though I appeared to be within +/- 20% of the measured results."

Northern Idaho Workshop

"Things went well once I understood the concept of matching the photos and being able to utilize several photo pairs for our individual plot."

"I need more practice, but I feel more comfortable now. I am excited to have my own book, but I wish the other areas were more available. "

"I liked the photo series although, once out in the field, it was much more difficult to use than I thought (i.e., using two or more series to identify the actual fuelbed you are looking at). Put common names on photo series instead of scientific names."

"Very awesome; it opened my eyes more and made me more critical and less generic. Chad Hoffman¹⁰ was very helpful with the field exercise. Alistair Smith⁹ also gave me helpful hints. I feel I will use this info in the field more efficiently because of the field portion of the workshop. Nicely done! "

"I'm still very skeptical of using the photo series and prefer to collect data sets. Obviously, the point of the series is to save time in the field. IF you're using different photos for different components, have a table to look up loadings from lowest to highest for each component, e.g., ground fuels, etc."

"The background in the morning was great; actually doing a site brought it full circle. It would have been nice to do a third, but because of time I understand it wasn't possible. I think that the more practice one gets, with a trained eye available to ask questions of, the better! One more field site would have been great."

¹⁰ 451 Course Instructor employed by University of Idaho

“I could show them what it is. I don’t have adequate knowledge of fuels to teach. I still need to plan a project, start to finish. I do feel that I have a basic knowledge of field methods, but still need to complete the whole process and test my results.”

“I feel I could help somebody use this guide, but I think the only way to become fully proficient in its use is practice/experience. While I’m comfortable with the idea behind the fuel guides, I think I lack of necessary experience to be fully confident in their use.”

“We need a photo series for ponderosa pine.”

6. Please comment on the field exercise and how we might improve it in future workshops.

Southeast Workshop

“One thing was not mentioned in summation, was that we worked through a gradient from lightest to heaviest loadings. That should have been evident but is an important point worth reinforcement with students.”

“I think the field exercises were great, but adding cadre into groups during the first photo point would aid in learning quicker.”

“I enjoyed the field exercise. I would have liked to translate the field results into FCCS. I am not sure the field data sheet will allow easy entry into FCCS.”

“The field exercise was very helpful. I think I would have learned better if we split the group into working teams with an instructor with each team to help guide us.”

“The field exercise was VERY helpful on the first site. I would put folks into groups. Second site have them work by themselves. And the third site do what we did – break them into two groups. .”

“Regarding the photo series, we might learn better by having a demo before assessing sites #2 and #3. Otherwise, I think they were good. Breaking the groups into 3-person teams may speed up the exercises and encourage collaboration and sharing.”

Hawaii Workshop

“Get information from participants in advance on locations that may be of interest or concern.”

“The field exercise taught me the flexibility and imagination required to evaluate the indices. It was very worthwhile.”

“More field time and photos would have been good. Also, Bob could have demonstrated how we would use the assessment sheet and the photo series to come up with the results. For example, we could have gone to one site, Bob would go through his assessment, and then the students can follow through.”

“Any posters the instructors could share in terms of the steps/protocols they would use to survey a fuelbed area so information could be less subjective. I believe there was a wide range of information gained from each sample/survey site. .”

“How about including a visit to a site not even close to the habitats represented by the photo series?”

“I really enjoyed the field portion. It seemed like everyone was happy to learn how to use

the photo series more effectively than simply picking a single picture to copy the information from.”

“Maybe set people up in groups so that they can help each other out. I know that I saw a couple people just by themselves, but maybe these people really understood the whole process and didn’t need help.”

“Perhaps in small groups with assigned coaches, and no rain. Best part is always practical, entering data and playing with it would help.”

“No RAIN! If time allows, seeing more sites would be better.”

Pacific Northwest Workshop

“Field exercise was excellent and I see no need to improve it.”

“The field exercise was excellent. I obviously should have been asking far more questions than I did.”

“Field exercise was extensive and the site provided a wide variety of conditions. Even a few bugs couldn’t distract from the benefits of doing the hands on work. Excellent.”

“Working with the plots was useful. I liked working up the data then comparing our figures to the experts who did the actual measuring – very helpful. Drop the pile measurements – we pile burn 3000-5000 acres annually; no time to measure.”

“Field exercises tied together things from the classroom.”

“Break out each portion into shorter exercises and then discuss before moving to the next portion. VERY GOOD to know the measured results to compare with what we interpreted.”

“I thought it was well done. Enough time allowed and didn’t drag on. Improvements – possibly go through the first stand as a group and complete the second stand individually.”

“I think the field exercise is very good. Maybe we could have used some field time to look at a larger area, i.e. treatment of 5 acres, something that seems more practical to managers.”

“More discussion about the local fuels and vegetation and fire problems → just a quick orientation/intro would be great for people not familiar with the area would have been very handy.”

Alaska Workshop

“Not sure how useful looking at the piles was.”

“Do an example first on the process. I gathered most folks didn’t know what to do at the first “plot.”

“Less time on the duff plug, more on how to use the photo series.”

“This portion (the field exercise) would have been much more valuable if the class had been split into groups and mentored through one unit.”

“Excellent. More is better. The field trip made clear the art involved.”

“One suggestion would be to break up in small groups with one mentor for 1st site then have folks do it on their own at the second site. A little more time would have been beneficial as well.”

“Field exercises were valuable for photo series but a little weak on forest consumption concepts.”

“I cannot see how they could be improved. Each group that you teach has unique needs and background, so you have to aim for “middle ground” when doing these exercises. What is most important is that they are real situations. The discussion following is always one of the more useful parts of such exercises.”

“The field exercise could be an additional day.”

“Field exercise went very well.”

Midwest Workshop

“I can’t think of anything – it was great. I really liked the consumption approach. It was good to have enough cadre to provide assistance.”

“It was exceedingly helpful the way it was taught including the field exercises. I now have a much better sense of how to apply this tool and how the results are carried forward throughout consumption, emissions, and dispersions modeling.”

“Small groups to work 1st plot was good. Got to share strategies. I would have had no idea where to start otherwise.”

“Hands-on field exercises are important. Improvement may include assigning and discussing each section individually instead of assigning the exercise as a whole.”

“This was the best part of the class. We could have looked at a couple of more sites and done less driving. I suggest having lunch in the field and looking at more sites.”

“I liked the field exercise. It could be improved by actually doing some of the sampling.”

“We needed clearer instructions on how to use/derive field data from photo series. I saw people counting trees, using prisms, writing numbers down directly from photo charts,

etc. Make it clear that users need to match and estimate actual numbers. I liked the demonstration of sample/experiment techniques.”

“I thought the field exercises were good. I thought the suggestion of a more guided first attempt would help move things along more quickly. You all did a really good job of tying the field visits to the classroom work with FCCS and CONSUME.”

Southern California Workshop

“Good field exercises. Excellent demonstrations of how photo series were developed. I liked the aspect that plots will be processed for future use.”

“Stress the fact that you can make up a form that better fits your needs to take out in the field.”

“Need a longer field day with more sites.”

“Good. It provided a good feeling for how to creatively use photo series. Again, it would have been interesting to see some analysis of how error affects fire behavior measure, i.e. if dead shrub biomass is off by a ratio of 3, what would happen to predicted fire behavior. It would help user gauge how much work-time to put into estimating fuels.”

“The field exercise was good. I think you should collect from each participant what their estimate of fuel loadings was for each site, and then compare those (F&SE) to the actual.”

“I thought the field exercise was the most important part of the class. I thought it was adequate. I would however go into a little more detail on the sampling procedures.”

“My request for the field exercise would be a more systematic approach to the inventory/evaluation process.”

“Great preparation in field exercise. Having research done on these sites was useful. These types of sites are common throughout central to southern California and were realistic.”

“Definite need for this portion, especially for those not as familiar with estimating fuelbed loadings and utilizing the photo series as a tool.”

“Like most things, your skill will improve with practice. The hardest thing is validating your thought process. It was nice to go out in the field and get the actual numbers after doing a photo run.”

Southwest Workshop

“Loved the opportunity to ‘calibrate’ my eyes to estimate trees per acre, woody debris and ground cover. Those were skills I was looking to gain and I succeeded in learning to apply the natural fuels photo series. As far as more photo series, more variation in

vegetation? Spruce maybe? Mixed conifer somewhere would be great!”

“The field exercise was beneficial. I look forward to putting the field data gathered into a practical exercise. Again, I would have enjoyed one more stand review in the afternoon.”

“After “guess-timating” loading from photo series, have handouts with actual numbers from field measured data and picture of the site.”

“I learned a fair amount. I have committed most of the mistakes Bob pointed out and warned against.”

“Having the class adjacent to the field was a big help (cut down traveling time). Good job to carpool as well. Have an option for participants to watch the field crew collect data on the plots.”

“Add another stop or two to fill out the day.”

“Using the photo series takes practice but how can you ever ensure you are picking the best photo? I have trouble comparing the 2^D photo to what I’m seeing on-site so the 3-D glasses help.”

Northern Idaho Workshop

“No improvements needed that I could see. Site was great and people were flexible. I enjoyed the day.”

“I had a really good time and learned a lot. As mentioned by others, doing some of the sampling techniques could be useful but I can see how that would limit the time for instruction and it is something we can do at a different time.”

“Maybe more time.... And an exercise with multiple small groups on different stands... where instructor wouldn’t necessarily have to measure the fuelbed, but would use the photo series themselves as a “check” on student results. We get better with multiple uses.”

“More exercises. This might be hard because of the logistics but more field time and exercises would be beneficial. Maybe add an extra field day.”

“Make it longer. Multiple groups work on a unit. Come back to the classroom, analyze and combine data, develop a proposal for treatment.”

“Include hints on how to use photo series effectively – this would be most effective as a brief discussion in the field. A second site would have been good to help reference and have a discussion of methods. Sorry for the challenges we had with the weather.”

7. Please comment on the final exercise. Did you learn from it? Do you have any comments about how the three applications work together?

Southeast Workshop

“VERY helpful in closing the loop on the course. Definitely keep the final exercise.”

“Final exercise was very necessary to reinforce training and work out bugs.”

Hawaii Workshop

“Excellent. It’s good to get out and do field work. We learned how to apply what we learned and how to gather fuelbed info. I would like to see how duff depth is determined.”

“This workshop was very valuable in the application of the final products (photo series, FCCS, Consume). When the whole system gets refined, or should I say when any significant portion of the system gets refined, a class would be valuable for us managers.”

Pacific Northwest Workshop

“I have learned a great deal in such a short workshop.”

“Good learning experience until computer software or user glitch threw the exercise into turmoil. I definitely learned. I learned there’s more I need to learn. Efforts to integrate these applications are obviously paying off.”

“I learned from the field experience, mostly techniques.”

“That was an important concept here. The software programs complement each other well. It is definitely a coordinated effort to provide us good tools to quantify some of the most important aspects of our work.”

Alaska Workshop

“Very helpful to reinforce familiarity with Consume.”

“Yes. As expected, this is a great way to conclude the workshop! Great job.”

“Very helpful to go through all the steps and programs again. Thanks for a great workshop.”

“Useful; good and necessary review.”

“The cadre and the instruction were superb; experts in the field. Thanks for the opportunity!”

“Exercise was good help to tie together FCCS and Consume functions.”

“Yes, but a little more time devoted to the examples would be nice.”

“Final exercise seemed to simply repeat previous lessons without much reference to what we saw in the field. It would be nice to discuss/relate observations in the field to make the inputs and results more relevant to the user.”

“The exercises are always useful. I think they could/should go more smoothly by organizing them beforehand.”

“Workshop was well thought-out, prepared, and instructed. It was a worthwhile 3 days.”

“Thank you for pulling it together!”

“I would like to see the ability to sequence burning piles other than building separate piles from the numbers of piles.”

“Very beneficial. We burn large piles and this will apply.”

Midwest Workshop

“It was good to run through it all over again. I still need to spend time running it through the FEPS/VSMOKE.”

“It was great. Again, as I mentioned before, I saw the overall picture as we compared the numbers. Great exercise.”

“Having never worked with fuelbed models before, I would like the experience of applying what I have learned in this workshop to my job duties.”

“Outstanding! Susan is a great instructor. The exercises helped a lot.”

“Very helpful – reinforced the previous stuff.”

“Good incorporation of both tools.”

“The last 1/2 day, including the final exercise, did a good job of tying the field and classroom parts of the workshop together. You had a motivated class, and I’m sure they appreciated working with fuels they cared about!”

Southern California Workshop

“More practice is always better. It is a most useful exercise.”

“Good use of real data to tie all together.”

“Final exercise was very good.”

“Very helpful in tying all together and using applications together.”

“Yes, it was a good way to tie together the 3 applications. I feel (well prepared) for my own use.”

“I do understand how the three applications work together. They all make sense and I think you are on the right track.”

“Good summary. Self-study guide to take home would be good.”

Southwest Workshop

“Yes! It went well. Both FCCS and Consume exercise. The last exercises are exactly what I needed to put this all together. Thanks again!”

“This helped bring everything together.”

“Really good way to tie together the course.”

“I liked that we tied FCCS and Consume together (something for reference sheet). I also liked looking for the fuel load; it would have been good to look through digital photo series to select a fuelbed. Would a link be possible from the digital photo series to FCCS? Maybe a thumbnail picture that you could click on?”

“Could be longer.”

“They seem to interface great. More time needed.”

“Great wrap up!”

“Final exercise helped tie things together and also tie it to the real world.”

Northern Idaho Workshop

“It would be great to have some time to evaluate after each day.”

“Yes, FCCS and Consume work together! Wow!”

“Awesome information. I feel the 3 applications flow nicely. I need to figure out Consume more but that will come with use. Very good workshop and very good class (FOR 451).”

“Essential to do this! It really tied everything together again. It also gave us the field application and the visual and then apply this with the programs. I enjoyed talking about ‘If this... then this is what happens.’ ‘Is this what we expect, if not why are we getting these results?’ Really great course!!!”

“Yes I learned a little better how to apply the field data into the programs. No comments; I just need practice!!!”

“Very helpful. Cadre, thanks for sharing. This was a great chance to learn from friendly,

knowledgeable and well-organized people. I would love to have all of my employees attend your workshop.”

“This went well, I learned how to input pile data into Consume, and received more practice inputting fuelbeds from FCCS.”

“(1) Focus an exercise on smoke – should you pile? What if broadcast burn under different conditions? (2) Talk about how you might go back and forth between models. For instance, if you’re running the Fire and Fuels Extension, to choose thinning then link to a changed fuelbed and related emissions.”

Appendix C—Selected Comments and Suggestions on the Tools

Selected Comments and Suggestions on the Tools

FCCS Evaluation Form

The FCCS development team would appreciate all your comments, positive and negative, on the FCCS program. These will be used to improve usability and data quality. If you run into general or specific concerns or difficulties, please let us know as much as possible about these.

We also envision an FCCS version 2.0 and would appreciate your thoughts on future direction, things that could be added or changes, etc.

Specifically, comments on the following are appreciated:

i. Installation of the FCCS

Easy

- Great. No problems.
- Easy to use and install
- Installation was easy.
- Installation was simple
- Installation worked smoothly
- No problem. Need an install wizard.
- Easy, and probably easier with your CD
- There was no problem installing program.
- This is very easy; I have not had any problems
- Installation was simple and program ran smoothly.
- Everything went fine, good instruction on the Web.
- Program seems use to install, input data, run program, and read end product.
- The FCCS computer program, its presentation, was easy to understand and follow.
- All FCCS installations went very well and were easily downloadable from the FERA website.
- FCCS installed quickly on my machine, and so far, has been running without any problems.
- Installation was smooth with no problems encountered. Program was easy to use and straightforward.
- Installation was easy; the only difficulties I experienced were related to my lack of computer skills and not the process.
- I had no problems with any of the topics listed here. Installation was quick and painless and the program is easy to navigate through.

Some Challenges

- I had to search for the .bat file on my computer to install.
- The installation of the FCCS was not easy but also not very difficult.
- Installation is a little cumbersome if your PC isn't configured correctly.
- So sad – BLM IT. I can install and use the programs at home, but it has become a nightmare at work.
- Installation was easy, but was not used to looking for a .jar file. I know I had to confirm what file to start.
- If the Microsoft and .jar files were incorporated in the download page or software packages, it would simplify things.
- Need to have a clickable desktop icon to launch FCCS. The current method is slow and cumbersome to use.
- It could have been my fault, but after I downloaded FCCS, I couldn't use it because the file had to be extracted, it would be nice if the program already did that for you.
- Installation was a bit cumbersome. Not sure how to tighten that up at this point. When updates are made, post the changes to new versions along with the new version.
- Installation is fairly straightforward → need some documentation on proper directory for custom fuelbed files when bringing them in from a thumb drive, etc.
- Installation was somewhat more involved than I realized initially. I did download FCCS from the website, but evidently not all files were successful. Susan was able to rectify with the CD.
- Installation was just a little difficult, but once I was able to hook up my laptop to the Internet it was fine. Someone else might encounter this problem in the future and if they are not able to hook up to the Internet it might be a major problem.
- Installation from the disc went smoothly during the class. When I tried to download it, it took several hours and then I couldn't get it running.
- It is a little confusing on how to update an older version. I didn't know if you are supposed to overwrite files or delete the files and reinstall
- It appears that FCCS requires a computer with relatively high capacity to work efficiently. This may be inhibiting.

Java Issues

- Installation of the program itself was simple enough; however, the Java upgrade was a little confusing. Maybe you could include the Java update in the install process. An install wizard-type installation would be great.
- I had difficulty installing the Java version, but it worked when I selected “manual installation.” You may want to recommend this to others. Once the Java was in I had no trouble with FCCS.
- I had problems with the FCCS once it was loaded. Loading went fine but the program was never operational on my laptop. After selection the ecoregion and vegetation form, and then “search for fuelbed” or “select fuelbed by file name” I'd hit the Next... button, and that was it... frozen laptop. Subsequent installs did not help either. I suspect it was a problem with Java!

- Installation seemed to work fine. I had problems downloading the Java version off the web page. It was blocked by IT security.
- I attempted to download FCCS twice from the web onto my PC at office. Both attempts proved unsuccessful, problem was centered on affiliated Java software.
- This was straight forward but I have not had the time to run FCCS on my PC yet because of problems with security allowing JAVA SCRIPT to be placed on my PC.
- Installation was difficult... mostly due to limited technical knowledge and the difficulty of obtaining admin privileges... the one part that was helpful was the detailed instructions including Java installation, etc.

Instructions

- Better information and instructions would be appreciated for installing these programs. I could not do it without help, and did not realize how much time it would take just to install these programs. But using FCCS was painless.

ii. Choosing Fuelbeds

Easy

- Good interface.
- Very easy, and explained nicely in user manual
- “Canned” fuelbeds are easy to find and choose.
- Drop-down menus are simple and straight forward.
- From the class exercises, I’d say these are fairly easy to access.
- I really like how straightforward, and easy to use in the program
- The choosing fuelbeds is very user friendly. I like the way it is set up.
- Until I use the program more, I do not see a problem choosing fuelbeds.
- Choosing fuelbeds was quite easy and would become easier with increased use.
- Choosing and customizing fuelbeds was straight-forward, and reports made sense.
- Simple and intuitive (maybe some small user changes such as names of radio buttons, etc.)
- Again, this is an easy thing to do. But I would like to be able to start with a blank fuelbed though.
- This is pretty straight forward. More discussion of what to do when working in an ecotone would help.
- Choosing fuelbeds is fairly straight-forward, some of the manipulation, save, copy and paste were a bit confusing.
- Choosing the fuelbed at first was a little difficult because I didn’t really understand the process but once I got a little practice it was easy.
- I also felt that it was easy to choose fuelbeds as well as customize fuelbeds. I appreciated the fact that a user is able to alter the existing fuelbed to create or customize their own.
- The program is well set up with the maps – since the names of “eco-regions” don’t necessarily mean anything at first glance. The pictures for the structure classes/veg forms are excellent. Choosing fuelbeds is straight forward. I’ll have to do some more work to see how applicable they are to my area and see if custom beds are necessary.
- It seems choosing and customizing fuelbeds will be simple after some practice w/FCCS. I can’t wait to get back to my home unit and start customizing the unique fuels thee. This software will help me in so many aspects of my job – Fire management plan updates, burn planning, mech. fuel treatments, pile burning, smoke management, etc.

Photos

- If you could include photo series images on the fuelbed search page it would be helpful in determining the quantifiers of (prescribed fire) (fire exclusion) (insect and disease)...
- Choosing fuelbeds was very easy, especially with the narrowing-down process using ecoregions and cover types. Actually incorporating photos into the preset fuelbeds would be helpful in determining how much to alter them when customizing.
- It would be helpful to have visual reference pictures to relate to fuelbed choices.
- Fuelbeds are relatively new to me – the natural photo series was great. Good to use in the field to train your eye.

File Names

- This is fairly intuitive and nicely done. Ease of selection (i.e. alpha-numeric arrangement or type in 1st letter) to get fuelbed of choice more quickly would be a good feature to add.
- Include #s (filenames) when searching fuelbeds.
- Choosing existing fuelbeds okay except need to add fuelbed # to “click a fuelbed for details” list box on “search for fuelbed” screen.
- Choosing fuelbeds and customizing fuelbeds seemed straight forward. It seems like the fuelbed list could have more detail in the names, or if you create a custom fuelbed starting it would be more users friendly if the custom fuelbed had the user’s name on it, instead of just repeating the standard fuelbed name.

General Comments and Suggestions

- The problem teaching this is the fact to change mindsets of a fuel model is a fuelbed.
- Figure out how to do multiple fuelbeds simultaneously.
- It seems like if you double-click on something like a fuelbed, you should be brought to it instead of having to click “next.”
- It would be easier for Hawaii users to access fuelbeds by having a Hawaii fuelbeds ecoregion. Having to select rainforest is deceiving to us since not all of our fuelbeds are located in a rainforest.
- Fuelbeds need to have some way to let the user know which input variable change the results more than others. Managers need a way to prioritize which information to collect with limited time and resources.
- I think the idea behind FCCS is great. The fuelbeds are definitely better descriptions of vegetation than the standard fuel models. The fuelbeds are easy to navigate through and provide good detail.
- As we discussed in class, building into the program a “regional” level to sort by would be very beneficial. I realize fuelbeds from different regions may end up fitting our area of interest; however, to start off it would be nice to scan through the Hawaii ones first.
- Coming from a purely fire suppression view, I would like to see more work done in “problem areas,” dry and hot areas which burn frequently. Ideally these types of fuels would be shown through various densities i.e. sparse versus heavy loading of same place.
- It would be helpful to see the SAF number next to the fuelbed name when selecting using ecoregion parameters. This would help us get used to the numbering so it is easier to find in the search function.
- On the Edit Fuelbed Screen, minimum/maximum fields may not be necessary – if present, should be grayed out to minimize data entry errors (delegate warnings to task bar). Should be a “Return to Defaults” button to return to stand fuelbed and possibly and “Undo” button to step back through edits.
- Ladder fuels -- better documentation. – hard to find and understand (min/max on both axes of table)
- I know it is a programming nightmare, but really need to be able to choose units.
- Common-scientific name lookup tool is great! Possibly a third column for standard species codes and another user editable column for local codes or common names?

- In the all-woody, depth and % cover need to be explicitly defined on screen and a methodology for calculating depth needs to be developed. Imagining woody spread out over unit is impossible to estimate accurately.
- Moss should be divided between sphagnum and other (feather) instead of forcing one or the other. A site may have a good mix of both and varying percentage will drastically affect fire behavior.
- There needs to be a comprehensive fuelbed for dead spruce/calamagrositis.

iii. Customizing Fuelbeds

- Very easy
- Need to look at this more.
- The customizing fuelbed is a great option.
- Customizing fuelbeds is easy and intuitive.
- With the correct data customization is straight-forward.
- This is a nice component, adaptable to many different sites.
- I believe the customized fuelbed builder will be a great tool.
- It appears easy enough. More practice and application will tell.
- Customizing fuelbed section is good, as well as report functions.
- Ability to customize fuelbeds was a very important part of the FCCS utility.
- More time could have been spent on custom fuelbeds and how to develop them.
- Choosing and customizing fuelbeds was straight forward and reports made sense.
- I will be customizing fuelbeds as there are a couple versions I see on a constant basis.
- With the data presented, we can start building fuelbeds that makes sense to the local user.
- I find that being able to customize a fuelbed to meet specific areas within our districts/islands is excellent.
- Easy and straight forward. Sometimes I think students do not realize they do not have to fill in every piece of information or that it can be left blank.
- The option of customizing fuelbeds is really nice to have in the event your area of interest is not represented.
- This was even more difficult at first, but by following along step by step with Tiffany and Clint, it made the processes a lot easier. I don't think I would be able to just jump in right now and do it without help. It will take some practice so expect some calls from me when I use it.
- Customizing fuelbeds still a little foggy with – how that would apply to the field trip yesterday? I think I understand parts – snapshots – about the different reference materials and programs but don't know how enough to understand the Big Picture to understand how they all relate?
- I'm not sure we covered this in-depth enough to line out a good procedure. A check list or step-by-step process or maybe even a publication that could be distributed on how to use the photo series and customize the fuelbeds would be nice.

General Comments and Suggestions

- It seems like real fuels data can be used as input, rather than simply picking a fuel model to match expected fire behavior, like with Behave, etc. This is significant progress! I was glad to see the %.... FBFM x-walk because many of us will be stuck using them for a long time.
- The exercise was very useful in customizing fuelbeds. One thing that struck me as we went through this program was that there are so many inputs it would be nice if, at all possible, to understand which ones are the most important for the formulas. As painful as it sounds, a bit more time could be spent on the fire potentials. IF you only have X constant amount of time to collect fuelbed info, what are the most important, etc. When is little info too little to trust results?

- The min/max fields could be eliminated if they are not used in the calculations. In woody fuels, put loading tables together, not side by side.
- The ability to create different layers could be a stumbling block. A tutorial or helpful hints for customizing fuelbeds would be good.
- Ability to incorporate slope and other environmental variables will be important.
- I like this. Perhaps if we had an example to review in class we might have been able to offer suggestions about other things to include.
- Customization seems straight forward. I'm a bit concerned that there may not be appropriate background equations to represent different flammability of shrub types (ericaceous versus others).
- Good – However, a couple of points to consider. Would an “Import Wizard” be helpful for folks using standardized databases such as FEAT (NPS) or Firemon?

iv. Reports

- Good
- Very useful.
- The reports seem good.
- I like the reports option.
- Reports were very friendly.
- Excellent selection of reports.
- Very useful, easy to understand.
- Reports were easy to understand.
- Inclusive reports are very helpful.
- Looks good so far, but I need to use more.
- Reports are swell, especially like the .pdf button.
- Need to be able to compare 2 fuelbeds side-by-side.
- System reports are great but can you customize them?
- Be able to run reports that compare fuelbeds side-by-side.
- The reports are great, easy to read and very clear cut.
- Excellent and easy to read. .pdf export easy and nice for presentation.
- Reports need to be easily malleable in Excel and Word as well as .pdf.
- I would like to see greater capability in comparing fuelbeds within FCCS.
- Reports were sufficient through graphing reports could definitely be improved.
- It would be a good idea to have the reports exportable to MS Word, Excel, etc.
- I also really like the fact that you can construct a quick report and print out a PDF.
- My only other comments would be to calculate a canopy bulk density for people to use.
- Generating reports is simple (w/ correct inputs). Applying them where and how I have to work on.
- Reports are good, though I'm very much looking forward to the "Suggested Fuel Model" with modification feature.
- It would be helpful to be able to generate an end result report for multiple runs in a format that could be exported into other documents.
- Reports were easy to read and interpret though it would be nice to be able to display two or three different alternatives for a project on the same page.
- It seems like there would be a better format for the reports like having every other line highlighted and is a bit more compact.
- I think reports should be updated to print out information that can be directly put into a government document or article.
- These seem to be pretty straight-forward. Their utility will get tested as we apply FCCS to real situations.
- Reports are nice. As alluded, I'm not sure they tell us anything we shouldn't already know. The numbers generated may prove most useful for presenting a proposal to a bureaucrat.
- Really like the report capability, especially the graphing. Managers love to see visuals, whether they mean anything or not, that's a different matter.
- I like how reports can be generated to show amount of energy released. We can now use this info to tailor our response level (for example, # of responding units).

- I like the reports – they are calculated very quickly and easy to understand. They will fit nicely into a fuel treatment analysis (specialist report) or a burn plan appendix.
- I talked with Sam Sandberg about this a bit; an output table with the behavior, and fuel models only (like the one in the PowerPoint) would be nice, also a condensed summary of the fuels (like in the photo guide) would be very cool.
- The report feature breaking down fire potential 1-9 FCCS code is the kind of data we like to have when discussing management options. I think we could use this kind of reporting in all our treatments.
- Reports are highly useful, but the fact that FCCS is not a nationally-sanctioned product limits its effectiveness. Crosswalks mitigate this as does peer review and acceptance by academic communities.

General Comments and Suggestions on FCCS

- Desktop shortcut icon
 - FCCS seems to be really user friendly.
 - Very helpful, professional cadre, every one of them.
 - Results have immediate management value and impact.
 - I look forward to using the program on future projects.
 - Is this a fire behavior tool or an ecosystem management tool?
 - Incorporating FCCS into Farsite landscapes would be deluxe!
 - Incorporate the ability to use a graphics package to visually see changes.
 - I think the FCCS is a useful tool which can be used for many purposes.
 - The program is amazing in its abilities, and I think has unlimited application.
 - FCCS could be great tool for mitigation (quantifying) in communities at risk.
 - Will need to input our own environmental variables and fuel moistures eventually.
 - Why does the program disappear when creating reports? Many around me thought it has crashed.
-
- In the future, it would be cool to see a version of FCCS with the option of inputting weather data.
 - I'd have to practice choosing and customizing fuelbeds, and generating reports. But it seems pretty easy.
 - Until FCCS outputs a fuel model for input to a fire behavior processor, or predicts fire behavior, its use will be limited.
 - It was a little frustrating to hear all these important improvements that will be coming in "October." They seem very useful.
 - I would also like a 3-D picture of the fuelbed... to see if I have described it accurately. Something like FS veg simulator has.
 - Tremendous amount of work has been done. Impressive. But still skeptical of fire and crown potential. Misleading 4 mph mid-flame wind speed.
 - Keep up the good work and I look forward to version 2.0. I think this application can help to get at risk and hazard, also within some of our WUI.
 - I support the ultimate goal of using fuelbeds instead of fuel models. Fuel models are not adequate (even with the new 42) for fuels project planning.
 - Ability to model hardwood crown fires would be nice, if only as a hypothetical! I think that FCCS is hard coded to not allow crown fires in hardwoods.
 - Help items, with explanation of each fuelbed and component and how it is measured/estimated would be neat (they may exist and I might have missed them.)
 - It remains to be seen if the Fire Potentials will be used by the field. I think comparisons are only relevant within climate zones, or rather a Forest/BLM District.
 - Need to give more thought to use of FCCS for post-burn fuels. Can we find a way to use that displays the altered characteristics of the fuel when compared with unburned?
 - A minor programming issue: I always got a "save as" button in FCCS, even after the first save. It would be nice to be able to hit "save" and not have to go to the "save as" screen.

- Lack of an ability to treat dormant versus growing-season fuels will be a problem for existing FCCS fuelbeds for mixed oak fuels. Current fires are almost exclusively dormant season.
 - More use would enable familiarity and proficiency. Could probably use more fuelbeds specific to Hawaii to allow product to be more viable to us. Much easier to understand and use than Consume.
 - Navigating by using the tab worked but it didn't highlight box for editing. Still need to use mouse or backspace keys to change numbers. This may be a Java thing.
 - Many of the things you said were in the works are suggestions I would have, like having photos on FCCS and having a sheet of statistics for each of the fuelbeds.
 - This is Eric Ellis's idea, but just in case he doesn't mention it, having a sap component of trees would be good since it serves as a better ladder fuel than branches some times.
- The FCCS program is really cool. As soon as our FCCS lecture was over, I called my FMO and told him about it. I'm excited about FCCS and can't wait for 2.0. Very user friendly. I believe FCCS will be very applicable for writing prescriptions for burning. Very nice program.
 - I have used FCCS before I came to this class, just by tinkering with it at work, but I had no idea how to properly apply it until after this class. I think an email server that can update users in changes would be a good idea.
 - FCCS seems like a great program that needs more field use. It would be nice to see more fuel types. Maybe types per USFS region, like R5, R3, R6. Will users cross the data with field results and be satisfied?
 - Overall, based on my limited experience, FCCS is a great tool for fuels planning and management. A software glitch (jittery screen) caused some minor problems. Cheatgrass fuel characteristics need to be addressed. Excellent presentation.
 - This program looks like it has great potential and should be very useful once you can change environmental and fuel moisture variables so that you can look at fire behavior outputs using realistic inputs.
 - It would also be nice to have the "back" button return you to your last screen within the FCCS rather than the fuelbed selection screen. This would allow us to look at a report then go back and change parameters if the results don't look correct.
 - Overall, I think there is valuable information that could be utilized from FCCS. I experienced no problems or difficulties with the installation, etc. Although I have not worked much with the program I can see a lot of value and application.
 - Good tool. Believe it will help to demonstrate change in fire characteristics better than Flammap. Shrub fuelbeds need to be better defined. Change agents do have an effect to reduce fuelbed without changing species at times.
 - Is it useful? At first glance, yes. I will apply it to my area for testing. In particular, it will provide a measuring stick for demonstration to manager on the effectiveness of some treatments. Hence; they see results, more money.
 - I found nothing negative on the FCCS system and I found it very useful and applicable to help me understand more about the different fuel types and fuelbeds here in Hawaii, although if program was more applicable to Hawaii fuels and fuel sites it would be more beneficial for use in Hawaii.

- The program appears to be user friendly. The real test is using it back at the district without cadre help. An ecoregion map that is zoomable w/ a few landmarks would be helpful, GIS layer? Reports that can be exported to Excel. Info in basal area in addition to trees per acre for fast analysis. Great free program for fuel lading versus FMA Plus
 - FCCS is a great tool for researchers, managers, etc..... This tool has endless possibilities I think the LANDFIRE group would be foolish to not use the potentials to map fuels, I hope you find the support from the national level to get FCCS in the nationally-supported list. Need a ponderosa pine photo series.... Keep trying for this...
 - I think that the fire potential output will be useful in many ways. Specifically, writing burn plans. I also think that it can be used as an educational tool to promote Firewise projects. In addition, it will prove to be a great monitoring tool and a way to display accomplishment prior to a hazard fuels project or burn.
 - This is my first exposure to FCCS. I need to work with it more to appreciate its usefulness. It seems to me it needs a direct weather component, e.g. a hardwood-conifer site is going to burn differently April 15 versus Sept. 15. On both dates, the grasses may be cured and leaves off the trees, but as I understand FCCS the potential values may be the same.
 - All aspects are what a person needs in this day and age for taking the valuation of a fuelbed and capability of displaying the resultant effects of treatment to a fuelbed. The more we can have programs that are “one stop shopping” the better it is. Fuelbeds for the Sierra mixed conifer stands would be helpful, but I now know how to utilize the 216 fuelbeds in FCCS to build these myself.
 - All useful tools. My comment would be, maybe there should be less variability between observers looking at the same ecotype or same plot. Seems like after the field observation there were a lot of variability between observers. I wonder if we ran FCCS with different inputs for some ecotype, would the outcome have the same effect or would it range also. If the outcome has a wide range then maybe the field observation should allow for some variance.
-
- From what we went over in the workshop, most aspects of FCCS seem very usable, easily understandable and useful. I would need to become more familiar with FCCS to be able to really comment on how to improve it. I did notice in the Forest fuelbeds, many were exotic timber-type stands – perhaps more variability in native woodlands would be great – lower elevation native forests (also would be especially helpful in the photo series).
 - Choosing and customizing fuelbeds is still too new of a concept in my mind to comment too much on it, but the information was presented by the cadre in a very straight-forward and understandable way. One problem that we are running into in the fire management world is just an overload of information/pathways to resolve issues and to make decisions, and different systems or approaches that try and answer the same questions. With all those different pathways, it is becoming difficult to see a logical way to or a single method to reach a process that confidently explains the best way to deal with our (fuels) problems and issues. The cadre did an exceptional job of making sure they pointed out differences in their approach to other systems that exist in the research world that may provide different answers to the same questions. Roger and Cynthia were very good at outlining an overview of the process and the specifics of how the system works.

- It all works well and provides the options we all felt were missing in the 13 fuel models. There is a lot of reliance on FARSITE landscape files for fire planning, fire management plans, and landscape/fire assessments. How can (besides converting to 13 fuel models) these models be used to display fire characteristics across a landscape? Attribute GIS polygons w/ '262" type outputs... w/fuelbed '209' then convert to '262'??
 - There are some fields that you could have some wizard or help buttons. It's not frequent that people are actually measuring foliar moisture of shrubs, trees, etc. Possibly a wizard/tool that you could input phenology and life form or species – estimate of % moisture. Also getting tons/acre for grasses/nonwoody – is there a chart that compare height and cover to give estimate of tons per acre?
 - Fire Potential: I like the idea of this, but am concerned about how the values are actually calculated. For instance, looking at the values calculated for a woodland black spruce/tussock (fuelbed_89.xml) gives very low potential (1,0,9). Yet from observations – this fuelbed type burns rapidly, usually has a dependent crown fire following the ground fire. This is a very typical fuel type in lowlands and I think this rating is very low. It only gives a torching potential of 0.5. Just not sure how well these numbers are calibrated. Generally, the Rothermel's equation has limited success in boreal fuel types. Would like a clear explanation of which portions of the strata are influencing the fire potential rating.
 - FCCS is useful → especially when trying to address 1st order fire effects in Rx and WFU situations. Behave does a poor job – and is used to describe fire effects where it should be used for fire control. Improvements: Follow up on the duff moisture suggestion in class. Import pictures of representative stands for FCCS. When I use more I'll send suggestions.... Develop a user's worksheet to fill out in field.
 - FCCS is another tool in the toolbox, personally I like it more than FVS/FFE, better interface and more user friendly. Would like to see a crown fire potential that is independent of weather and fuel variables and based solely on stand structure. Hard to comment much on these programs with so little use but I will definitely try them out ASAP and provide more feedback as I get more familiar.
-
- Great tutorials and help resources. I want to see this supported at the national level. FCCS fuelbeds should be mapped as part of LANDFIRE. One approach would be to identify which FCCS fuelbeds might be most appropriate, especially vegetation, cover type, and structure as mapped in LANDFIRE. One of the reasons this would be helpful is that in linking local site and stand management into assessments of carbon and other emissions.
 - As a “beginner” in the fuels realm, FCCS strikes me as being very user friendly. It seems like it will become the standard planning tool in the future. I hope you get funded for the Ponderosa Pine project in the near future. I may have missed something, but a feature to input plot data, that would do the math and import that info into a custom fuelbed would complete the package.
 - The “how to” guide sent out prior to the course was excellent! It was step by step and worked. Also, I don't think there was a single problem in the class with the program that wasn't troubleshoot and fixed. Kudos! You really know your products (this goes for Consume as well). I like the tab layout. It's easy to get around and “makes sense.” Your discussion on fuelbed versus fuel models was very helpful and needed. Although I'm working more with fuel models, the background information was very helpful for me to understand the differences and the reasons you promote the fuelbeds so much! I will be

looking forward to more fire behavior in the new version (I believe that is in the works). Thank you for all of your hard work and presentation that was so useful!!!! *An add-on: This was also brought up in the class, but indicating which parameters are most important to altering spread rates and flame length would be very helpful (critical variables). This would be great for each fuelbed, but even at the level of main ecosystem types. This would be a key to managers that they should really pay attention to those few factors and if they can make it out in the field, these should be the things they focus on measuring. It was brought up in the field exercise at duff layer/loading... whether this influences rate of spread or not, its good to know that due to high variability the fuelbeds don't estimate this well for variety of sites.*

- I believe that the FCCS will be extremely useful in future jobs that could come my way. With the workshop the model was relatively easy to run and it was unbelievable how much info it would product in the reports. I do believe though that without the workshop or if you don't stay proficient at using the system, it could be very difficult to use. I mean that you would not be able to just self-learn this system and use it the right way. Things that I would like to see is maybe a link to upload field data to built custom fuelbeds from data already in your computer. I'm not sure if this is possible but just a thought. I really liked this system though and I think it will just get easier and better with new fuelbeds that will be added.

Consume Evaluation Form

The Consume development team would appreciate all your comments, positive and negative, on Consume 3.0. This program is in the testing stage, and your comments will be used to improve the program. If you run into general or specific concerns or difficulties, please let us know as much as possible about these.

Specifically, comments on the following are appreciated:

i. Installation of Consume 3.0

- Easy.
- Piece o' cake
- Install seems easy.
- Install was fairly simple
- It seemed very easy to load.
- Consume has easy installation.
- Installation failed from the web.
- Installation was straight-forward.
- Simple from the Internet once I found it.
- Easy, and probably easier with your CD
- A bit cumbersome if your PC isn't configured correctly.
- I found the installation and use of Consume to very easy.
- Unfortunately, did not seem to agree with my computer : (
- Well-explained; make more available once it is ready for full use.
- Doh! I still haven't been able to install it on my notebook! .net 2.0? J+ 2.0? Incompatible.
- We had some issues with the install not sure if this is from us or the software. Not a big deal.
- Installation of .net took several tries but was eventually successful and program did run on my PC.
- BLM IT protocol is not user friendly. By the time software is approved for use it is more often than not obsolete.
- Installation was a pain. All files needed should be packaged and checked against several operating systems and hardware configurations.
- I never would have been able to install Consume by myself. The presence of an "install" button took me in the wrong direction.
- Installation was a bit cumbersome. Not sure how to tighten that up at this point. When updates are made, post the changes to new versions along with the new version.
- May have been easier for the cadre to just make a disc for each student to install rather than downloading it at home. Everyone would have the same version and cadre wouldn't have to spend their lunch cleaning up computers.
- Like FCCS, the installation of Consume went quickly. It did have one file from an older version of Consume that did into show up in my add/delete programs; this made installation

of the new Consume more time-consuming because it recognized that file and thought the program was already present.

- There are some difficulties installing Consume online. This is mitigated on the installation CD. CD is very useful. Tech support would be useful.

ii. Entering data, including using the FCCS wizard

- Good.
 - Easy to use.
 - I had no problems.
 - Good, straight forward
 - Need more hands-on, to be honest
 - Data entry was easier than expected.
 - “One stop shopping” is always better.
 - Having the piles separately would be good.
 - Annoying info screen w/changing pictures.
 - Very easy to do. FCCS wizard worked well.
 - Need to be able to choose units in all screens.
 - Very easy and explained nicely in user manual.
 - More time could have been spent on the FCCS wizard
 - Data entry was no problem, very nice the link to FCCS.
 - I like the wizard, makes changing fields relatively easily.
 - Program is straight forward and easy to use. Reports are sufficient.
 - Glad the user is only required to locate FCCS via Consume once.
 - Straight forward and easy to use programs with very useful outputs.
 - Very easy and intuitive, except for finding your customized FCCS data.
 - You could have a tool or lookup for 10-hr/1000-hr fuel moistures like FMA Plus.
 - Entering data and running 3.0 is much easier than 2.1 was. I find it relatively easy.
 - The Data Save and file management portion of Consume seems to be cumbersome.
 - The program is easy to use but again more familiarization would allow for competency.
 - Entering data was very easy especially since you used the same symbols as the FCCS.
 - Easy to do. I can not think of a way this could be improved. I like the connection to the FCCS.
 - The FCCS wizard made data entry easy, and I like the parallel format between the 2 programs.
 - Entering data seems easy enough. The option of customizing fuelbeds from FCCS is pretty good.
 - Moss must be split between sphagnum and other (feather) instead of requiring one or another.
-
- Know where you put FCCS on your computer. The FCCS wizard will take a few times run through to know exactly how to run it efficiently.
 - Consume was very hard for me to navigate; it would be nice if it was formatting with info button like FCCS on the opening page; for me button is easier than listed files.
 - Consume (w/crosswalks) is extremely useful although sometimes data input is difficult until class work shows us how to input and manipulate data sets.
 - Getting to custom fuelbed clunky. FCCS-Consume interface very clunky. Error message screens need to go or at least be less intimidating.

- Importing data from FCCS is valuable but is there a way to relate emissions to smoke management? At this point, I am not able to relate pounds of carbon to go/no go decisions.
- Standardize an input format for the fuels data so it could be imported directly from, say a text file or spreadsheet. Saves time.
- The program is simple to use but the results are not so easy to interpret. The output graphs didn't make a lot of sense in the examples we used which makes me doubt the accuracy.
- It would be helpful to have a way to incorporate ignition probability into recently burned fuelbeds so that the results can include the caveat (FCCS issue).
- Still a little confused by Tree view hierarchy & cut and paste functionality. May improve with practice.
- Still confused by “percent canopy loading consumed” field. What does it mean and when does it need to be edited?
- I've only used v 3.0 in the classroom, so my experience is not broad enough to comment at this time.
- Data management good. FCCS wizard a bit confusing, hard to know where FCCS leaves off and Consume begins.
- It would be helpful if the fuel vegetation forms could be accessed by typing the first 2 to 3 letters of the name.
- When installing a custom fuelbed, it'd be nice to see the name of the custom fuelbed somewhere on the screen after variables are loaded.
- The Return to Editing button is confusing at times when you are viewing a particular application within the program. It would be better to re-label the button as “back” or “Close” etc.
- Know where you put FCCS on your computer. The FCCS wizard will take a few times run through to know exactly how to run it efficiently.
- Consume was very hard for me to navigate; it would be nice if it was formatting with info button like FCCS on the opening page; for me button is easier than listed files.
- The data entry was fairly simple as well. I've used the older version and this seems much more straight forward and easier to use.
- Being able to input data from FCCS was a worthwhile addition to Consume. I'm glad the user is only required to locate FCCS via Consume once.
- Data entry was straight forward and easily done including importation of data generated using the FCCS. Again, having alpha-numeric listings with 1st letter/number entry to select data more quickly would be a nice feature.
- Problem: Activity/Project/Treatment/Treatment Unit is fairly explicitly defined by NFPORS reporting database used by all DOI and FS agencies. NFPORS definitions are different from yours. Will lead to confusion.
- The only thing I find a bit awkward in Consume is the interaction with the tree. Although it is very handy to copy a fuelbed, it also seems easy to confuse yourself if your “renaming” skills aren't up to par. The error messages and the red “Edit Mode” messages seem awkward as well. Overall, I think it is a fairly simple program to use.
- The data entry was fairly simple as well. I've used the older version and this seems much more straight forward and easier to use.

- Importing FCCS fuelbeds was a little confusing about which one to choose. Need to explain better in the program that it does not matter whether you use the .input or .intermediate file. This is potentially confusing to the beginning user.
- The only thing that seemed a little confusing was when creating new projects the drop down tree for the different projects or parts of projects (2 or more Consume runs on 1 project) seemed to confuse myself and people around me.
- I really like that the setup is based on the same menus and tabs as FCCS... learn one program and can easily get around in another. I liked that we did a fuelbed that was already in the program and we were also walked through, not just talked through, importing a custom fuelbed from FCCS. This will be incredibly helpful.

iii. Using the scenario testing tool

- Ok
- Good.
- Seemed to work well.
- Not much experience yet.
- Side-by-side comparison reports
- Needed more time to use competently.
- Thanks so much for the Alaska examples.
- Not enough practice to evaluate though the concept appears sound.
- I will use this for environmental assessments looking at alternatives.
- Being able to combine outputs side-by-side to compare would be useful.
- Scenario testing seems to be an extremely useful tool for planning prescribed fires
- I need to learn more about this feature to have a good opinion on its usefulness.
- Moving around the various scenarios and testing parts of Consume takes good familiarity of software program processors. Perhaps there are ways to make the program more user-friendly.
- Shrub % black needs to be on Environmental Variables screen (or a warning telling you to update it!)
- Unfortunately, I was unable to use the scenario testing tool or produce reports/graphs due to technical difficulties, but it looked simple and very useful.

iv. Output reports and graphs

- Ok
- Good.
- Very good.
- Very useful.
- Helpful and informative.
- Outputs will be very useful.
- I like the Excel link feature!
- Lots of report type options.
- The output format was also good.
- Again, reports okay but graphing needs to be improved.
- The window should be a standard size for the report.
- Unsure if able to display all components in the reports.
- These are great, they provide all the info I ever need and some more.
- The reporting feature is exactly what we like to see to make our work easier.
- Getting the formatting figured out so you don't have to scroll as much, at least side to side.

- The Excel reports are a great addition, so I can copy them into an EA or smoke plan.
- It would be good if you could print side-by-side reports of the units that are being compared. Everything else seemed pretty simple to do.
- Output reports and graphs seem fine again more time required with these to really have many suggestions.
- Outputs are an improvement, reports and graphs are well done, and I'm sure I'll find them useful in planning.
- Spend a bit more time helping to understand/interpret the outputs.
- Just like the FCCS, I think the reports and graphs need to be updated so they can be directly entered into a government document or publication.
- The window needs to be larger or adjustable. Even if you made it the width that could fit on a laptop screen – would be an improvement. Graphs to Excel very cool!
- I would prefer that reports appear in pop-up screen that floats over edit screen instead of replacing it.
- One problem with the Consume report is that screen maximize doesn't maximize the reports – i.e., in big reports you have to use the arrows a lot – which seems a bit annoying.
- Outputs useful. But the fact of the outputs being different on different computer is troubling to me.

General Comments and Suggestions on Consume

- Need to fix the shaking screen.
- Equations need modification!
- A bit of work to do before release!
- Thanks for your efforts and good luck on revisions.
- Good and great, useful and can be applied for our use.
- Installation of Consume 3.0 was fairly easy. Directions were clear.
- At this time I haven't worked with them enough to give good feedback.
- Please let us know when you have made updates to any of the programs.
- Again, more useful if accepted national product. All together a very good product.
 - Susan did an excellent job in covering the software and making sure it was properly loaded and workable.
 - Consume seemed to be a little harder to understand. But using the program and practice will make it easier.
 - Again, great tool for quantifying fuel reduction. No real air quality issues here. Nice to have programs linked.
 - A few buggy problems with the program but overall a very user-friendly program. I really liked the interface with FCCS.
 - The pile builder is awesome. It would be nice if the validation error message explained how to make the fuelbed valid.
 - More time was needed to understand Consume. I think a majority of the students were "consumed" by information overload.
 - Consume could probably have been a whole separate workshop in itself – at least 3 days with exercises to familiarize the users.
 - I personally wouldn't use Consume and don't see the benefit of its use right now. I only say that because I don't fully understand it.
 - FCCS wizard went a little too fast for me to completely understand. Maybe more explanation on the actual smoke emission/pollutants.
 - Consume didn't work for the newer laptop computer operating systems, so it was difficult to fully understand the ins and outs of Consume.
 - From a fire department perspective, I don't really see the benefit to what we do. I can see how forest managers can find this beneficial.
 - Still a little unclear on how these two programs will be interpreted when it comes to fire danger versus fire effects and objective attainment for prescribed fire.
 - I'll need to use Consume more often to better understand both the program and application of it. I'm glad to have had an introduction to it and its compatibility with FCCS.
 - Installation of CONSUME went fine. However, as you know, I couldn't calculate consumption on my machine (FS Image, Dell Latitude, D800, Error message "Load Report Failed").
 - Question on the ability of building different reports if necessary. Great tool with a wide array of future uses.

- Provide additional crosswalks, i.e. if this plant isn't liked use this plant instead, especially for piles. Very useful tool. Addition of brush species in pile composition lists.
 - Installation was easy and I am not that great with the computer and loading software. Entering data and FCCS wizard is easy and scenarios were good. Just needs some work for the East.
 - I think you should put together a fact sheet on how someone could use this to estimate carbon credits.
 - Consume I thought was a great tool and was very easy to use. So easy that someone could learn to use it just by playing around with it for awhile.
 - No problems with any of these. I think this program will take a bit more use to master than FCCS but shouldn't be a problem.
 - Again, evaluation is significantly impacted by lack of national acceptance. However, Consume has high value in multiple situations.
 - All around great products, and I really look forward to using them! They will be incredibly helpful.
 - As important as smoke issues have become, this program will be a very useful tool when working to get approval for burns. Again, it seems very user friendly.
- Installation and entering data in Consume 3.0 was easy to use and apply. I see this program as a very useful tool and very beneficial in prescribed fires and wildfires. Consume also helps in understanding impact on environment.
 - I would like to see Consume eventually deal with emissions over time as does FEPS (or integrate the two). Total emissions are important, but I think daily/hourly/emissions (unit 1, unit 2)
 - I would like clarification of how Consume 3.0 addresses the difference between burn block acres and acres blackened. We rarely blacken all acres in our Rx burns in the mountains – we need to be able to clearly show that the program understands this.
 - No problems downloading and installing. Will comment more after final exercise. Like output to Excel and text files. Would like to be able to modify internal assumed values such as litter/duff density. Maybe an “advanced” tab?
 - Software glitch prohibited me from being able to complete the exercise; however, the usefulness of Consume in fuels planning and management is obvious. Being able to quickly do scenario comparison is useful.
 - The sugar company on Maui does a lot of field burns on a consistent and scheduled basis and contacts could be made with the company to validate particular consumption models. The Army on Oahu does prescribed burns.
 - Very useful. Does the user's guide have explanations of some of the science behind the model, for example the case of more CO₂ being produced than CO₂ being consumed? Needs to be attached to future SMS process for OR and WA.
 - Installation of Consume 3.0 went smoothly. My lack of experience with fuelbeds and program use does not allow me to comment on related topics. It does seem Consume 3.0 is not very accurate when applied to this region because of lack of weather inputs both present and past (KBDI).

- I will probably have more comments and suggestions after I play around with it some more (assuming your program can get it to run on my machine.) I know you are way beyond being able to implement a lot of this for the initial release – maybe future versions.
 - “It’s the programmer” or “the programmer does not or can’t do it that way,” are not acceptable reasons why something does not work, display correctly, or give you the information you want. I would suggest replacing your programmer if he/she can not deliver the products you want.
 - Great tools for managers to use to gauge fire hazards. We talk about structures as fuels? Can those calculations be added? The pile program is great. You can estimate outputs for both broadcast and piles work well, but can you customize them?
 - I didn’t like Consume as well as I did FCCS. I would like to see Consume with more similar format to FCCS, more than it already is. I do like the photo series in Consume. Nice program, but not as user friendly as FCCS.
-
- I hadn’t used Consume before this class but after looking at it and using it I am very confident it will be a very helpful tool. I really like the scenario testing tool. I think it’s very helpful to see changes in fuel dynamics and how they change emissions. An email server that lets users know of updates would be very useful.
 - I enjoyed the background refresher info on consumption. People, at least me, can always use refreshers on basic concepts. Especially considering this is an empirical model it is important the users understand and are able to tell others where this data came from. On this note, for both FCS and Consume, it would be nice to have the database ranking how reliable data sources are and what they are.
 - This is not easy to follow and grasp. It was presented in the best way possible by not having the students use the laptops. As the info was presented and students focus on the PowerPoint presentations, too much new information in a short period. Need more time to do hands-on exercises on the laptop.
 - I don’t know that most people can estimate tons/acre for trees or any of the strata. I guess this is where the photo series comes in use, or by creating the custom FCCS fuelbed. So this is a very good link, since other than Brown’s transects and clip plots – there are not a lot of methods for getting biomass.
 - Very useful for my work, I need to use it more to have confidence in my abilities to use it correctly. One possible helpful tool would be to somehow put the stand exam data from FS Veg directly into the program somehow. I don’t know if it would be practical or not, but would save doing inputs twice. Also... can we estimate duff consumption... for soils/hydrology concerns... i.e., can it model how much of the unit would have no duff retention post-burn under planned burn conditions?
 - I can appreciate the Consume program as a tool to educate the public on the possible effects of, or results from, large wildland fires and the impact on the health and welfare of the community. Again, taking it to the basic user level. This training showed how Consume and FCCS are linked together and the training cadre did a great job of delivering the training.
 - In general CONSUME was user friendly, nicely organized. I had some trouble figuring out how to manage projects in CONSUME. It required switching back and forth between the hierarchical list on the left and the pull-down menus. I’m sure I can figure it out when I run the model, but I suspect it will be somewhat of a barrier.

- I think it would be helpful to define duff right on the ground fuels window. The F and H layers (as I define them) have different bulk densities and until I had data showing that the F and H layer depths were positively correlated (they might be), I would recommend separating the F and H layers for hardwoods. It might prove that little error is introduced in treating F and H as one, but I don't know that.
- The installation of Consume 3.0 was straight forward as well as entering data. Of course, all new programs will become more familiar when one actually puts in time with it. The data entry was also straight forward. As I am becoming familiar with this program, I will join my counterparts and compare differences as we both become more familiar. I feel this is a good way to learn from each other.
- On the CONSUME equations, I wonder whether predictions for duff consumption will be adequate under the situation where duff consumption is dependent on the flaming phase of the fire. I don't suspect there is much independent smoldering in hardwood fuels in contrast to forests with deeper duff layers. Van Wagner tried modeling flaming-dependent duff consumption, but the equations require fireline intensity. I don't think he felt he had much success with the approach for deeper duff layers where smoldering occurs independently. However, it might work well for hardwood duff.
- Installation – good instruction on what updates are needed, how to get them, etc. Please correct version online. Data entry is easy, as is the entire user interface. Black acres input should be moved from shrubs to a more appropriate location. Equations calculation consumed should be adjusted to reflect actual consumption in oak-hickory forests. Field testing would be useful to help in compiling solid data. Reports, graphs, are both very good. Lots of good choices and options. Outputs are very clear and concise. I like the export option. Provide an ecosystem specific explanation for the 1-9 rating system rather than just a number.

“Parting Shots: I’m one of those guys that are transitioning from fire suppression to fuels management duties. I started predicting fire behavior with nomograms. It’s hard to keep up with you academic scientific types. That said, this presentation and system is by far the least intimidating, most practical, and most potentially useful system I’ve encountered. Good stuff & thanks.”
