



**Documentation of a Natural Event Due to  
High Winds  
April 27, 2004  
Burbank, Kennewick, Sunnyside,  
Walla Walla, and Wallula Port,  
Washington**

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04-02-017  
October 2004

 Printed on Recycled Paper

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April 27, 2004  
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Prepared by:

Washington State Department of Ecology  
Air Quality Program

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## Summary

On April 27, 2004, the Federal Reference Method monitors in Burbank, Kennewick, Sunnyside, Walla Walla, and Wallula Port, Washington measured concentrations of 249, 539, 255, 263 and 299 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), respectively, for particulate matter 10 microns and smaller in size ( $\text{PM}_{10}$ ). These concentrations exceeded the primary 24-hour  $\text{PM}_{10}$  National Ambient Air Quality Standard (NAAQS) of  $150 \mu\text{g}/\text{m}^3$ .

The Washington State Department of Ecology (Ecology) has determined these exceedances were due to a natural event caused by high winds. Thus, these data points should be excluded from assessments of the attainment status for the areas. Ecology flagged the data points for April 27, 2004 in the Air Quality System database maintained by the U.S. Environmental Protection Agency (EPA) to indicate a natural event was involved.

Ecology, the Yakima Regional Clean Air Authority and the Benton Clean Air Authority agreed to provide natural event documentation in one account, due to the regional nature of this high wind event. Thus, Ecology is submitting this documentation to EPA in support of the data flags for EPA's acknowledgement and flagging of the data points.

## Natural Events Policy

EPA issued the policy on "Areas Affected by PM-10 Natural Events" (hereafter referred to as Natural Events Policy or NEP) on May 30, 1996. EPA's reasons for issuing the NEP are described in the following terms:

In issuing the natural events policy, EPA now believes that, under certain circumstances, it is appropriate to again exclude PM-10 air quality data that are attributable to uncontrollable natural events from the decisions regarding an area's nonattainment status.

Under the policy, ambient  $\text{PM}_{10}$  concentrations raised by unusually high winds are treated as uncontrollable natural events when the dust originates from nonanthropogenic (other than human-caused) sources, or when the dust originates from contributing anthropogenic sources controlled with best available control measures (BACM).

After natural events cause the  $\text{PM}_{10}$  concentration to violate the  $\text{PM}_{10}$  NAAQS, the NEP requires a state to develop a natural events action plan (NEAP) to deal with future exceedances. The NEP specifies that the NEAP is available for public review and comment. A state submits the NEAP to EPA for review and comment.

Under the NEP, when a state has reason to believe that natural events have caused monitored exceedances of the  $\text{PM}_{10}$  standard, the state is responsible for establishing a clear causal relationship between the natural event and the exceedance. Documentation of the natural event should be sufficient to demonstrate that the natural event occurred and that it impacted a particular monitoring site. The documentation should provide evidence that concentrations at the monitoring site would not have exceeded the  $\text{PM}_{10}$  standard in the absence of a natural event.

# Ecology's Response to High Wind Events on the Columbia Plateau

During the late 1980s and early 1990s, a large number of exceedances of the 24-hour standard for PM<sub>10</sub> were recorded in Spokane, Kennewick, and Wallula, Washington. Detailed examination of these exceedances showed a close correlation to high wind events. Upwind agricultural fields were identified as the chief source of the windblown dust. Accordingly, Ecology developed the *Natural Events Action Plan for High Wind Events in the Columbia Plateau* in March 1998, to deal with high wind natural events in eastern Washington.

EPA's NEP identifies various criteria states are expected to address in a NEAP, including a commitment to re-evaluate the NEAP every five years. Ecology completed a re-evaluation and submitted a revised NEAP to EPA in June 2003. The Columbia Plateau NEAP continues to address the NEP by providing for:

- Notification of citizens when air quality is likely to be impaired due to high wind events.
- Advice to citizens on steps to minimize exposure.
- Development of a program to identify and implement controls for anthropogenic sources of windblown dust in the Columbia Plateau.

As well, based on the re-evaluation, several changes were incorporated into the 2003 NEAP. Significant changes include a more refined definition for a high wind event and a finding that BACM is in place throughout the Columbia Plateau.

The 2003 NEAP refined the definition of a high wind event for Washington State in accordance with the provisions of the NEP allowing the states to determine this definition. This provision recognizes the multiple variables that affect the wind erosion processes that result in windblown dust and the generation and transport of PM<sub>10</sub>.

*“A high wind event occurs when the wind entrains and suspends dust to the extent that concentrations of PM<sub>10</sub> are elevated. This typically occurs when the average hourly wind speed at 33 ft is 18 miles per hour or greater for two or more hours; or in excess of 13 miles per hour for two hours or more hours when conditions of higher susceptibility to wind erosion exist. A high wind event that exceeds the PM<sub>10</sub> standard is a natural event.”*

The Columbia Plateau NEAP documents the research and explains the logic behind this “high wind event” definition. The high wind event definition necessarily includes the concept that the intensity of the wind event is a combination of wind speed and significant duration (sustained wind).

The state of Washington finds that windblown dust from agricultural fields is still a significant contributing source of PM<sub>10</sub> exceedances throughout the Columbia Plateau. The soil is very fine



with low organic content. This, coupled with low precipitation weather patterns, means very dry soil that is highly susceptible to wind erosion.

The 2003 NEAP identified BACM for agricultural fields as conservation programs and practices that reduce or minimize wind erosion. Specifically, this means USDA Conservation Title Programs supplemented by incentive based implementation of wind-erosion conservation practices or best management practices (BMPs).

Washington State evaluated BACM implementation for agricultural fields in the 2003 NEAP. Based on the evaluation, Washington State views these levels of wind erosion control as sufficient to fulfill BACM criterion of the NEP. A 2003 Annual Status Report regarding BACM implementation is found in Appendix C.

## Evaluation of the April 27, 2004 Exceedances on the Columbia Plateau, Washington

### 1. PM<sub>10</sub> Data

Monitoring data for each of the sites recording exceedances of the 24-hour PM<sub>10</sub> standard on April 27, 2004 are summarized in Table 1. The annual average PM<sub>10</sub> concentration as well as the monthly maxima is shown for 2003 and January through March, 2004.

Table 1.

Annual Average PM<sub>10</sub> Concentration and Monthly Maxima for 2003 and January -March, 2004

Sampling site	Operating Frequency	Average Annual PM <sub>10</sub> concentration (µg/m <sup>3</sup> )		Monthly maxima (µg/m <sup>3</sup> )			
		2003	2004 (1/1-3/31)	2003		2004	
				Low	Hi	Low	Hi
1. Burbank	1 in 3	28	20	15	37	14	22
2. Kennewick	1 in 3	29	22	10	41	16	30
3. Sunnyside	1 in 6	25	23	9	46	23	24
4. Walla Walla	1 in 3	39	19	8	46	23	48
5. Wallula Port	1 in 6	33	18	9	53	13	23

### A. Burbank PM<sub>10</sub> Data

Data reported for the Burbank monitor shows annual average PM<sub>10</sub> concentrations of 28 µg/m<sup>3</sup> and 20 µg/m<sup>3</sup> for 2003 and 2004, respectively. Monthly maxima for 2003 ranged from a low of 15 µg/m<sup>3</sup> in January, to a high of 37 µg/m<sup>3</sup> in October, and from a low of 14 µg/m<sup>3</sup> in February, 2004 to a high of 22 µg/m<sup>3</sup>, in March, 2004.

Burbank recorded one exceedance of the standard in 2003, due to windblown dust. On October 30, 2003 the 24-hour PM<sub>10</sub> concentration measured 282 µg/m<sup>3</sup>. In accordance with the NEP, Ecology submitted natural event documentation to EPA on April 30, 2004. EPA concurred with Ecology's finding in a letter dated August 6, 2004.

### B. Kennewick PM<sub>10</sub> Data

Data reported for the Kennewick monitor shows annual average PM<sub>10</sub> concentrations of 29 µg/m<sup>3</sup> and 22 µg/m<sup>3</sup> for 2003 and 2004, respectively. Monthly maxima for 2003 ranged from a low of 10 µg/m<sup>3</sup> in January, to a high of 41 µg/m<sup>3</sup> in October, and from a low of 16 µg/m<sup>3</sup> in February, 2004 to a high of 30 µg/m<sup>3</sup> in March, 2004.

Kennewick recorded three exceedances of the standard in 2003, due to windblown dust. On March 5, 2003, October 28, 2003 and November 10, 2003, 24-hour PM<sub>10</sub> concentrations measured 186 µg/m<sup>3</sup>, 1432 µg/m<sup>3</sup>, and 164 µg/m<sup>3</sup>, respectively. Kennewick also recorded an exceedance of the standard on March 18, 2004, due to windblown dust; the 24-hour PM<sub>10</sub> concentration measured 301 µg/m<sup>3</sup>.

Ecology submitted natural event documentation for the March 5, 2003 exceedance to EPA on May 10, 2004 and EPA concurred with Ecology's finding in a letter dated August 6, 2004. Ecology submitted natural event documentation for the October 28 and November 10, 2003 exceedances to EPA on April 30, 2004 and August 30, 2003, respectively. EPA concurred with Ecology's finding regarding the October 28, 2003 event in a letter dated August 6, 2004. Likewise, Ecology submitted natural event documentation for the March 18, 2004 exceedance to EPA on September 30, 2004. Ecology anticipates EPA concurrence with the November 10, 2003 and March 18, 2004 findings.

### C. Sunnyside PM<sub>10</sub> Data

Data reported for the Sunnyside monitor shows annual average PM<sub>10</sub> concentrations of 25 µg/m<sup>3</sup> and 23 µg/m<sup>3</sup> for 2003 and 2004, respectively. Monthly maxima for 2003 ranged from a low of 9 µg/m<sup>3</sup> in April, to a high of 46 µg/m<sup>3</sup> in October, and from a low of 23 µg/m<sup>3</sup> in February 2004 to a high of 24 µg/m<sup>3</sup> in March, 2004.

The Sunnyside monitor has not previously recorded an exceedance of the 24-hour PM<sub>10</sub> standard due to windblown dust.

### D. Walla Walla PM<sub>10</sub> Data

Data reported for the Walla Walla monitor shows annual average PM<sub>10</sub> concentrations of 39 µg/m<sup>3</sup> and 19 µg/m<sup>3</sup> for 2003 and 2004, respectively. Monthly maxima for 2003 ranged from a low of 8 µg/m<sup>3</sup> in April, to a high of 46 µg/m<sup>3</sup> in October, and from a low of 15 µg/m<sup>3</sup> in February 2004 to a high of 24 µg/m<sup>3</sup> in March, 2004.

Walla Walla recorded two exceedances of the standard in 2003, due to windblown dust. On October 28, 2003 and November 10, 2003, 24-hour PM<sub>10</sub> concentrations measured 1338 µg/m<sup>3</sup> and 165 µg/m<sup>3</sup>, respectively. Ecology submitted natural event documentation for both exceedances to EPA on April 30, 2004 and EPA concurred with Ecology's finding in a letter dated August 6, 2004.

### E. Port of Wallula PM<sub>10</sub> Data

Data reported for the Wallula Port monitor shows annual average PM<sub>10</sub> concentrations of 33 µg/m<sup>3</sup> and 18 for 2003 and 2004, respectively. Monthly maxima for 2003 ranged from a low of 9 µg/m<sup>3</sup> in January, to a high of 53 µg/m<sup>3</sup> in October, and from a low of 13 µg/m<sup>3</sup> in February

2004 to a high of 23  $\mu\text{g}/\text{m}^3$  in March, 2004.

Wallula Port recorded one exceedance of the standard in 2003, due to windblown dust. On November 11, 2003 the 24-hour  $\text{PM}_{10}$  concentration measured 218  $\mu\text{g}/\text{m}^3$ . As well, Wallula Port recorded a windblown dust natural event on October 30, 2003 (134  $\mu\text{g}/\text{m}^3$ ) that did not exceed the standard. Ecology submitted natural event documentation for both events to EPA on April 30, 2004 and EPA concurred with Ecology's finding in a letter dated August 6, 2004.

## 2. Meteorological Data

Ecology operates meteorological equipment co-located with Ecology's  $\text{PM}_{10}$  monitor in Burbank, Washington. A failure in the wind speed sensor, however, occurred in April, 2004 and Ecology determined the data for the April 27, 2004 exceedance to be invalid. Ecology would otherwise rely on meteorological data collected at Burbank as representative of the general area, including conditions at the Wallula Port monitoring site. The Wallula Port monitoring site is located about six miles southeast of Burbank, Washington. Due to the equipment failure, other meteorological data is used to document this natural event.

The Tri-Cities Airport, in Pasco, lies about eight miles to the northwest of Burbank Washington and Ecology finds the data representative of the broader general area. Moreover, Ecology finds National Weather Service (NWS) station data from the Tri-Cities Airport, the Yakima Regional Airport and Walla Walla Regional Airport accurately and sufficiently represent the broad, regional geographic impact of the weather system and high winds that caused the natural event. Therefore, data from these three NWS stations are used to document the April 27, 2004 natural event at Burbank, Kennewick, Sunnyside, Walla Walla and Wallula Port.

NWS data from Tri-Cities Airport, Yakima Regional Airport, and Walla Walla Regional Airport shows high winds ranging from the south-southwest through west to north-northwest the afternoon and evening of April 27, 2004. Select data for the day are displayed in Table 2. Wind speeds during this time ranged from the low 20s to the high 30s; gusts ranged from 31 to 49 mph. The meteorological data is found in Appendix B.

The data shows the winds at Burbank, Kennewick, Sunnyside, Wallula Port and Walla Walla met Ecology's definition for a high wind event:

*“A high wind event occurs when the wind entrains and suspends dust to the extent that concentrations of  $\text{PM}_{10}$  are elevated. This typically occurs when the average hourly wind speed at 33 ft is 18 miles per hour or greater for two or more hours; or in excess of 13 miles per hour for two hours or more hours when conditions of higher susceptibility to wind erosion exist. A high wind event that exceeds the  $\text{PM}_{10}$  standard is a natural event.”*

### B. Pasco Meteorological Data

Data from the Tri-Cities Airport in Pasco shows windy and gusty conditions from about 1300 to 1900 hours, April 27, 2004, Pacific Standard Time (Table 1). Wind speeds ranged from 25 to 38 mph; gusts ranged from 32 to 47 mph. For over seven consecutive hours the high winds ranged in direction from the south-southwest through west. The data shows the winds at Burbank,

Kennewick and Wallula Port clearly met Ecology’s definition for a high wind event.

Wind speeds, gusts and wind direction at Pasco, Washington from 2000, April 26, 2004, to 0000, April 28, 2004 are displayed in Figure 2.

C. Yakima Meteorological Data

At the Yakima Regional Airport high winds and gusty conditions were also observed for over seven consecutive hours, from 1256 to 1856, on April 27, 2004. Wind speeds ranged from 23 to 33 mph; gusts ranged from 32 to 49 mph (Table 2). Winds were primarily from the west-southwest through west to northwest. The data shows the winds at Sunnyside clearly met Ecology’s definition for a high wind event.

Wind speeds, gusts and wind direction at Yakima, Washington from 2000, April 26, 2004, to 0000, April 28, 2004 are displayed in Figure 2.

Table 2.

Select Pasco, Yakima and Walla Walla Wind Observations, April 27, 2004

Time (PST)	Wind Direction	Wind Speed (mph)	Peak Wind (mph)
<b>Pasco</b>			
1253	SW (230°)	25	32
1353	SSW (210°)	38	47
1453	SW (230°)	28	41
1553	W (260°)	28	40
1653	W (280°)	30	40
1753	W (280°)	29	41
1853	W (280°)	30	41
<b>Yakima</b>			
1256	W (270°)	23	32
1356	WNW (290°)	26	36
1456	W (270°)	33	41
1556	WSW (250°)	32	46
1656	W (270°)	33	49
1756	WNW (280°)	32	47
1856	W (270°)	29	36
<b>Walla Walla</b>			
1453	SW (230°)	25	37
1553	WSW (250°)	28	38
1653	W (260°)	25	31
1753	W (260°)	35	46
1853	W (270°)	31	43

Figure 1

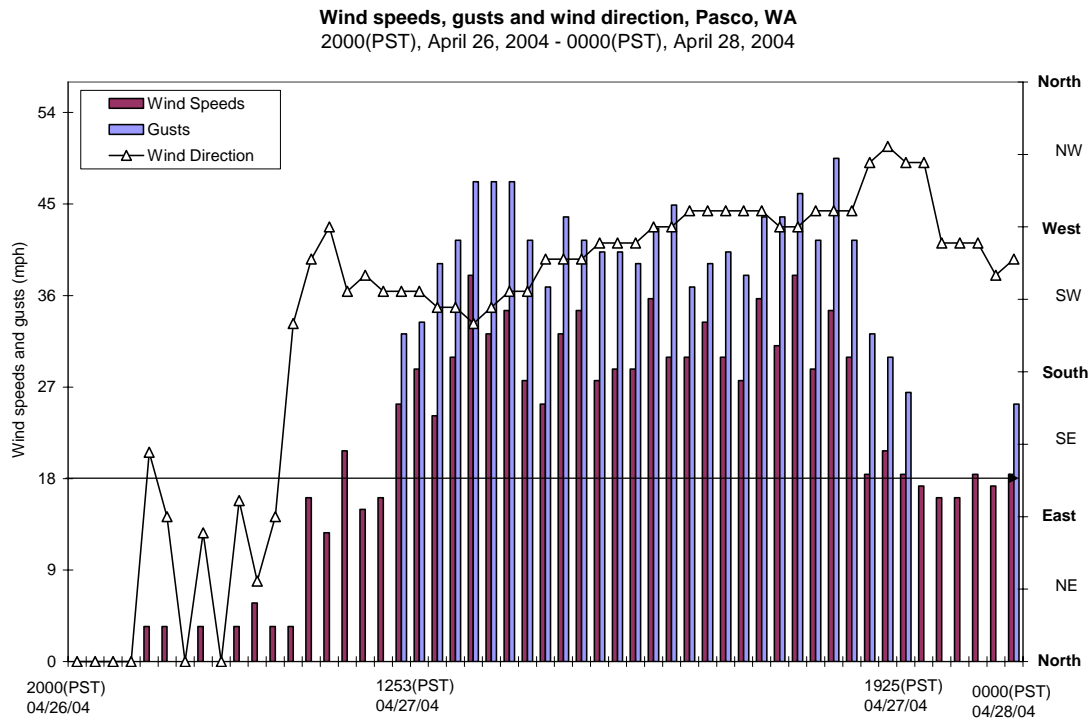
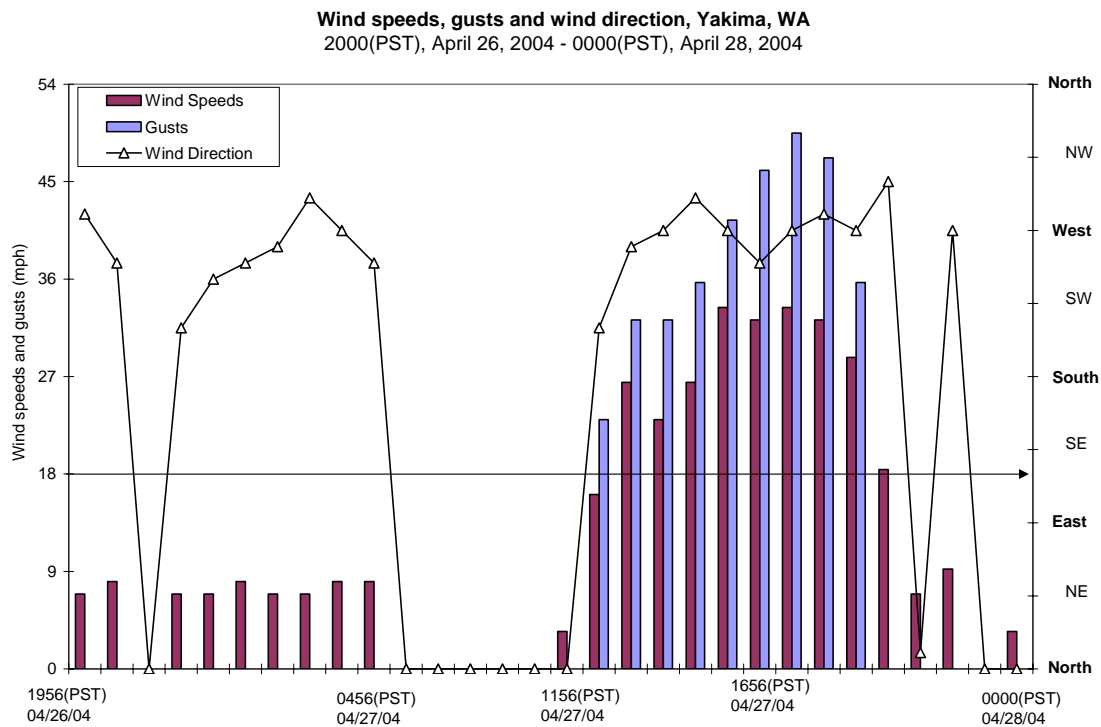


Figure 2



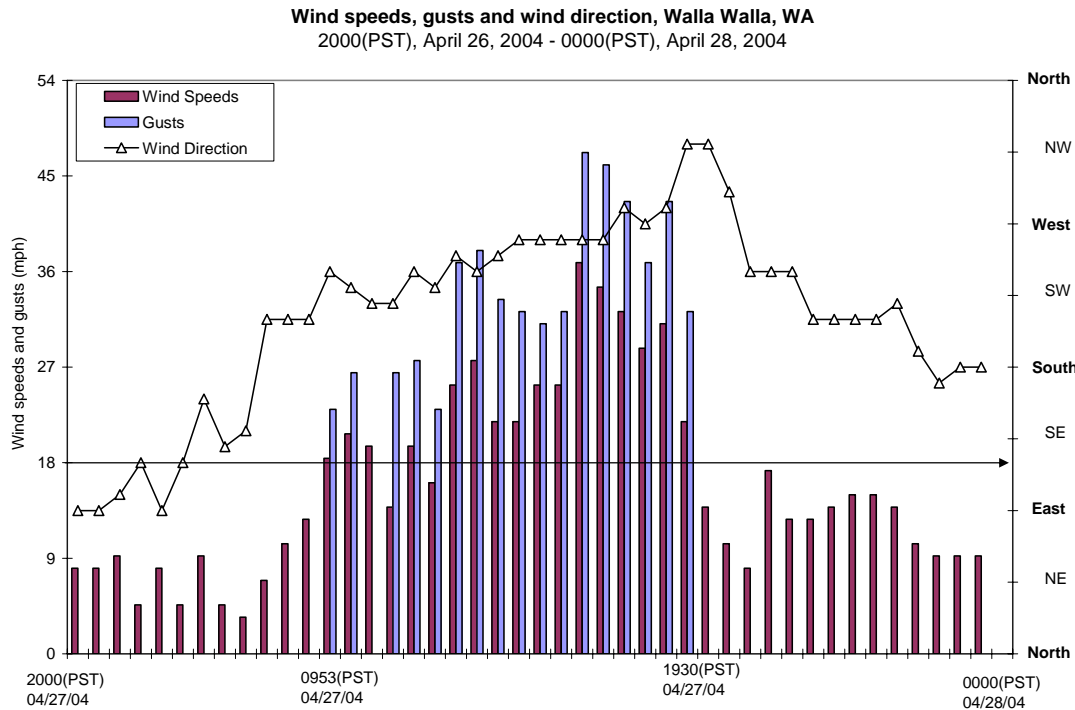
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### D. Walla Walla Meteorological Data

At Walla Walla, Washington high winds and gusty conditions were observed for four consecutive hours, from about 1600 to 1900, on April 27, 2004. Wind speeds ranged from 22 to 37 mph; gusts ranged from 32 to 47 mph (Table 2). Winds were primarily from the southwest through west-southwest to west. The data shows the winds at Walla Walla clearly met Ecology’s definition for a high wind event.

Wind speeds, gusts and wind direction at Walla Walla, Washington from 2000, April 26, 2004, to 0000, April 28, 2004 are displayed in Figure 3.

Figure 3



### 3. Additional Meteorological Data

Table 3 summarizes precipitation data from the Tri-Cities Airport in Pasco, the Yakima Regional Airport and the Walla Walla Regional Airport. The data show the date of the most recently recorded precipitation ranged from April 19<sup>th</sup> at Pasco to the 24<sup>th</sup> at Walla Walla.

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Table 3. Precipitation prior to a Natural Event due to high winds, April 27, 2004

STATION:	Precipitation (inches)			# Days w/o precipitation prior to event day
	April 27, 2004	72 hrs prior to event day (04/24-04/26)	Last measured prior to 72 hr. period	
Pasco (NWS)	0	0	0.05 (04/19)	7
Walla Walla (NWS)	0	0	0.19 (04/19)	7
Yakima (NWS)	0	0	.04 (04/21)	5

The data was analyzed in order to assess the general vulnerability of soils to high winds. The data shows that none of the sites recorded precipitation within 72 hours prior to the high winds on April 27, 2004.

2. April 2004 precipitation data from three Public Agriculture Weather System (PAWS) stations was compared to April mean precipitation for the most recent nine to fourteen years in order to further assess the likelihood that soils were vulnerable to erosion by high winds (Table 4). Long-term data is not readily available from NWS stations. For this reason, the PAWS CBC Pasco, Sunnyside, and Walla Walla sites were chosen as representative sites to include in this assessment. The period of record for each site is found in Appendix B. Two of the three sites report April 2004 measurable precipitation well below the mean for the month of April.

Table 4. April, 2004 precipitation compared to mean precipitation

Station	April Precip.	April 1 – 27, 2004	Percent of mean
CBC Pasco	.4	.16	40
Sunnyside	.7	.4	57
Walla Walla	1.6	1.98	1.24

The data shows Pasco and Sunnyside were especially dry in April 2004 when compared to mean April precipitation. Moreover, all sites analyzed show conditions were sufficiently dry for wind-blown dust generation 72 hours prior to the high winds on April 27, 2004. Such dry conditions leave soils vulnerable to wind erosion, particularly in light of the five to nine consecutive hours of recorded high winds.

## BACM Implementation

The 2003 NEAP evaluated data for the year 2000 and determined BACM is implemented in the Columbia Plateau based on 68 percent use of conservation practices. BACM for agricultural fields is defined as USDA Conservation Title Programs supplemented by incentive based implementation of wind erosion conservation practices or BMPs. In short, the BACM definition recognizes the critical role of agricultural agencies in defining and instituting BACM on the Columbia Plateau. The NEAP acknowledges the combined expertise of these agencies and relies on the various programs of these agencies in implementing the conservation practices that constitute BACM.

For defining BACM, the NEAP uses the USDA's CRP program and the wind erosion BMPs encouraged by NRCS and/or the Columbia Plateau Wind Erosion /Air Quality Project (referred to as the CP3). Use of these practices is tracked by the Conservation Technology Information Center's (CTIC) Core 4 program. The CTIC's Core 4 program tracks conservation tillage (No-Till, Ridge-Till, Mulch-Till) and conventional tillage (0-15% and 15-30% residue) practices and CRP enrollment on a county-by-county basis.

A 2003 Annual Status Report regarding BACM implementation evaluated data for the year 2002 (Appendix C). Comparing the 2003 NEAP to the annual report shows the level of Conservation Reserve Program (CRP) and Best Management Practice (BMP) use have increased, from the years 2000 to 2002, from 68 to 70 percent in the priority counties of the Columbia Plateau. Seventy percent of the total farmable acres in these counties are now part of a United States Department of Agriculture (USDA) conservation program, use one of the minimum till practices, or contain 15-30% residue.

Washington State finds this level of CRP and BMP implementation fulfills BACM criteria. A full discussion on Ecology's BACM definition and tracking mechanism may be found in the revised NEAP.

## Findings

The meteorological data from the Pasco, Yakima, and Walla Walla, Washington NWS stations show that April 27, 2004 was characterized by windy and gusty conditions. Wind speeds and gusts ranged from 22 to 38 mph for as many as seven consecutive hours; gusts ranged from 31 to 49 mph. The winds meet Ecology's high wind event definition.

The data shows areas that were especially dry in April 2004 when compared to mean April precipitation. Moreover, all sites analyzed show conditions were sufficiently dry for wind-blown dust generation 72 hours prior to the high winds on April 27, 2004. Such dry conditions leave soils vulnerable to wind erosion, particularly in light of the five to seven consecutive hours of recorded high winds.

Under the dry conditions so common in this area, the windy conditions are likely to raise dust that led to the monitored high PM<sub>10</sub> levels. Therefore, the monitored PM<sub>10</sub> concentrations of 249, 539, 255, 263 and 299 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), measured at Burbank, Kennewick, Sunnyside, Walla Walla, and Wallula Port, Washington respectively, are reasonably attributed to a natural event due to high winds.

## **Appendix A**

### **Burbank, Kennewick, Sunnyside, Wallula Port and Walla Walla, Washington PM<sub>10</sub> Data**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
 AIR QUALITY SYSTEM  
 RAW DATA REPORT

Jun.

22, 2004

(81102) PM10 Total 0-10um STP  
 SITE ID: 53-005-0002 POC: 1

CAS NUMBER:  
 LATITUDE:

46.218611

COUNTY: (005) BENTON

STATE: (53) WASHINGTON

LONGITUDE: -

119.205556

CITY:(35275) KENNEWICK  
 SITE ADDRESS: KENNEWICK VSC/5929 W METALINE

AQCR: (230) SOUTH CENTRAL WASHINGTON  
 URBANIZED AREA:6740) RICHLAND-KENNEWICK-PASCO, WA

UTM ZONE: 11  
 UTM NORTHING:

5120514

SITE COMMENTS:

LAND USE: RESIDENTIAL

UTM EASTING:

329896

MONITOR COMMENTS:

LOCATION SETTING: URBAN AND CENTER CITY

ELEVATION-MSL: 0  
 PROBE HEIGHT: 9

SUPPORT AGENCY: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY  
 MONITOR TYPE: SLAMS  
 COLLECTION AND ANALYSIS METHOD: (063) HI-VOL SA/GMW-1200 GRAVIMETRIC  
 REPORTING ORG: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY

REPORT FOR: 2003

DURATION: 24 HOURS  
 UNITS: UG/CU METER (25 C)  
 MIN DETECTABLE: 4

Day	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1	8	5	22	10	11	16	23	32	36	48	40	8
2	12	5	17	6	21	25	18	26	58	49	26	18
3	7			32	28	24	24	21		56	17	23
4	5	13	11	11	33	25	21	47	75	53	22	10
5	6	21	186 a	10	14		20	45	49	47	40	15
6	13	26	126	4	13	34		19	86	59		10
7	11	27	21	10	17	27		18		19	39	
8	12	20	7	16	18	36	36	16	15	84	37	13
9	11	22	33	13	20	27	27	80	13	30	32	9
10		22	17	17	17	33		15	29	14	164 a	5
11	14	20	34	7	15	19	42	14	5	16	41	12
12	14	18		11	13	28	69	16	16	138	38	19
13	14	16	60	9	16	37	25	30	22		40	11
14	13	22	19		34	15	22	34	27	14	50	3
15	9	17		9	39	17	30	62		13		8
16	12	4			8	28	25	41	54		18	10
17		4		11	9	34	22	17	14	15	31	12
18	10		12	7	9	65	29		24	23		13
19	12	15	10	15	14	50	33	50	81		10	15
20	6	14	36	14	18	17	23	41	20	22	7	18
21		9	6	13	16	20	25	54		14	16	11
22	5	5	9	17	27	9	43	40	33	42	14	
23	12	10	11	16	72	16	36	21	36	22	13	11
24	19	14	11	15	24	19	39	16	43	22	22	10
25	21	27		4	13	22	34		40	24	37	2
26	4	25	19	2	9	30	35	31	45	27	12	7
27	6	25	16	3	10	22	29	17	41		12	
28	9	19	13		22	22	37	24	38	1438 a	24	7
29	10		14	5	21	32	40	55	61	40	7	10
30	11		20	5	28	43	44	45	55	126		
31	6		29		17		35	40		39		22

NO.: 28 26 25 27 31 29 28 29 26 27 26 27  
 MAX: 21. 27. 186. 32. 72. 65. 69. 80. 86. 1438. 164. 23.  
 MEAN: 10.4 16.3 30.4 10.8 20.2 27.3 31.6 33.3 39.1 92.4 31.1 11.6  
 ANNUAL OBSERVATIONS: 329 ANNUAL MEAN: 29.4 ANNUAL MAX: 1438.

Note: Qualifier codes with regional concurrence are shown in upper case, and those without

regional review are shown in lower case. An asterisk ("\*\*") indicates that the regi

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
 AIR QUALITY SYSTEM  
 RAW DATA REPORT

Jun.

22, 2004

(81102) PM10 Total 0-10um STP  
 SITE ID: 53-005-0002 POC: 1

CAS NUMBER:  
 LATITUDE:

46.218611

COUNTY: (005) BENTON

STATE: (53) WASHINGTON

LONGITUDE: -

119.205556

CITY:(35275) KENNEWICK  
 SITE ADDRESS: KENNEWICK VSC/5929 W METALINE

AQCR: (230) SOUTH CENTRAL WASHINGTON  
 URBANIZED AREA:6740) RICHLAND-KENNEWICK-PASCO, WA

UTM ZONE: 11  
 UTM NORTHING:

5120514

SITE COMMENTS:

LAND USE: RESIDENTIAL

UTM EASTING:

329896

MONITOR COMMENTS:

LOCATION SETTING: URBAN AND CENTER CITY

ELEVATION-MSL: 0  
 PROBE HEIGHT: 9

SUPPORT AGENCY: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY  
 MONITOR TYPE: SLAMS  
 COLLECTION AND ANALYSIS METHOD: (063) HI-VOL SA/GMW-1200 GRAVIMETRIC  
 REPORTING ORG: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY

REPORT FOR: 2004

DURATION: 24 HOURS  
 UNITS: UG/CU METER (25 C)  
 MIN DETECTABLE: 4

Day	MONTH											
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1	16	7										
2	10		13									
3	16	9	11									
4	24		6									
5	40	27	30									
6	14		10									
7	17	15	14									
8	30		20									
9	50	20	22									
10	44	23	30									
11	40		20									
12	15	16	19									
13	16	25	14									
14	23	29	7									
15	23	22										
16	10	12	19									
17	17	12	19									
18	19		301 a									
19	13	13										
20	20		25									
21	21	19										
22	31	14										
23	20											
24	9	15	44									
25	4	9	14									
26	6	9	7									
27	15	7										
28			10									
29	5	9	19									
30	22		30									
31			9									

NO.: 29 21 23 0 0 0 0 0 0 0 0 0 0  
 MAX: 50. 29. 301.  
 MEAN: 20.3 15.8 30.1  
 ANNUAL OBSERVATIONS: 73 ANNUAL MEAN: 22.1 ANNUAL MAX: 301.

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk (\*\*\*) indicates that the regi

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
 AIR QUALITY SYSTEM  
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Jun.

22, 2004

(81102) PM10 Total 0-10um STP  
 SITE ID: 53-071-0005 POC: 1

CAS NUMBER:  
 LATITUDE:

46.060833

COUNTY: (071) WALLA WALLA

STATE: (53) WASHINGTON

LONGITUDE: -

118.348333

CITY:(75775) WALLA WALLA  
 SITE ADDRESS: FIRE STATION/200 S 12TH

AQCR: (230) SOUTH CENTRAL WASHINGTON  
 URBANIZED AREA:7840) SPOKANE, WA

UTM ZONE: 11  
 UTM NORTHING:

5101472

SITE COMMENTS: DOE SITE #3692007A01

LAND USE: COMMERCIAL

UTM EASTING:

395707

MONITOR COMMENTS:

LOCATION SETTING: SUBURBAN

ELEVATION-MSL: 0  
 PROBE HEIGHT: 5

SUPPORT AGENCY: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY  
 MONITOR TYPE: OTHER  
 COLLECTION AND ANALYSIS METHOD: (063) HI-VOL SA/GMW-1200 GRAVIMETRIC  
 REPORTING ORG: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY

REPORT FOR: 2003

DURATION: 24 HOURS  
 UNITS: UG/CU METER (25 C)  
 MIN DETECTABLE: 4

MONTH	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Day 1			22					53				
2		3				24	22		90	61	25	21
3					6							
4			9	8				28				
5		27				29	15				36	14
6	7				13				27	96		
7			8					28				
8		11				43						15
9	13				16					23		
10			4					26				
11		35									165 a	12
12	18				7		40					
13			24			16	20				56	
14		22								11		
15	13			8	16			104				
16			7									
17						41	28				14	20
18	10			9	13					24		
19			17									
20		4				36	30	57	25			
21				14	15					23		5
22			2					47	29			
23		6					58					
24	15			6	31				43	22		6
25			6					51				
26		28				27	31					9
27	5			1	27				42			
28								38		1338 a		
29			13			61					10	17
30	4				23		38		65	35		
31			9									
NO.:	8	8	11	6	10	8	9	9	7	9	6	9
MAX:	18.	35.	24.	14.	31.	61.	58.	104.	90.	1338.	165.	21.
MEAN:	10.6	17.0	11.0	7.7	16.7	34.6	31.3	48.0	45.9	181.4	51.0	13.2
ANNUAL OBSERVATIONS:	100											
ANNUAL MEAN:			39.3			1338.						

Note: Qualifier codes with regional concurrence are shown in upper case, and those without

regional review are shown in lower case. An asterisk ("\*") indicates that the regi

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
 AIR QUALITY SYSTEM  
 RAW DATA REPORT

Jun.

22, 2004

(81102) PM10 Total 0-10um STP  
 SITE ID: 53-071-0005 POC: 1

CAS NUMBER:  
 LATITUDE:

46.060833

COUNTY: (071) WALLA WALLA

STATE: (53) WASHINGTON

LONGITUDE: -

118.348333

CITY:(75775) WALLA WALLA  
 SITE ADDRESS: FIRE STATION/200 S 12TH

AQCR: (230) SOUTH CENTRAL WASHINGTON  
 URBANIZED AREA:7840) SPOKANE, WA

UTM ZONE: 11  
 UTM NORTHING:

5101472

SITE COMMENTS: DOE SITE #3692007A01

LAND USE: COMMERCIAL

UTM EASTING:

395707

MONITOR COMMENTS:

LOCATION SETTING: SUBURBAN

ELEVATION-MSL: 0  
 PROBE HEIGHT: 5

SUPPORT AGENCY: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY  
 MONITOR TYPE: OTHER  
 COLLECTION AND ANALYSIS METHOD: (063) HI-VOL SA/GMW-1200 GRAVIMETRIC  
 REPORTING ORG: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY

REPORT FOR: 2004

DURATION: 24 HOURS  
 UNITS: UG/CU METER (25 C)  
 MIN DETECTABLE: 4

Day	MONTH											
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1			24									
2												
3		13										
4												
5	14											
6		16										
7	22		20									
8												
9		30										
10	36		26									
11												
12												
13	15		26									
14												
15		19										
16	10		26									
17												
18		12										
19			23									
20												
21		23										
22	18											
23												
24		24										
25	7											
26												
27		17										
28	4											
29												
30												
31	6											
NO.:	9	8	6	0	0	0	0	0	0	0	0	0
MAX:	36.	30.	26.									
MEAN:	14.7	19.3	24.2									
ANNUAL OBSERVATIONS:	23											
ANNUAL MEAN:				18.7								
ANNUAL MAX:					36.							



Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk (\*\*\*) indicates that the regi

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
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Jun.

22, 2004

(81102) PM10 Total 0-10um STP

CAS NUMBER:

SITE ID: 53-071-0006 POC: 1

LATITUDE:

46.199901

COUNTY: (071) WALLA WALLA

STATE: (53) WASHINGTON

LONGITUDE: -

119.008329

CITY:(00000) NOT IN A CITY

AQCR: (230) SOUTH CENTRAL WASHINGTON

UTM ZONE: 11

SITE ADDRESS: 755 MAPLE STREET, BURBANK WA

URBANIZED AREA:0000) NOT IN AN URBAN AREA

UTM NORTHING:

5118011

SITE COMMENTS:

LAND USE: RESIDENTIAL

UTM EASTING:

345048

MONITOR COMMENTS:

LOCATION SETTING: SUBURBAN

ELEVATION-MSL:

9999

PROBE HEIGHT: 6

SUPPORT AGENCY: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY  
MONITOR TYPE: OTHER  
COLLECTION AND ANALYSIS METHOD: (063) HI-VOL SA/GMW-1200 GRAVIMETRIC  
REPORTING ORG: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY

REPORT FOR: 2003

DURATION: 24 HOURS  
UNITS: UG/CU METER (25 C)  
MIN DETECTABLE: 4

Day	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1			15					41				
2						31					24	15
3	11			22						63		
4		14						37				
5		18				40					37	14
6	15			7	22				63	57		
7								27				
8		20				39	34				37	12
9	6			16	21				15	22		
10								21				
11		20				24	48					13
12	15			15	10				19	67		
13			39					38				
14		23				20					52	2
15	12			11	33				34	13		
16			5					57				
17		3				48					25	1
18	11			16	12				31	28		
19			15					58				
20		7	12			24					8	19
21				17	21				28	22		
22								47				
23		8					49				17	11
24				12	33				53	23		
25								49				
26		20	4			33	35				9	12
27			4		18				54			
28			14					41				
29	8		16			61	49				7	27
30	9			13	34				47	282 a		
31	8							46				



29  
30  
31

NO.: 8 6 9 0 0 0 0 0 0 0 0 0  
MAX: 50. 21. 41.  
MEAN: 21.1 13.8 21.9  
ANNUAL OBSERVATIONS: 23 ANNUAL MEAN: 19.5 ANNUAL MAX: 50.

Note: Qualifier codes with regional concurrence are shown in upper case, and those without

regional review are shown in lower case. An asterisk ("\*\*") indicates that the regi

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
AIR QUALITY SYSTEM  
RAW DATA REPORT

Jun.

22, 2004

(81102) PM10 Total 0-10um STP  
SITE ID: 53-077-0005 POC: 1

CAS NUMBER:  
LATITUDE:

46.375556

COUNTY: (077) YAKIMA

STATE: (53) WASHINGTON

LONGITUDE: -

120

CITY:(68750) SUNNYSIDE  
SITE ADDRESS: HARRISON MIDDLE SCHOOL SUNNYSIDE, WA

AQCR: (230) SOUTH CENTRAL WASHINGTON  
URBANIZED AREA:9260) YAKIMA, WA

UTM ZONE: 11  
UTM NORTHING:

5139917

SITE COMMENTS:

LAND USE: RESIDENTIAL

UTM EASTING:

269162

MONITOR COMMENTS:

LOCATION SETTING: SUBURBAN

ELEVATION-MSL: 0  
PROBE HEIGHT: 8

SUPPORT AGENCY: (1195) YAKIMA COUNTY CLEAN AIR AUTHORITY  
MONITOR TYPE: SLAMS  
COLLECTION AND ANALYSIS METHOD: (063) HI-VOL SA/GMW-1200 GRAVIMETRIC  
REPORTING ORG: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY

REPORT FOR: 2003

DURATION: 24 HOURS  
UNITS: UG/CU METER (25 C)  
MIN DETECTABLE: 4

Day	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1								40				
2		13				32	25					17
3	11			9	17							
4			17						54	60	29	12
5								12				
6						40	21					
7												
8												
9	21			14	22							
10			7								25	15
11									25	27		
12												
13		22				18	22	25				
14	12			5	37							
15			6									
16												
17											30	27
18									39	26		
19								40				
20		9				18	26					
21	10				22							
22			7									
23												16
24										30		
25								27	53			

26		34				15							
27					25								
28	23		13	8									
29													17
30									57	87			
31								39					
NO.:	5	4	5	4	5	5	4	6	5	5	3	6	
MAX:	23.	34.	17.	14.	37.	40.	26.	40.	57.	87.	30.	27.	
MEAN:	15.4	19.5	10.0	9.0	24.6	24.6	23.5	30.5	45.6	46.0	28.0	17.3	
ANNUAL OBSERVATIONS:	57		ANNUAL MEAN:	24.7	ANNUAL MAX:	87.							

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk (\*\*\*) indicates that the regional review are shown in lower case. An asterisk (\*\*\*) indicates that the regional review are shown in lower case.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
 AIR QUALITY SYSTEM  
 RAW DATA REPORT

Jun.

22, 2004

(81102) PM10 Total 0-10um STP  
 SITE ID: 53-077-0005 POC: 1

CAS NUMBER:  
 LATITUDE:

46.375556

COUNTY: (077) YAKIMA

STATE: (53) WASHINGTON

LONGITUDE: -

120

CITY:(68750) SUNNYSIDE  
 SITE ADDRESS: HARRISON MIDDLE SCHOOL SUNNYSIDE, WA

AQCR: (230) SOUTH CENTRAL WASHINGTON  
 URBANIZED AREA:9260) YAKIMA, WA

UTM ZONE: 11  
 UTM NORTHING:

5139917

SITE COMMENTS:

LAND USE: RESIDENTIAL

UTM EASTING:

269162

MONITOR COMMENTS:

LOCATION SETTING: SUBURBAN

ELEVATION-MSL: 0  
 PROBE HEIGHT: 8

SUPPORT AGENCY: (1195) YAKIMA COUNTY CLEAN AIR AUTHORITY  
 MONITOR TYPE: SLAMS  
 COLLECTION AND ANALYSIS METHOD: (063) HI-VOL SA/GMW-1200 GRAVIMETRIC  
 REPORTING ORG: (1136) WASHINGTON STATE DEPARTMENT OF ECOLOGY

REPORT FOR: 2004

DURATION: 24 HOURS  
 UNITS: UG/CU METER (25 C)  
 MIN DETECTABLE: 4

Day	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1												
2												
3												
4	15		12			16						
5												
6												
7												
8												
9												
10	40					25						
11												
12												
13												
14												
15												
16	15					24						
17												
18												
19												
20												
21												
22	32					43						

23  
24  
25  
26  
27  
28  
29  
30  
31

NO.:	5	6	5	0	0	0	0	0	0	0	0	0	0
MAX:	40.	33.	43.										
MEAN:	23.2	23.0	23.8										
ANNUAL OBSERVATIONS:	16												
ANNUAL MEAN:				23.3									
ANNUAL MAX:				43.									

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk (\*\*\*) indicates that the regi

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
AIR QUALITY SYSTEM  
RAW DATA REPORT

Jun.

22, 2004

QUALIFIER CODES:

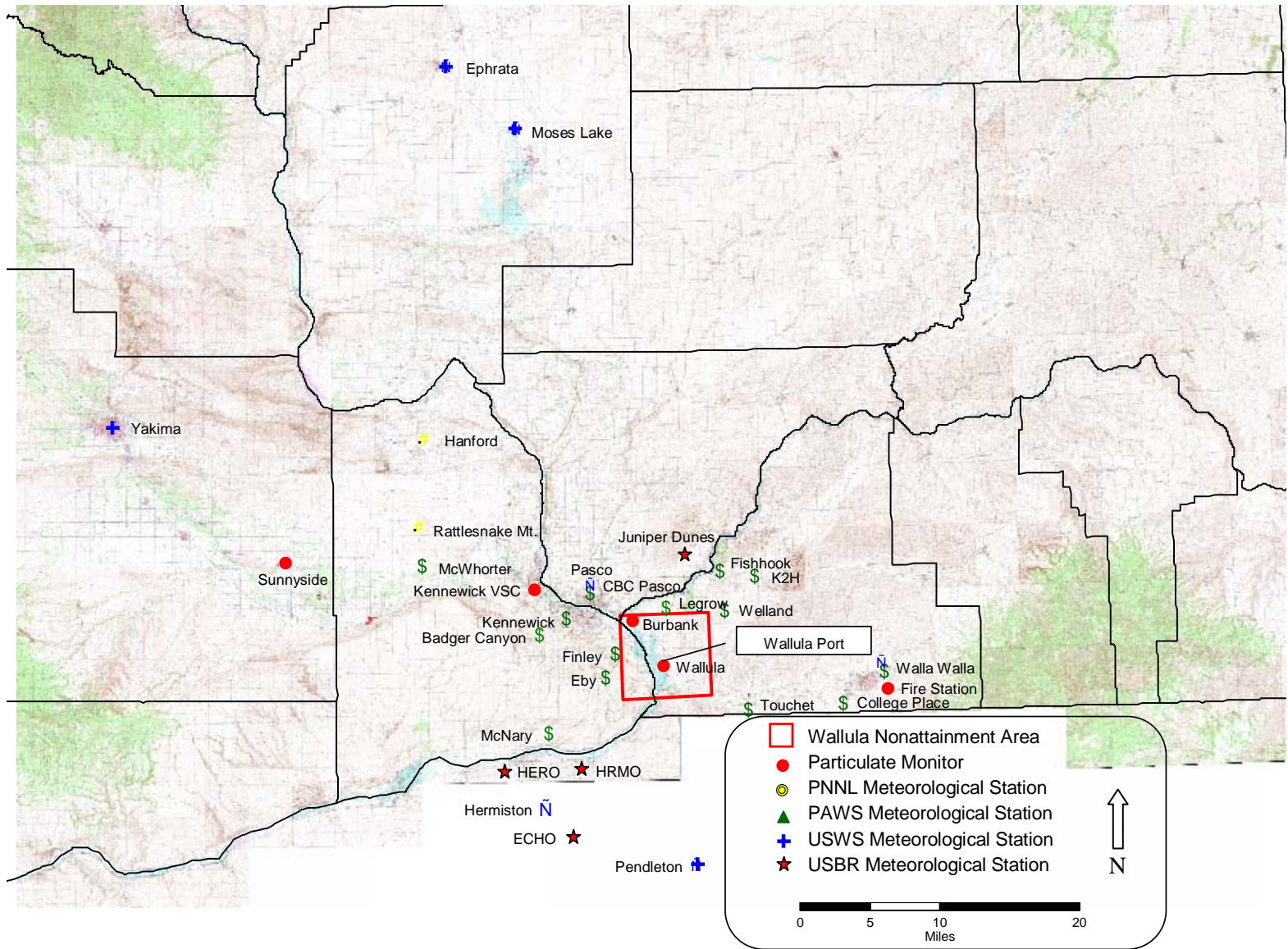
Qualifier Code	Qualifier Description	Qualifier Type
a	HIGH WINDS	NAT

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional concurrence are shown in lower case.

## **Appendix B**

### **Meteorological Data Pasco, Yakima and Walla Walla, Washington**















2004-04-06	13:53	2453102.5784722	1017.6	38.0	37.0	0	0.0	NA	0	120	9	NA	96.1	NA	M	M	M	M	M	M	M	M	M	M
2004-04-06	14:53	2453102.6201389	1018.1	44.0	42.0	0	0.0	NA	0	120	8	NA	92.6	NA	M	M	M	M	M	M	M	M	M	M
2004-04-06	15:53	2453102.6618056	1018.2	52.0	41.0	90	4.0	NA	0	120	9	NA	66.0	NA	M	M	M	M	M	M	M	M	M	M
2004-04-06	16:53	2453102.7034722	1018.1	56.0	40.0	0	0.0	NA	0	120	10	NA	54.8	NA	M	M	M	M	M	M	M	M	M	M
2004-04-06	17:53	2453102.7451389	1017.8	60.0	41.0	360	3.0	NA	0	120	10	NA	49.4	NA	60	36	M	M	M	M	M	M	M	M
2004-04-06	18:53	2453102.7868056	1017.3	62.0	40.0	NA	3.0	NA	0	120	10	NA	44.2	NA	M	M	M	M	M	M	M	M	M	M
2004-04-06	19:53	2453102.8284722	1016.7	65.0	41.0	350	5.0	NA	0	120	10	NA	41.4	NA	M	M	M	M	M	M	M	M	M	M
2004-04-06	20:53	2453102.8701389	1016.0	67.0	42.0	350	4.0	NA	0	120	10	NA	40.1	NA	M	M	M	M	M	M	M	0.95	0.034	M
2004-04-06	21:53	2453102.9118056	1015.5	69.0	42.0	NA	3.0	NA	0	120	10	NA	37.5	NA	M	M	M	M	M	M	M	M	M	M
2004-04-06	22:53	2453102.9534722	1014.9	71.0	43.0	360	6.0	NA	0	120	10	NA	36.4	NA	M	M	M	M	M	M	M	M	M	M
2004-04-06	23:53	2453102.9951389	1014.8	72.0	42.0	360	4.0	NA	0	120	10	NA	33.8	NA	72	59	64.6	M	M	81	M	M	M	M
2004-04-07	00:53	2453103.0368056	1014.6	71.0	44.0	340	4.0	NA	0	120	10	NA	37.8	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	01:53	2453103.0784722	1014.5	70.0	43.0	0	0.0	NA	0	120	10	NA	37.6	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	02:53	2453103.1201389	1014.8	65.0	40.0	110	5.0	NA	0	120	10	NA	39.8	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	03:53	2453103.1618056	1015.7	60.0	43.0	0	0.0	NA	0	120	10	NA	53.3	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	04:53	2453103.2034722	1016.1	58.0	42.0	0	0.0	NA	0	120	10	NA	55.1	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	05:53	2453103.2451389	1016.4	47.0	43.0	0	0.0	NA	0	120	10	NA	85.9	NA	73	46	M	M	M	M	M	M	M	M
2004-04-07	06:53	2453103.2868056	1016.5	47.0	42.0	30	3.0	NA	0	120	10	NA	82.6	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	07:53	2453103.3284722	1016.5	49.0	42.0	170	3.0	NA	0	120	10	NA	76.7	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	08:53	2453103.3701389	1017.0	55.0	42.0	200	12.0	NA	0	120	10	NA	61.4	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	09:53	2453103.4118056	1017.5	54.0	43.0	190	9.0	NA	0	120	10	NA	66.2	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	10:53	2453103.4534722	1018.2	52.0	42.0	210	7.0	NA	0	120	10	NA	68.6	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	12:53	2453103.5368056	1019.4	51.0	40.0	220	10.0	NA	0	120	10	NA	65.8	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	13:53	2453103.5784722	1019.8	50.0	40.0	220	9.0	NA	0	120	10	NA	68.3	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	14:53	2453103.6201389	1020.5	54.0	41.0	220	11.0	NA	0	120	10	NA	61.3	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	15:53	2453103.6618056	1020.5	56.0	41.0	200	11.0	NA	0	120	10	NA	57.0	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	16:53	2453103.7034722	1020.8	60.0	41.0	210	7.0	NA	0	120	10	NA	49.4	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	17:53	2453103.7451389	1020.8	62.0	42.0	250	5.0	NA	0	120	10	NA	47.8	NA	62	50	M	M	M	M	M	M	M	M
2004-04-07	18:53	2453103.7868056	1020.4	64.0	41.0	280	5.0	NA	0	120	10	NA	42.9	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	19:53	2453103.8284722	1019.6	67.0	42.0	NA	4.0	NA	0	120	10	NA	40.1	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	20:53	2453103.8701389	1018.9	69.0	42.0	220	7.0	NA	0	120	10	NA	37.5	NA	M	M	M	M	M	M	M	0.07	0.004	M
2004-04-07	21:53	2453103.9118056	1018.3	69.0	42.0	NA	3.0	NA	0	120	10	NA	37.5	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	22:53	2453103.9534722	1017.6	72.0	41.0	NA	6.0	NA	0	120	10	NA	32.5	NA	M	M	M	M	M	M	M	M	M	M
2004-04-07	23:53	2453103.9951389	1017.2	72.0	41.0	190	7.0	NA	0	120	10	NA	32.5	NA	72	63	64.9	M	87	M	M	M	M	M
2004-04-08	00:53	2453104.0368056	1016.9	71.0	41.0	210	8.0	NA	0	120	10	NA	33.7	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	01:53	2453104.0784722	1017.0	68.0	42.0	240	9.0	NA	0	120	10	NA	38.8	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	02:53	2453104.1201389	1017.7	61.0	42.0	320	9.0	NA	0	120	10	NA	49.5	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	03:53	2453104.1618056	1018.1	59.0	39.0	310	11.0	NA	0	120	10	NA	47.3	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	04:53	2453104.2034722	1018.4	59.0	38.0	NA	3.0	NA	0	120	10	NA	45.5	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	05:53	2453104.2451389	1018.5	58.0	40.0	NA	5.0	NA	0	120	10	NA	51.0	NA	72	56	M	M	M	M	M	M	M	M
2004-04-08	06:53	2453104.2868056	1018.5	53.0	38.0	0	0.0	NA	0	120	10	NA	56.6	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	07:53	2453104.3284722	1018.7	50.0	39.0	270	4.0	NA	0	120	10	NA	65.7	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	08:53	2453104.3701389	1018.9	49.0	39.0	0	0.0	NA	0	120	10	NA	68.2	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	09:53	2453104.4118056	1018.8	46.0	40.0	0	0.0	NA	0	120	10	NA	79.4	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	10:53	2453104.4534722	1019.3	42.0	37.0	120	3.0	NA	1	120	10	NA	82.3	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	11:53	2453104.4951389	1019.3	41.0	38.0	60	3.0	NA	3	120	10	NA	89.0	0.00	57	39	M	39.4	M	22	M	M	M	M
2004-04-08	12:53	2453104.5368056	1019.5	35.0	35.0	20	4.0	NA	0	120	10	NA	100.0	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	13:53	2453104.5784722	1019.8	36.0	35.0	0	0.0	NA	0	120	9	NA	96.1	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	14:53	2453104.6201389	1020.1	45.0	39.0	0	0.0	NA	0	120	10	NA	79.3	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	15:53	2453104.6618056	1020.2	51.0	41.0	330	3.0	NA	0	120	10	NA	68.5	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	16:53	2453104.7034722	1020.4	57.0	41.0	NA	3.0	NA	0	120	10	NA	55.0	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	17:53	2453104.7451389	1020.3	61.0	36.0	NA	4.0	NA	0	120	10	NA	39.2	NA	61	34	M	M	M	M	M	M	M	M
2004-04-08	18:53	2453104.7868056	1019.9	63.0	35.0	320	5.0	NA	0	120	10	NA	35.1	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	19:53	2453104.8284722	1019.3	65.0	34.0	280	7.0	NA	0	120	10	NA	31.4	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	20:53	2453104.8701389	1018.9	67.0	33.0	NA	4.0	NA	0	120	10	NA	28.2	NA	M	M	M	M	M	M	M	0.20	0.016	M
2004-04-08	21:53	2453104.9118056	1018.5	68.0	32.0	260	6.0	NA	0	120	10	NA	26.1	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	22:53	2453104.9534722	1018.2	70.0	30.0	280	8.0	NA	0	120	10	NA	22.5	NA	M	M	M	M	M	M	M	M	M	M
2004-04-08	23:53	2453104.9951389	1018.2	71.0	31.0	360	6.0	NA	0	120	10	NA	22.6	NA	71	60	65.1	M	80	M	M	M	M	M





















#  
 # This data is from: Walla Walla (stn. code alw)  
 #

#  
 # Walla Walla Site and Instrument specifications  
 # Walla Walla, WA  
 # NWS: This site is a National Weather Service site.

Archived data available via this UW link since: 01 Jul 1996

STATION NAME	ID	LAT	LON	ELEV M	ELEV FT	WMO															
WALLA WALLA RGN WA US	KALW	46.10	-118.28	367 m	1204 ft	72788															
# Station precip: maximum and daily avg (inches) over entire period of record -----*																					
# Station extrema: daily hi/lo temperatures over entire period of record -----*																					
# Station average: daily hi/lo temperatures over entire period of record -----*																					
# Station 6-hour hi/lo temperatures -----*																					
# Rain Gauge (inches) -----*																					
# Relative humidity (%) -----*																					
# Solar irradiance (W/m^2) -----*																					
# Visibility (miles) -----*																					
# Cloud height (100's of feet) -----*																					
# Cloud cover (1/8ths of sky) -----*																					
# Wind peak (nautical miles per hour) -----*																					
# Wind speed (nautical miles per hour) -----*																					
# Wind direction (clockwise degrees from North) -----*																					
# Dewpoint temperature (F) -----*																					
# Air temperature (F) -----*																					
# Pressure (millibars) -----*																					
Date (GMT)	Julian date	Pres	Tair	Tdew	Dir	Spd	Peak	Cc	Cht	Vis	Radn	RelH	Rain	hi	lo	hi	lo	hi	lo	max	avg
2004-03-31 23:53	2453096.9951389	1019.0	53.0	23.0	NA	4.0	NA	0	120	10	NA	30.7	NA	53	47	59.2	M	74	M	M	M
2004-04-01 00:53	2453097.0368056	1019.2	52.0	26.0	280	8.0	NA	0	120	10	NA	36.1	NA	M	M	M	M	M	M	M	M
2004-04-01 01:53	2453097.0784722	1019.5	47.0	31.0	270	5.0	NA	0	120	10	NA	53.5	NA	M	M	M	M	M	M	M	M
2004-04-01 02:53	2453097.1201389	1019.7	46.0	28.0	260	3.0	NA	0	120	10	NA	49.1	NA	M	M	M	M	M	M	M	M
2004-04-01 03:53	2453097.1618056	1020.0	44.0	30.0	120	4.0	NA	0	120	10	NA	57.5	NA	M	M	M	M	M	M	M	M
2004-04-01 04:53	2453097.2034722	1020.1	42.0	29.0	120	5.0	NA	6	100	10	NA	59.7	NA	M	M	M	M	M	M	M	M
2004-04-01 05:53	2453097.2451389	1020.1	40.0	29.0	120	5.0	NA	8	95	10	NA	64.5	NA	53	40	M	M	M	M	M	M
2004-04-01 06:53	2453097.2868056	1020.4	39.0	28.0	120	6.0	NA	0	120	10	NA	64.3	NA	M	M	M	M	M	M	M	M
2004-04-01 07:53	2453097.3284722	1020.9	42.0	25.0	150	7.0	NA	6	100	10	NA	50.6	NA	M	M	M	M	M	M	M	M
2004-04-01 08:53	2453097.3701389	1021.3	41.0	28.0	170	7.0	NA	8	90	10	NA	59.5	NA	M	M	M	M	M	M	M	M
2004-04-01 09:53	2453097.4118056	1021.6	39.0	30.0	180	6.0	NA	0	120	10	NA	69.8	NA	M	M	M	M	M	M	M	M
2004-04-01 10:53	2453097.4534722	1022.0	37.0	28.0	180	8.0	NA	3	120	10	NA	69.6	NA	M	M	M	M	M	M	M	M
2004-04-01 11:53	2453097.4951389	1022.5	37.0	29.0	170	7.0	NA	0	120	10	NA	72.5	NA	43	37	M	39.0	M	31	M	M
2004-04-01 12:53	2453097.5368056	1023.3	39.0	30.0	190	9.0	NA	8	70	10	NA	69.8	NA	M	M	M	M	M	M	M	M
2004-04-01 13:53	2453097.5784722	1024.1	39.0	30.0	190	7.0	NA	8	80	10	NA	69.8	NA	M	M	M	M	M	M	M	M
2004-04-01 14:53	2453097.6201389	1024.6	42.0	32.0	180	6.0	NA	8	85	10	NA	67.4	NA	M	M	M	M	M	M	M	M
2004-04-01 15:53	2453097.6618056	1025.2	46.0	32.0	220	7.0	NA	6	75	10	NA	57.8	NA	M	M	M	M	M	M	M	M
2004-04-01 16:53	2453097.7034722	1025.3	48.0	33.0	220	8.0	NA	8	90	10	NA	55.8	NA	M	M	M	M	M	M	M	M
2004-04-01 17:53	2453097.7451389	1025.4	50.0	32.0	240	5.0	NA	8	90	10	NA	49.8	NA	50	37	M	M	M	M	M	M





























# This data is from: Yakima (stn. code ykm)  
 #  
 #  
 Yakima Site and Instrument specifications  
 Yakima, WA  
 NWS: This site is a National Weather Service site.

Archived data available via this UW link since: 01 July 1996

STATION NAME	ID	LAT	LON	ELEV M	ELEV FT	WMO
YAKIMA	WA US YKM	46.57	-120.53	322 m	1056 ft	72781

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#
# Station precip: maximum and daily avg (inches) over entire period of record -----*
#
# Station extrema: daily hi/lo temperatures over entire period of record -----*
#
# Station average: daily hi/lo temperatures over entire period of record -----*
#
# Station 6-hour hi/lo temperatures -----*
#
# Rain Gauge (inches) -----*
# Relative humidity (%) -----*
# Solar irradiance (W/m^2) -----*
# Visibility (miles) -----*
# Cloud height (100's of feet) -----*
# Cloud cover (1/8ths of sky) -----*
# Wind peak (nautical miles per hour) -----*
# Wind speed (nautical miles per hour) -----*
# Wind direction (clockwise degrees from North) --*
# Dewpoint temperature (F) -----*
# Air temperature (F) -----*
# Pressure (millibars) -----*
#
#
# Date(GMT) Julian date Pres Tair Tdew Dir Spd Peak Cc Cht Vis Radn RelH Rain hi lo hi lo hi lo max avg
# -----
#
2004-04-01 07:56 2453097.3305556 1021.2 39.0 26.0 NA 3.0 NA 0 120 10 NA 59.2 NA M M M M M M M M M
2004-04-01 08:56 2453097.3722222 1021.8 34.0 24.0 260 3.0 NA 0 120 10 NA 66.4 NA M M M M M M M M M
2004-04-01 09:56 2453097.4138889 1022.1 36.0 24.0 260 5.0 NA 0 120 10 NA 61.3 NA M M M M M M M M M
2004-04-01 10:56 2453097.4555556 1022.4 35.0 24.0 300 7.0 NA 0 120 10 NA 63.8 NA M M M M M M M M M
2004-04-01 11:56 2453097.4972222 1023.0 38.0 24.0 320 8.0 NA 0 120 10 NA 56.7 0.00 43 32 M 32.2 M 21 M M M
2004-04-01 12:56 2453097.5388889 1023.9 37.0 23.0 290 4.0 NA 0 120 10 NA 56.5 NA M M M M M M M M M
2004-04-01 13:56 2453097.5805556 1024.4 34.0 23.0 310 3.0 NA 0 120 10 NA 63.7 NA M M M M M M M M M
2004-04-01 14:56 2453097.6222222 1024.9 40.0 26.0 0 0.0 NA 0 120 10 NA 57.0 NA M M M M M M M M M
2004-04-01 15:56 2453097.6638889 1025.2 44.0 25.0 NA 3.0 NA 0 120 10 NA 46.8 NA M M M M M M M M M
2004-04-01 16:56 2453097.7055556 1025.3 49.0 26.0 NA 4.0 NA 0 120 10 NA 40.4 NA M M M M M M M M M
2004-04-01 17:56 2453097.7472222 1025.3 51.0 24.0 0 0.0 NA 0 120 10 NA 34.5 NA 52 32 M M M M M M M M M
2004-04-01 18:56 2453097.7888889 1025.4 53.0 24.0 0 0.0 NA 0 120 10 NA 32.1 NA M M M M M M M M M

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2004-04-18	20:56	2453114.8722222	1015.6	57.0	29.0	170	10.0	NA	0	120	10	NA	34.1	NA	M	M	M	M	M	M	0.43	0.016
2004-04-18	21:56	2453114.9138889	1015.1	59.0	26.0	160	9.0	NA	0	120	10	NA	28.0	NA	M	M	M	M	M	M	M	M
2004-04-18	22:56	2453114.9555556	1014.3	61.0	31.0	150	13.0	18.0	0	120	10	NA	32.0	NA	M	M	M	M	M	M	M	M
2004-04-18	23:56	2453114.9972222	1013.9	58.0	30.0	170	10.0	NA	0	120	10	NA	34.2	NA	62	55	64.3	M	84	M	M	M
2004-04-19	00:56	2453115.0388889	1013.9	59.0	34.0	270	10.0	NA	3	120	10	NA	38.8	NA	M	M	M	M	M	M	M	M
2004-04-19	01:56	2453115.0805556	1013.7	58.0	34.0	180	10.0	NA	1	120	10	NA	40.2	NA	M	M	M	M	M	M	M	M
2004-04-19	02:56	2453115.1222222	1013.6	53.0	35.0	210	10.0	NA	0	120	10	NA	50.2	NA	M	M	M	M	M	M	M	M
2004-04-19	03:56	2453115.1638889	1014.2	52.0	34.0	220	9.0	NA	0	120	10	NA	50.1	NA	M	M	M	M	M	M	M	M
2004-04-19	04:56	2453115.2055556	1014.9	44.0	34.0	180	3.0	NA	0	120	10	NA	67.6	NA	M	M	M	M	M	M	M	M
2004-04-19	05:56	2453115.2472222	1015.2	38.0	32.0	270	6.0	NA	0	120	10	NA	78.7	NA	59	38	M	M	M	M	M	M
2004-04-19	06:56	2453115.2888889	1015.5	38.0	32.0	0	0.0	NA	0	120	10	NA	78.7	NA	M	M	M	M	M	M	M	M
2004-04-19	07:56	2453115.3305556	1015.6	34.0	30.0	290	5.0	NA	1	120	10	NA	85.1	NA	M	M	M	M	M	M	M	M
2004-04-19	08:56	2453115.3722222	1015.7	31.0	29.0	260	5.0	NA	0	120	10	NA	92.2	NA	M	M	M	M	M	M	M	M
2004-04-19	09:56	2453115.4138889	1015.2	32.0	30.0	250	3.0	NA	0	120	10	NA	92.2	NA	M	M	M	M	M	M	M	M
2004-04-19	10:56	2453115.4555556	1015.2	28.0	27.0	270	6.0	NA	0	120	10	NA	96.0	NA	M	M	M	M	M	M	M	M
2004-04-19	11:56	2453115.4972222	1015.2	29.0	28.0	280	5.0	NA	0	120	10	NA	96.0	0.00	39	28	M	35.7	M	23	M	M
2004-04-19	12:56	2453115.5388889	1015.1	28.0	26.0	310	4.0	NA	0	120	10	NA	92.1	NA	M	M	M	M	M	M	M	M
2004-04-19	13:56	2453115.5805556	1015.4	30.0	28.0	0	0.0	NA	0	120	10	NA	92.1	NA	M	M	M	M	M	M	M	M
2004-04-19	14:56	2453115.6222222	1015.1	40.0	33.0	0	0.0	NA	0	120	10	NA	75.8	NA	M	M	M	M	M	M	M	M
2004-04-19	16:56	2453115.7055556	1014.5	48.0	35.0	0	0.0	NA	1	120	10	NA	60.5	NA	M	M	M	M	M	M	M	M
2004-04-19	17:56	2453115.7472222	1013.8	55.0	37.0	70	8.0	NA	1	120	10	NA	50.5	NA	55	27	M	M	M	M	M	M
2004-04-19	18:56	2453115.7888889	1012.9	58.0	35.0	NA	5.0	NA	0	120	10	NA	41.9	NA	M	M	M	M	M	M	M	M
2004-04-19	19:56	2453115.8305556	1012.0	60.0	36.0	110	9.0	15.0	0	120	10	NA	40.6	NA	M	M	M	M	M	M	M	M
2004-04-19	20:56	2453115.8722222	1011.4	61.0	33.0	190	8.0	NA	3	120	10	NA	34.7	NA	M	M	M	M	M	M	0.31	0.018
2004-04-19	21:56	2453115.9138889	1010.0	62.0	33.0	110	9.0	NA	0	120	10	NA	33.5	NA	M	M	M	M	M	M	M	M
2004-04-19	22:56	2453115.9555556	1009.3	62.0	32.0	150	7.0	NA	3	120	10	NA	32.2	NA	M	M	M	M	M	M	M	M
2004-04-19	23:56	2453115.9972222	1008.7	62.0	32.0	140	12.0	NA	0	120	10	NA	32.2	NA	64	55	64.6	M	79	M	M	M
2004-04-20	00:56	2453116.0388889	1008.1	62.0	31.0	140	8.0	NA	6	90	10	NA	30.9	NA	M	M	M	M	M	M	M	M
2004-04-20	01:56	2453116.0805556	1008.3	59.0	34.0	190	12.0	NA	8	70	10	NA	38.8	NA	M	M	M	M	M	M	M	M
2004-04-20	02:56	2453116.1222222	1008.2	55.0	37.0	240	14.0	21.0	8	75	10	NA	50.5	NA	M	M	M	M	M	M	M	M
2004-04-20	03:56	2453116.1638889	1008.6	52.0	39.0	230	8.0	NA	8	85	10	NA	61.0	NA	M	M	M	M	M	M	M	M
2004-04-20	04:56	2453116.2055556	1008.6	50.0	44.0	60	3.0	NA	8	60	10	NA	79.7	NA	M	M	M	M	M	M	M	M
2004-04-20	05:56	2453116.2472222	1008.1	48.0	46.0	100	3.0	NA	8	47	10	NA	92.7	NA	63	48	M	M	M	M	M	M
2004-04-20	06:56	2453116.2888889	1008.1	47.0	47.0	80	3.0	NA	8	38	7	NA	100.0	NA	M	M	M	M	M	M	M	M
2004-04-20	07:56	2453116.3305556	1007.2	47.0	43.0	80	8.0	NA	8	41	10	NA	85.9	NA	M	M	M	M	M	M	M	M
2004-04-20	08:56	2453116.3722222	1007.2	46.0	43.0	0	0.0	NA	0	120	10	NA	89.2	NA	M	M	M	M	M	M	M	M
2004-04-20	09:56	2453116.4138889	1007.4	46.0	40.0	200	5.0	NA	0	120	10	NA	79.4	NA	M	M	M	M	M	M	M	M
2004-04-20	10:56	2453116.4555556	1008.0	42.0	41.0	150	3.0	NA	0	120	10	NA	96.2	NA	M	M	M	M	M	M	M	M
2004-04-20	11:56	2453116.4972222	1008.7	40.0	40.0	290	5.0	NA	0	120	10	NA	100.0	0.19	48	39	M	35.9	M	22	M	M
2004-04-20	12:56	2453116.5388889	1009.3	40.0	40.0	70	3.0	NA	0	120	10	NA	100.0	NA	M	M	M	M	M	M	M	M
2004-04-20	13:56	2453116.5805556	1009.9	43.0	40.0	50	4.0	NA	6	85	10	NA	89.0	NA	M	M	M	M	M	M	M	M
2004-04-20	14:56	2453116.6222222	1010.6	46.0	38.0	240	4.0	NA	0	120	10	NA	73.4	NA	M	M	M	M	M	M	M	M
2004-04-20	15:56	2453116.6638889	1010.7	48.0	39.0	160	10.0	16.0	0	120	10	NA	70.8	NA	M	M	M	M	M	M	M	M
2004-04-20	16:56	2453116.7055556	1011.0	50.0	39.0	160	15.0	NA	0	120	10	NA	65.7	NA	M	M	M	M	M	M	M	M
2004-04-20	17:56	2453116.7472222	1011.2	51.0	37.0	160	14.0	NA	0	120	10	NA	58.5	NA	52	39	M	M	M	M	M	M
2004-04-20	18:56	2453116.7888889	1011.0	55.0	36.0	130	11.0	NA	1	120	10	NA	48.6	NA	M	M	M	M	M	M	M	M
2004-04-20	19:56	2453116.8305556	1011.0	55.0	36.0	180	14.0	20.0	6	85	10	NA	48.6	NA	M	M	M	M	M	M	M	M
2004-04-20	20:56	2453116.8722222	1010.5	57.0	38.0	170	20.0	23.0	1	120	9	NA	48.9	NA	M	M	M	M	M	M	0.39	0.028
2004-04-20	21:56	2453116.9138889	1010.4	55.0	37.0	170	16.0	NA	1	120	10	NA	50.5	NA	M	M	M	M	M	M	M	M
2004-04-20	22:56	2453116.9555556	1010.2	56.0	36.0	180	15.0	23.0	0	120	10	NA	46.8	NA	M	M	M	M	M	M	M	M
2004-04-20	23:56	2453116.9972222	1010.0	56.0	38.0	200	10.0	21.0	0	120	10	NA	50.7	NA	57	51	64.8	M	84	M	M	M











2004-04-29 11:56 2453125.4972222 NA 36.0 31.0 260 8.0 NA 0 120 10 NA 81.8 0.00 51 35 M 38.0 M 24 M M



**WSU Public Agricultural Weather System**

Data Extracted:2004-09-24 11:17:33

[CBC-PASCO, on CBC Campus, Pasco, Wa](#)

Lat:46.2 Lng:119.1 elevation:339

Dates Range From 1995-06-22 To 2004-09-23

DATE Gregorian	Total Precip inches
2004-04-01	.00
2004-04-02	.00
2004-04-03	.00
2004-04-04	.00
2004-04-05	.00
2004-04-06	.00
2004-04-07	.00
2004-04-08	.00
2004-04-09	.00
2004-04-10	.00
2004-04-11	.00
2004-04-12	.00
2004-04-13	.13
2004-04-14	.00
2004-04-15	.00
2004-04-16	.00
2004-04-17	.00
2004-04-18	.00
2004-04-19	.00
2004-04-20	.03
2004-04-21	.00
2004-04-22	.00
2004-04-23	.00
2004-04-24	.00
2004-04-25	.00
2004-04-26	.00
2004-04-27	.00

Data Extracted:2004-09-24 11:17:33  
[SUNNYSIDE, 4.2 MI N of Sunnyside, Wa](#)  
Lat:46.3 Lng:119.9 elevation:876  
Dates Range From 1989-01-01 To 2004-09-23

DATE	Total Precip Gregorian inches
-----	-----
2004-04-01	.00
2004-04-02	.00
2004-04-03	.00
2004-04-04	.00
2004-04-05	.00
2004-04-06	.00
2004-04-07	.00
2004-04-08	.00
2004-04-09	.00
2004-04-10	.00
2004-04-11	.00
2004-04-12	.00
2004-04-13	.00
2004-04-14	.00
2004-04-15	.00
2004-04-16	.00
2004-04-17	.00
2004-04-18	.00
2004-04-19	.22
2004-04-20	.10
2004-04-21	.02
2004-04-22	.00
2004-04-23	.06
2004-04-24	.00
2004-04-25	.00
2004-04-26	.00
2004-04-27	.00

Data Extracted:2004-09-24 11:17:34  
[WALLA WALLA, 1 MI E of Walla Walla, Wa](#)  
Lat:46.0 Lng:118.2 elevation:1186  
Dates Range From 1992-07-22 To 2004-09-23

DATE	Total Precip Gregorian inches
-----	-----
2004-04-01	.00
2004-04-02	.00
2004-04-03	.00
2004-04-04	.00
2004-04-05	.00
2004-04-06	.06
2004-04-07	.02
2004-04-08	.00
2004-04-09	.09
2004-04-10	.00
2004-04-11	.00
2004-04-12	.00
2004-04-13	.06
2004-04-14	.00
2004-04-15	.84
2004-04-16	.00
2004-04-17	.00
2004-04-18	.00
2004-04-19	.06
2004-04-20	.17
2004-04-21	.53
2004-04-22	.00
2004-04-23	.15
2004-04-24	.00
2004-04-25	.00
2004-04-26	.00
2004-04-27	.00

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*This page was generated on 2004-09-24*

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**WSU Public Agricultural Weather System**

Data Extracted:2004-09-24 11:10:05  
[CBC-PASCO, on CBC Campus, Pasco, Wa](#)  
 Lat:46.2 Lng:119.1 elevation:339  
 Dates Range From 1995-06-22 To 2004-09-23

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Precipitation											
1.0	.8	.6	.4	.5	.3	.3	.0	.2	.5	.9	1.1

Data Extracted:2004-09-24 11:10:07  
[SUNNYSIDE, 4.2 MI N of Sunnyside, Wa](#)  
 Lat:46.3 Lng:119.9 elevation:876  
 Dates Range From 1989-01-01 To 2004-09-23

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Precipitation											
.7	.6	.5	.7	.8	.6	1.4	1.0	.3	.5	.7	.9

Data Extracted:2004-09-24 11:10:08  
[WALLA WALLA, 1 MI E of Walla Walla, Wa](#)  
 Lat:46.0 Lng:118.2 elevation:1186  
 Dates Range From 1992-07-22 To 2004-09-23

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Precipitation											
1.8	1.4	1.4	1.6	2.2	2.2	1.8	2.1	1.8	1.7	1.9	1.6

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# Appendix C

## STATUS REPORT 2003 Best Available Control Measures for Columbia Plateau Agriculture January, 2004

### Summary

This report fulfills Ecology's commitment to review and report annually on the use of Best Available Control Measures (BACM) in the Columbia Plateau. Ecology committed to provide such a report to the Environmental Protection Agency (EPA) in the revised Natural Events Action Plan (NEAP).

The level of Conservation Reserve Program (CRP) and Best Management Practice (BMP) use has increased from 68 to 70 percent in the priority counties of the Columbia Plateau. Seventy percent of the total farmable acres in these counties are now part of a United States Department of Agriculture (USDA) conservation program, use one of the minimum till practices, or contain 15-30% residue. Washington State finds this level of CRP and BMP implementation fulfills BACM criteria.

### Background

EPA issued the policy on "Areas Affected by PM-10 Natural Events," or the Natural Events Policy (NEP), on May 30, 1996. Under the NEP, ambient PM<sub>10</sub> concentrations raised by unusually high winds may be treated as uncontrollable natural events when the dust originates from nonanthropogenic sources, or when the dust originates from contributing anthropogenic sources controlled with BACM. After natural events cause the PM<sub>10</sub> concentration to violate the PM<sub>10</sub> National Ambient Air Quality Standard, the NEP allows a state to develop a natural events action plan (NEAP) to deal with future exceedances.

A number of exceedances of the 24-hour standard for PM<sub>10</sub> were recorded in eastern Washington in the late 1980s and early 1990s. Examination of the exceedances showed a close correlation to high wind events and upwind agricultural fields were identified as the chief source of the wind-blown dust. The Washington State Department of Ecology (Ecology) developed the *Natural Events Action Plan for High Wind Events in the Columbia Plateau* in March 1998, and submitted it to Region 10 EPA, in accordance with the NEP.

The 1998 NEAP included Ecology's commitment to re-evaluate the NEAP at the end of 2001. The 2001 evaluation is embodied in the revised NEAP submitted to EPA in July, 2003. Several changes were incorporated into the revised NEAP including Ecology's commitment to review and report to EPA annual BACM implementation.

### BACM Definition and Tracking Mechanism

The revised NEAP defines BACM for agricultural fields as USDA Conservation Title Programs supplemented by incentive based implementation of wind erosion conservation practices or

BMPs. In short, the BACM definition recognizes the critical role of agricultural agencies in defining and instituting BACM on the Columbia Plateau. The primary agencies include those directly reporting to the USDA such as the Natural Resources Conservation Service (NRCS), the Farm Service Agency (FSA), and the Agricultural Research Service (ARS). Additional agricultural agencies include the Washington State Conservation Commission, local Conservation Districts and various agriculture related departments of the Washington State University. The NEAP acknowledges the combined expertise of these agencies and relies on the various programs of these agencies in implementing the conservation practices that constitute BACM.

For defining BACM, the NEAP uses the USDA's CRP program and the wind erosion BMPs encouraged by NRCS and/or the Columbia Plateau Wind Erosion /Air Quality Project (referred to as the CP3). Use of these practices is tracked by the Conservation Technology Information Center's (CTIC), Core 4 program. The CTIC's Core 4 program tracks conservation tillage (No-Till, Ridge-Till, Mulch-Till) and conventional tillage (0-15% and 15-30% residue) practices and CRP enrollment on a county by county basis.

A full discussion on Ecology's BACM definition and tracking mechanism may be found in the revised NEAP.

### **STATUS REPORT: 2003 BACM**

The 2003 NEAP determined BACM is implemented in the Columbia Plateau based on 68 percent use of conservation practices. Attachment 1 shows the implementation of conservation practices for the seven priority counties, as defined in the NEAP. These counties have the lowest rainfall and thus are the most susceptible to windblown dust.

Data evaluated is for the year 2002, the most recent year for which data is available. The evaluation includes data on CRP, minimum tillage, and residue remaining on the field for the lowest rainfall counties of the Columbia Plateau - counties Ecology finds to be high priority in terms of addressing wind blown dust. Ecology identified Adams, Douglas, Franklin, Grant and Lincoln as priority counties in the 1998 NEAP. Benton and Walla Walla counties were added to the list more recently. The Core 4 data shows 70 percent of the priority counties' total farmable acres are in a USDA conservation program, use one of the minimum till practices, or contain 15-30% residue.

Similarly, attachment 2 shows the implementation of conservation practices for all counties of the Columbia Plateau NEAP. The data shows 71 percent use of conservation practices throughout the Columbia Plateau.

The results are consistent with the 2003 NEAP determination and show that we continue to meet BACM requirements.

### **Additional Efforts to Enhance Wind Erosion Conservation Measures**

Ecology is continuing to work with the various agricultural agencies to enhance the use of conservation practices in the Columbia Plateau. In doing so, implementation of wind erosion conservation measures is enhanced beyond that tracked and reported by the Core 4. For

example, Ecology contracted with the Benton Conservation District (BCD) for tasks associated with a special funds grant from the EPA. The goal of the project is twofold: to provide immediate, temporary treatment to critical areas and to promote other options for longer-term or permanent wind erosion control measures identified in the CP3.

The first goal is addressed by the purchase of a straw mulcher and cost share straw for use in the Horse Heaven Hills of Benton County. To date, the straw mulcher has been used by eight different farm operators. They have applied roughly 556 tons of grass straw on about 275 acres of "hot spots" (highly erodible areas). An additional 150 tons was applied without project-supplied cost-share. In total, roughly 706 tons of straw were applied to highly erodible areas in an effort to protect against the occurrence of windblown dust.

Education and outreach will address the second goal. The outreach will focus on installing wind erosion conservation buffers as a longer-term solution to wind erosion. Ecology, the BCD, the NRCS and the CTIC will conduct the outreach in the winter of 2004.

Moreover, Ecology's Water Quality Program recently awarded two funding requests that will enhance wind erosion control measures on the Columbia Plateau. The objectives of both water and wind erosion control are to prevent or minimize soil particle detachment and entrainment by the medium (air or water.) Consequently, conservation practices to reduce the effects from both types of erosion are substantially similar. For this reason, air quality is improved when conservation measures to reduce water erosion are increased.

The Water Quality Program awarded the Spokane County Conservation District a \$2,000,000 low interest State Revolving Fund loan for its Eastern Washington Conservation Tillage Program. This program promotes the implementation of direct seeding in Whitman and Asotin Counties, resulting in decreased erosion and improved water infiltration. The low interest loans provided to agricultural producers will facilitate the purchase of direct seeding equipment, making the transition to conservation tillage economically feasible. Direct seeding is recognized by both the CP3 and the NRCS as an effective wind erosion control measure.

Similarly, the Franklin Conservation District was awarded a \$250,000 Centennial Clean Water Fund grant to install perennial wheat erosion buffers. This project is designed to address water and soil runoff from fallow fields in dryland farm areas of Franklin and Whitman Counties. Erosion events increase sediments and contaminants in eastern Washington streams. Perennial wheat will be evaluated as an erosion control method, compared to conventional wheat/fallow and CRP cultivations. Conservation buffers, too, are recognized by both the CP3 and the NRCS as an effective wind erosion control measure.

## **Conclusion**

Ecology and the identified agricultural agencies continue to carry out the Columbia Plateau NEAP. Ecology finds the level of CRP and BMP implementation identified in this report continues to fulfill BACM criteria. Ecology will continue to document natural events and flag exceedances when justified under the terms of the 2003 NEAP.



## 2003 BACM Status Report: Columbia Plateau

		BACM (component 1)	BACM (component 2) - ADDITIONAL CONSERVATION MEASURES APPLIED				BACM total (components 1 & 2)	
		CRP	No-Till	Ridge-Till	Mulch-Till	15-30% Residue.	acres	% acres
<b>Adams</b>								
HEL withdrawn from production	212,524	212,524					212,524	100.00%
Fallow acres	226,183		11,878	0	11,878	11,397	35,153	15.54%
Planted acres	377,167		31,562	2,675	43,537	42,688	120,462	31.94%
Total farmable acres	815,874	26%	43,440	2,675	55,415	54,085	368,139	45.12%
<b>Asotin</b>								
HEL withdrawn from production	28,648	28,648					28,648	100.00%
Fallow acres	13,754		3,000	0	2,000	8,754	13,754	100.00%
Planted acres	31,035		650	0	9,235	11,650	21,535	69.39%
Total farmable acres	73,437	39%	3,650	0	11,235	20,404	63,937	87.06%
<b>Benton</b>								
HEL withdrawn from production	75,019	75,019					75,019	100.00%
Fallow acres	131,488		3,550	0	0	67,979	71,529	54.40%
Total planted acres	232,100		2,488	0	2,212	124,202	128,902	55.54%
Total farmable acres	438,607	17%	6,038	0	2,212	192,181	275,450	62.80%
<b>Chelan</b>								
HEL withdrawn from production	1,373	1,373					1,373	100.00%
Fallow acres	391		0	0	0	391	391	100.00%
Total planted acres	391		0	0	0	391	391	100.00%
Total farmable acres	2,155	64%	0	0	0	782	2,155	100.00%
<b>Columbia</b>								
HEL withdrawn from production	38,269	38,269					38,269	100.00%
Fallow acres	28,253		8,467	0	5,651	0	14,118	49.97%
Total planted acres	119,622		27,481	0	3,096	25,483	56,060	46.86%
Total farmable acres	186,144	21%	35,948	0	8,747	25,483	108,447	58.26%
<b>Douglas</b>								
HEL withdrawn from production	187,733	187,733					187,733	100.00%
Fallow acres	245,153		0	0	15,514	100,000	115,514	47.12%
Total planted acres	183,770		4,929	0	53,685	75,275	133,889	72.86%
Total farmable acres	616,656	30%	4,929	0	69,199	175,275	437,136	70.89%
<b>Ferry</b>								
HEL withdrawn from production	1,091	1,091					1,091	100.00%
Fallow acres	500		0	0	0	200	200	40.00%
Total planted acres	4,650		0	0	0	2,950	2,950	63.44%
Total farmable acres	6,241	17%	0	0	0	3,150	4,241	67.95%
<b>Franklin</b>								
HEL withdrawn from production	104,417	104,417					104,417	100.00%
Fallow acres	63,000		0	0	0	59,100	59,100	93.81%
Total planted acres	269,900		0	0	9,950	121,977	131,927	48.88%
Total farmable acres	437,317	24%	0	0	9,950	181,077	295,444	67.56%
<b>Garfield</b>								
HEL withdrawn from production	44,527	44,527					44,527	100.00%
Fallow acres	45,545		12,780	0	11,727	14,617	39,124	85.90%
Total planted acres	111,794		38,001	0	32,637	9,038	79,676	71.27%
Total farmable acres	201,866	22%	50,781	0	44,364	23,655	163,327	80.91%
<b>Grant</b>								
HEL withdrawn from production	60,747	60,747					60,747	100.00%
Fallow acres	102,000		1,020	0	24,480	60,180	85,680	84.00%
Total planted acres	342,700		5,310	0	59,290	101,340	165,940	48.42%

<b>Kittitas</b>		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
HEL withdrawn from production	3,294	3,294					3,294	100.00%
Fallow acres	3,100		0	0	0	2,480	2,480	80.00%
Planted acres	18,300		0	0	0	5,738	5,738	31.36%
Total farmable acres	24,694	13%	0	0	0	8,218	11,512	46.62%
<b>Klickitat</b>		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
HEL withdrawn from production	57,925	57,925					57,925	100.00%
Fallow acres	22,028		0	0	0	16,080	16,080	73.00%
Planted acres	69,451		30,963	0	0	31,003	61,966	89.22%
Total farmable acres	149,404	39%	30,963	0	0	47,083	135,971	91.01%
<b>Lincoln</b>		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
HEL withdrawn from production	86,330	86,330					86,330	100.00%
Fallow acres	239,832		23,983	0	83,941	119,916	227,840	95.00%
Total planted acres	483,639		47,182	0	175,071	230,057	452,310	93.52%
Total farmable acres	809,801	11%	71,165	0	259,012	349,973	766,480	94.65%
<b>Okanogan</b>		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
HEL withdrawn from production	4,057	4,057					4,057	100.00%
Fallow acres	7,151		0	0	0	3,933	3,933	55.00%
Total planted acres	25,425		0	0	0	18,372	18,372	72.26%
Total farmable acres	36,633	11%	0	0	0	22,305	26,362	71.96%
<b>Pend Oreille</b>		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
HEL withdrawn from production	0	0%					0	NA
Fallow acres	184		0	0	0	0	0	0.00%
Total planted acres	641		0	0	0	315	315	49.14%
Total farmable acres	825	0%	0	0	0	315	315	38.18%
<b>Spokane</b>		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
HEL withdrawn from production	32,033	32,033					32,033	100.00%
Fallow acres	225,203		11,260	0	45,041	135,122	191,423	85.00%
Total planted acres	224,672		17,133	0	53,535	104,542	175,210	77.98%
Total farmable acres	481,908	7%	28,393	0	98,576	239,664	398,666	82.73%
<b>Stevens</b>		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
HEL withdrawn from production	3,552	3,552					3,552	100.00%
Fallow acres	6,000		0	0	0	4,020	4,020	67.00%
Total planted acres	29,100		711	0	7,061	15,699	23,471	80.66%
Total farmable acres	38,652	9%	711	0	7,061	19,719	31,043	80.31%
<b>Walla Walla</b>		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
HEL withdrawn from production	148,578	148,578					148,578	100.00%
Fallow acres	120,084		12,000	0	60,042	33,023	105,065	87.49%
Total planted acres	295,888		29,343	0	99,662	91,884	220,889	74.65%
Total farmable acres	564,550	26%	41,343	0	159,704	124,907	474,532	84.05%
<b>Whitman</b>		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
HEL withdrawn from production	135,755	135,755					135,755	100.00%
Fallow acres	172,000		30,000	0	20,000	61,000	111,000	64.53%
Total planted acres	733,170		90,650	0	96,000	281,800	468,450	63.89%
Total farmable acres	1,040,925	13%	120,650	0	116,000	342,800	715,205	68.71%
<b>Yakima</b>		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
HEL withdrawn from production	53,727	53,727					53,727	100.00%
Fallow acres	9,175		0	0	0	3,853	3,853	41.99%
Total planted acres	66,770		0	0	4,224	16,903	21,127	31.64%
Total farmable acres	129,672	41%	0	0	4,224	20,756	78,707	60.70%
<b>SUMMARY</b>		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
Total farmable acres	6,560,808	1,279,599	444,341	2,675	929,469	2,013,352	4,669,436	
		20%	7%	0%	14%	31%		71%

## 2003 BACM Status Report: Columbia Plateau Priority Counties

		<b>BACM (component 1)</b>	<b>BACM (component 2) - ADDITIONAL CONSERVATION MEASURES APPLIED</b>				<b>BACM total (components 1 &amp; 2)</b>	
		<b>CRP</b>	<b>No-Till</b>	<b>Ridge-Till</b>	<b>Mulch-Till</b>	<b>15-30% Residue.</b>	<b>acres</b>	<b>% acres</b>
<b>Adams</b>								
HEL withdrawn from production	212,524	212,524					212,524	100.00%
Fallow acres	226,183		11,878	0	11,878	11,397	35,153	15.54%
Planted acres	377,167		31,562	2,675	43,537	42,688	120,462	31.94%
Total farmable acres	815,874	<b>26%</b>	43,440	2,675	55,415	54,085	368,139	<b>45.12%</b>
<b>Benton</b>								
HEL withdrawn from production	75,019	75,019					75,019	100.00%
Fallow acres	131,488		3,550	0	0	67,979	71,529	54.40%
Total planted acres	232,100		2,488	0	2,212	124,202	128,902	55.54%
Total farmable acres	438,607	<b>17%</b>	6,038	0	2,212	192,181	275,450	<b>62.80%</b>
<b>Douglas</b>								
HEL withdrawn from production	187,733	187,733					187,733	100.00%
Fallow acres	245,153		0	0	15,514	100,000	115,514	47.12%
Total planted acres	183,770		4,929	0	53,685	75,275	133,889	72.86%
Total farmable acres	616,656	<b>30%</b>	4,929	0	69,199	175,275	437,136	<b>70.89%</b>
<b>Franklin</b>								
HEL withdrawn from production	104,417	104,417					104,417	100.00%
Fallow acres	63,000		0	0	0	59,100	59,100	93.81%
Total planted acres	269,900		0	0	9,950	121,977	131,927	48.88%
Total farmable acres	437,317	<b>24%</b>	0	0	9,950	181,077	295,444	<b>67.56%</b>
<b>Grant</b>								
HEL withdrawn from production	60,747	60,747					60,747	100.00%
Fallow acres	102,000		1,020	0	24,480	60,180	85,680	84.00%
Total planted acres	342,700		5,310	0	59,290	101,340	165,940	48.42%
Total farmable acres	505,447	<b>12%</b>	6,330	0	83,770	161,520	312,367	<b>61.80%</b>
<b>Lincoln</b>								
HEL withdrawn from production	86,330	86,330					86,330	100.00%
Fallow acres	239,832		23,983	0	83,941	119,916	227,840	95.00%
Total planted acres	483,639		47,182	0	175,071	230,057	452,310	93.52%
Total farmable acres	809,801	<b>11%</b>	71,165	0	259,012	349,973	766,480	<b>94.65%</b>
<b>Walla Walla</b>								
HEL withdrawn from production	148,578	148,578					148,578	100.00%
Fallow acres	120,084		12,000	0	60,042	33,023	105,065	87.49%
Total planted acres	295,888		29,343	0	99,662	91,884	220,889	74.65%
Total farmable acres	564,550	<b>26%</b>	41,343	0	159,704	124,907	474,532	<b>84.05%</b>
<b>SUMMARY</b>								
Total farmable acres	4,188,252	875,348	173,245	2,675	639,262	1,239,018	2,929,548	
		<b>21%</b>	<b>4%</b>	<b>0%</b>	<b>15%</b>	<b>30%</b>		<b>70%</b>