



## Copy Paper Report

### Fiscal Year 2008

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### *Executive Summary*

Copy paper is currently a big part of life at Portland State University. From purchasing and printing to recycling, how we deal with paper signals environmental and economic fitness of the institution. In fiscal year 2008, Portland State University purchased an estimated 147 tons of copy paper, spending at least \$215,835. Of those paper purchases, 36% was virgin paper, another 37% was 30% post-consumer waste (PCW), and 27% was entirely post-consumer content. By adopting best practices for paper use and purchasing, PSU will save money and reduce carbon emissions, while supporting healthier ecosystems.

### *Background*

The digital revolution promised an end to paper waste. Instead, it has made printing much easier, and paper use in America has proliferated. Because of this conundrum, public agencies have begun to actively promote new habits among employees and shift purchasing practices to lighten their impacts on forested watershed ecosystems.

At the Federal level, the Resource Conservation and Recovery Act requires all agencies that receive federal funds and spend over \$10,000 on an item, like copy paper, to purchase that item with recovered materials. For copy paper, the EPA currently requires a minimum of 30% post-consumer content (Appendix C, Section 1). At the state level, Executive Order 98-07 encourages state agencies to reduce waste and purchase materials with recycled content.<sup>1</sup> Locally, the City of Portland has a three-pronged policy: reducing paper consumption, purchasing paper that meets and improves upon the EPA's minimum standard, and implementing paper-tracking systems (Appendix C, Section 2).

The City of Seattle is another leader. Mayor Greg Nickels challenged city departments to reduce paper consumption by 30%. Savings were used to purchase regionally produced, high-quality paper. All City paper, including bills, envelopes, etc., contain 100% post-consumer recycled content and are manufactured in Grays Harbor, Washington (Appendix C, Section 3).

### *PSU Paper Study*

This report is a first attempt to track copy paper consumption at PSU. Since offices make individual purchasing decisions using a decentralized system, the Campus Sustainability Office contacted four main vendors to determine the quantity and kinds of copy paper PSU offices use. Calculation methods can be found in Appendix B. This is a "best estimate" of PSU copy paper use –not exact numbers. There may be small vendors who serve the campus, but are not taken into consideration. This study will be improved upon and repeated every three years to track conservation progress. Suggestions for improving research methods may be sent to [GreenCampus@pdx.edu](mailto:GreenCampus@pdx.edu).

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<sup>1</sup> [http://arcweb.sos.state.or.us/governors/Kitzhaber/web\\_pages/governor/legal/execords/eo98-07.pdf](http://arcweb.sos.state.or.us/governors/Kitzhaber/web_pages/governor/legal/execords/eo98-07.pdf)

## Results

In fiscal year 2008, PSU purchased at least 147 tons of copy paper. If this were assembled into a stack, the pile would be 1.9 miles high, or 90% the height of Mt. Hood (Appendix B, Section 2). In the absence of University guidance, post-consumer recycled content of this paper varies, as shown in Figure 1. 36% of the paper purchased contains no recycled content and is out of compliance with Oregon state law. The full set of data can be found in Appendix D.

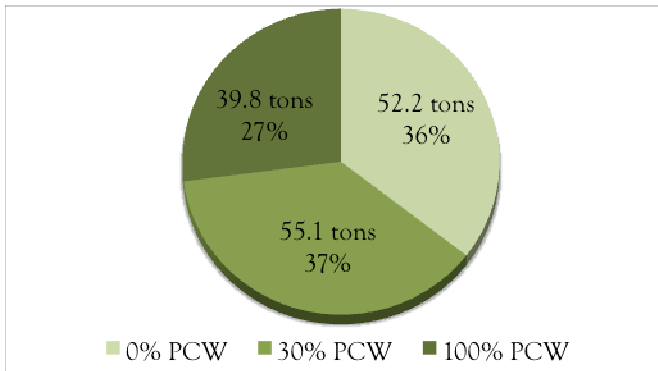


Figure 1: Post-consumer content of PSU's paper purchases

The figure below displays sample purchasing choices of top-consuming departments. Because PSU lacks a recycled content purchasing policy, there is great variability in PCW content.

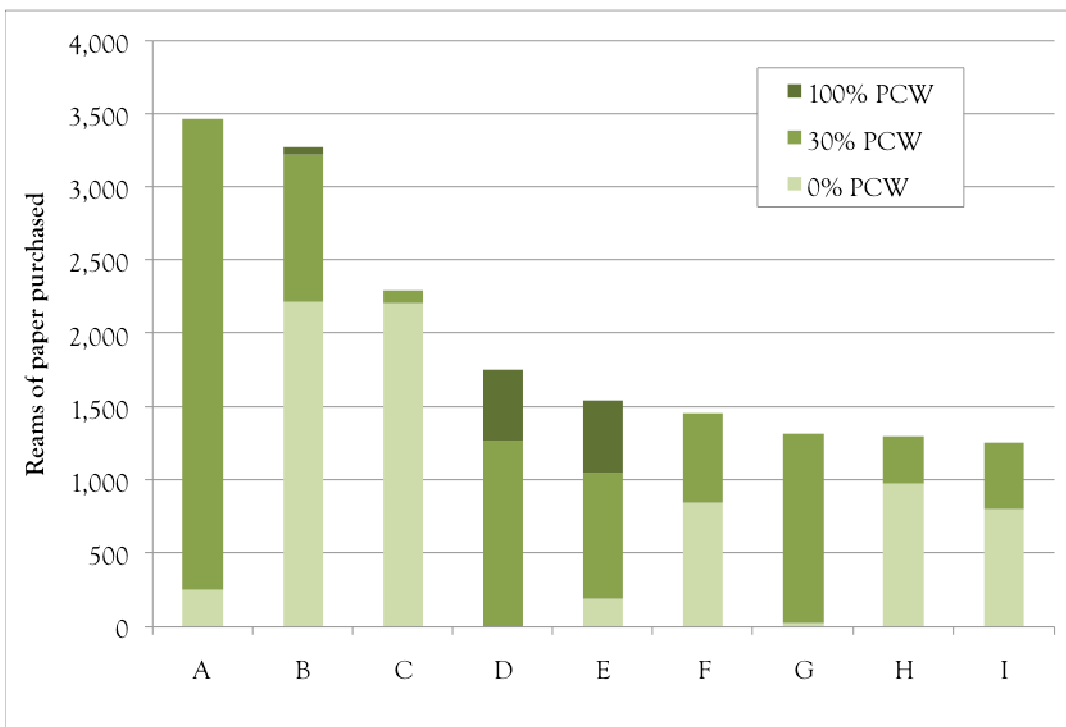


Figure 2: Post-consumer content of paper purchases by nine offices in FY 2008.

## Financial Impacts

Copy paper expenditures in FY08 totaled \$215,835. The top ten offices purchased in the range of \$4,000 to \$12,000 (not including the paper purchased for labs with the Information Technology Fee). 109 departments were included in this study. This indicates that many departments are making relatively small purchases that add up to a large total expenditure for PSU.

Table 1: Expenditures for top-consuming departments

Dept	Total Reams	\$ Total	Dept	Total Reams	\$ Total	Dept	Total Reams	\$ Total
TEC	11,211	\$45,487.33	D	1,755	\$6,459.16	H	1,299	\$4,745.84
A	3,468	\$12,125.84	E	1,542	\$5,678.10	I	1,253	\$4,080.52
B	3,276	\$11,019.58	F	1,454	\$4,913.96	J	1,183	\$3,690.88
C	2,295	\$8,050.83	G	1,317	\$4,870.79			

### Social Impacts

Due to a lack of data specificity, it is not possible to identify the mills from which PSU paper originated. Therefore, it is unclear how many Pacific Northwest jobs were supported by PSU purchases. We cannot identify how the paper was transported from the mills to campus. We do not know the labor practices of the companies that supplied PSU with paper.

### Environmental Impacts

In general, environmental impacts of purchased goods are not easily calculated. Impacts of paper, however, have been researched extensively, and the Environmental Defense Fund's Paper Calculator, Environmental Protection Agency (EPA), and Conservatree have been helping businesses understand the environmental impacts of copy paper for several years (Appendix B, Section 3). Because fairly reliable data are available, paper is the only commodity purchase that appears in PSU's Climate Action Plan (Appendix C, Section 4). Table 2 summarizes the impacts of PSU's paper consumption, including the release of 330 metric tons of greenhouse gasses. Table 3 reveals the purchasing choices of the top-consuming departments (excluding the paper purchased by the Information Technology fee for student printing, which is almost all 100% PCW).

Table 2: Impacts of PSU's copy paper use

Recycled Content of Purchased Paper	0% PC	30% PC	100% PC	Total
Paper purchased in FY08 (tons)	52.2	55.1	39.8	147.1 tons
Trees consumed	1,253	926	0	2,178 trees
CO <sub>2</sub> emissions (metric tons)	140	129	62	330 metric tons
Equiv. to gas consumed (gallons)	15,711	14,499	6,957	37,165 gallons
Net Energy (million BTU's)	1,562	1,513	863	3,938 BTUs
Solid Waste (lbs)	99,711	93,322	47,291	240,324 lbs
Wastewater (gallons)	1,160,713	1,028,843	412,378	2,601,934 gallons
Nitrogen oxides (lbs)	460	477	332	1,269 lbs
Sulfur dioxide (lbs)	1,331	1,386	971	3688 lbs
Hazardous Air Pollutants (lbs)	141	118	34	293 lbs
Particulates (lbs)	283	261	124	668 lbs

## Recommendations

### **No. 1 Priority: Adopt best paper use practices**

*Goal: Cut paper use 30% before 2015*

Reduce paper use through improved printing habits, digital information transfer, electronic filing, and streamlined business forms/processes to align with Executive Order 98-07. Departments will save money, which can be used to pay the premium for higher recycled content in copy paper. Table 3 shows four different purchasing scenarios: the cost of purchasing paper at FY08 levels and the savings associated with cutting paper use by 30% while purchasing different amounts of recycled content.

- Suggested Policies:
  1. All new printers shall be capable of automatic duplex printing.
  2. All existing printers shall be set to duplex by default
- Steps:
  1. Share information
    - a. Establish a webpage listing paper-saving strategies
    - b. Offer trainings
  2. Launch a competition in 2011 with prizes for the departments that significantly reduce paper consumption to motivate and encourage innovation.

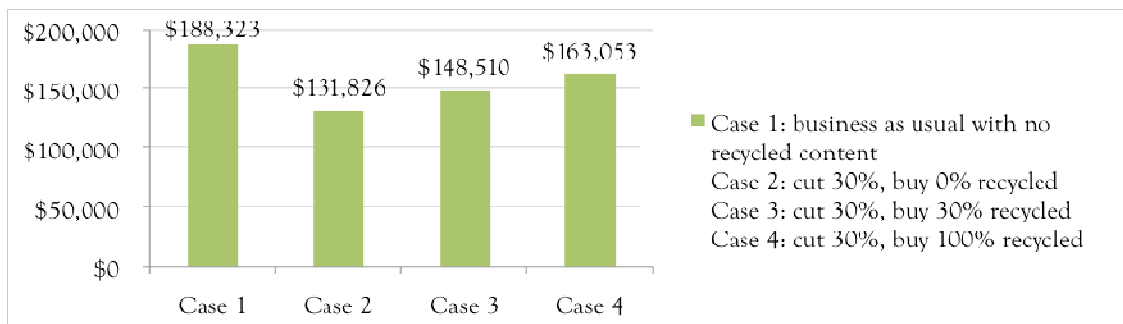


Figure 3: Cost analysis of four scenarios involving reduction in paper consumption and PCW (Appendix B, Section 4)

### **No. 2 Priority: Buy better paper, more strategically.**

*Goal: By 2012, 100% of departments will purchase at least 50% PCW with a preference for paper that is 100% PCW and processed chlorine free (PCF) (Appendix A, Section 1).*

- Suggested Policy:
  1. All paper purchased by PSU departments must contain at least 30% post-consumer content effective September 1, 2010.
- Steps:
  1. Identify the most inexpensive means to purchasing high-quality, high-PCW content paper.
  2. Identify public contracts that PSU can use to purchase paper: State of Oregon, Multnomah County, the City of Portland. If no contracts are available, consider issuing a paper RFP for paper that includes annual reports. Include runability tests to determine which brands of 100% PCW work best, to address staff concerns about jamming rates of 100% PCW.
  3. Train departments in the proper handling and storage of paper and copy machines to reduce jamming (Appendix C, Section 5).
  4. Educate office coordinators about paper purchasing options.

### **No. 3 Priority: Establish a paper tracking system to enable PSU to understand the impact of paper purchases on regional jobs, air/water quality, and finances.**

## Appendix A – Definitions

1. **Alternative bleaching processes** – “Bleaching with elemental chlorine was once the industry’s preferred method for processing paper. However, using elemental chlorine produces chlorinated organic compounds, such as dioxins and furans, which have significant impacts for human health and the environment. Dioxins, for example, do not break down when discharged in water. Dioxins travel up the food chain, accumulating in the fatty tissues of fish, sea birds, and humans. Dioxins are a known human carcinogen and numerous research studies connect them with endocrine, reproductive, nervous, and immune system damage.”
  - a. **Elemental Chlorine Free (ECF)** – “Because of dioxin concerns, most paper producers have switched to bleaching with a chlorine derivative, such as chlorine dioxide, in a process known as elemental chlorine-free (ECF) bleaching. Although ECF bleaching reduces some dioxins by up to 90 percent over traditional chlorine bleaching, it does not eliminate them.”
  - b. **Process Chlorine Free (PCF)** – *preferred* – “Totally chlorine-free” (TCF) papers are also available that produce no dioxins or chlorinated toxic pollutants during the manufacturing phase because chlorine is not used in any part of the production process. Unfortunately, TCF papers containing post-consumer recycled content are unavailable because the recycled-content paper pulp was most likely originally bleached with chlorine. As a result, most TCF papers are made from virgin wood although some TCF tree-free papers are commercially available.”
  - c. **Totally Chlorine Free (TCF)** – “To further reduce dioxin emissions, some paper manufacturers and purchasers are switching to process chlorine-free (PCF) methods in which new recycled-content paper is bleached without the use of any chlorine or chlorine derivatives. While some dioxin might be released during this process because the recycled papers were originally bleached with chlorine or chlorine derivatives, no additional dioxin is produced with the PCF method. PCF papers with high post-consumer recycled content (30 percent or greater) are generally the most preferable because they are affordable, contain recycled content, and are, for all practical purposes, chlorine-free.”
2. **FSC-certified papers**– Paper manufacturers that have permission to use the Forest Stewardship Council logo provide paper products that have been tracked through the FSC chain of custody. This ensures that the forest, paper producer, paper merchant and printer meet strict sustainable guidelines.
3. **Recycled content** – waste materials and by-products that have been diverted from the solid waste stream; includes pre- and post-consumer materials.
  - a. **Pre-consumer waste** – recovered material that does not come in contact with end-use consumer; includes waste left over from manufacturing, converting and printing processes.
  - b. **Post-consumer waste (PCW)** - material recovered from a consumer product at the end of its life, diverted from waste destined for disposal and used again in the manufacturing of a product (in this report, refers to post-consumer recycled content)
4. **Second use paper** – Paper that has been printed on one side already.
5. **Tree-free materials** – “Non-wood, alternative fibers primarily derived from annual crops, either grown intentionally for paper or abundant by-products of food and fiber production. Because they only grow for one season, these crops do not develop the high levels of lignins that bind tree cellulose fibers together. This means tree-free fibers can be pulped with significantly fewer chemicals, fewer stages of bleaching, using less energy and water, making tree-free fibers more environmentally advantageous than wood-based varieties. Most of these crops can be blended with post-consumer materials to create quality papers for a variety of applications. Examples include Bamboo, Kenaf, and Hemp.”
6. Definitions of PCW paper and bleaching processes taken from Responsible Purchasing Network in 2007 [http://www.responsiblepurchasing.org/purchasing\\_guides/copy\\_paper/definitions/](http://www.responsiblepurchasing.org/purchasing_guides/copy_paper/definitions/)

## Appendix B – Methods

### 1. Copy paper data

- a. Obtained from PSU’s four main vendors – Corporate Express, Office Depot, Office Max, and Staples – for July 1, 2007 through June 30, 2008.

	PSU copy paper purchases in FY08
Office Depot	\$102,499
Corporate Express	\$87,566
Staples	\$14,940
Office Max	\$10,830

- b. 30% post-consumer content paper includes paper with 25%, 35%, and 50% post-consumer content. 25% PC paper made up 0.35% of total PSU FY08 purchases; 35% PC paper made up 0.14%; 50% PC paper made up 0.04%
- c. Units of quantity verified with vendors. All reams have been standardized to 1 ream = 500 sheets. Units that could not be verified against vendors’ catalogs were assumed as follows: 1 ream = 500 sheets, 1 carton = 5000 sheets.

### 2. To calculate the height of PSU’s paper purchases in FY08, we used the following:

- a. A typical ream of copy paper is 20 lb paper and 2 inches thick
- b. Mt. Hood is 2.13 miles high

### 3. Environmental impacts

- a. To compare the environmental impacts of different post-consumer contents, we used the Environmental Defense Fund’s Paper calculator: <http://www.papercalculator.org>
- b. To determine how many trees were consumed for each type paper, we used Conservatree’s Tree Statistics
  - i. “Claudia Thompson, in her book Recycled Papers: The Essential Guide (Cambridge, MA: MIT Press, 1992), reports on an estimate calculated by Tom Soder, then a graduate student in the Pulp and Paper Technology Program at the University of Maine. He calculated that, based on a mixture of softwoods and hardwoods 40 feet tall and 6-8 inches in diameter, it would take a rough average of 24 trees to produce a ton of printing and writing paper, using the kraft chemical (freesheet) pulping process. One ton of uncoated virgin (non-recycled) printing and office paper uses 24 trees.”
  - ii. Conservatree – “Trees into Paper”  
<http://www.conservatree.org/learn/Envirolssues/TreeStats.shtml>
  - iii. Calculations:
    1. 0% PC: 24 trees/ton of paper
    2. 30% PC: only 70% of the weight requires trees. So  $0.70 \times 24$  trees/ton of paper
    3. 100% PC: requires no trees
- c. To calculate the carbon emission equivalencies in terms of gallons of gas burned, we used the EPA’s Greenhouse Gas calculator: <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>

### 4. Paper scenarios

- a. Prices from Jan 2010 Office Depot with Portland State University discount, according to Timothy Waugh in the Business Affairs Office. Office Depot provides 47% of PSU’s copy paper needs. Lowest price per case:
  - i. 0% PCW: \$32.00
  - ii. 30% PCW: \$36.05
  - iii. 100% PCW: \$39.58
- b. Business as usual: amount of paper purchased in FY08 – 58,851 reams (5,885 cases)

## Appendix C – Resources

1. **Executive Order 13101 – Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition**
  - a. signed by President Clinton in 1998
  - b. Full document <http://www.epa.gov/fedreg/eo/eo13101.htm>
2. **City of Portland Sustainable Paper Use Policy**
  - a. Summary: <http://www.portlandonline.com/bps/index.cfm?c=44621&a=156805>
    - i. Paper use represents one of the City’s largest consumption of a material resource. In 2003, City Council adopted the Sustainable Paper Use Policy directing all affected City Bureaus to take actions necessary to incorporate sustainable practices into paper procurement, use and disposal. Specifically:
    - ii. Reduce overall printing and writing paper consumption by 15% by 2008;
    - iii. By July 2004 all paper products purchased by the City shall at minimum meet the U.S. Environmental Protection Agency’s (EPA) recommendations for recycled content;
    - iv. By July 2004 10% of paper products purchased by the City shall exceed the EPA recycled content minimum or is an alternative environmentally preferable paper (AEPP) as defined by the policy;
    - v. Gives preference to paper products that have been processed chlorine free (PCF) or totally chlorine free (TCF) with the goal that by July 2004 all paper products procured by the City will be PCF or TCF;
    - vi. Track consumption of copy, printing, and writing papers and create Bureau-level strategies for reducing paper consumption.
  - b. In full: <http://www.portlandonline.com/shared/cfm/image.cfm?id=24521>
3. **City of Seattle Recycled Content Product Procurement Program**
  - a. **“SMC 20.60.218 Rules and regulations for procurement of paper and paper products including the following provisions.**
    - A. The Director and departments shall purchase and/or use only recycled-content paper for all imprinted letterhead, envelope and business card paper, file folders, writing and message tablets, photocopy paper, sanitary papers, packaging papers, and printing papers. In addition, the Director and departments shall purchase recycled-content photocopy paper that has not been bleached with a chlorine-based lighting process, including elemental chlorine gas, chlorine dioxide, or hypochlorite when nonchlorinated bleached photocopy paper is readily available and similarly priced.”
  - b. Seattle Municipal Code, Code section number: 20.60.218: <http://clerk.ci.seattle.wa.us/~public/code1.htm>
  - c. For more info on Seattle’s paper use, see <http://www.seattle.gov/papercuts/>
4. **PSU Climate Action Plan**
  - a. see Section 4: Materials for paper consumption
  - b. in full: <http://www.pdx.edu/sustainability/climate-action-plan>
5. **Proper handling and storage of paper and copy machines**
  - a. Avoiding paper jams:
    - i. “Where does the perception that recycled content copier paper jam more come from? A copier can jam for any number of reasons, such as: a bad batch of paper (this happens to non-recycled content paper as well); poor maintenance of copier machine, improper storage of paper (allowing moisture to affect sheets); improper handling of paper (not fanning paper out, not loading paper according to grain, not allowing paper to warm up (or cool down) to match the temperature of the copier room), etc. It has been historically proven that dust in a copier room can contribute significantly to paper jams and problems.”
    - ii. For more tips, see Federal Network for Sustainability: [http://www.federalsustainability.org/initiatives/gfcp\\_faq.htm](http://www.federalsustainability.org/initiatives/gfcp_faq.htm) - copyjams
  - b. Myths about recycled paper:

“Does recycled paper perform competitively in office machines? That is the question we asked paper buyers, paper users, copier and office printer equipment manufacturers, copier service technicians, environmental groups, and technical experts. The answers are surprising.” Conservatree’s Paper Listening Study: <http://www.conservatree.org/paperlisteningstudy/RecyEquip/recyequip.html>
6. **Best Practices for Copy Paper Reduction**
  - a. PSU Green Guide: <http://www.ecowiki.pdx.edu/green-teams.html>
  - b. Portland Green Office Guide: [http://www.pdc.us/pubs/inv\\_detail.asp?id=127&ty=46](http://www.pdc.us/pubs/inv_detail.asp?id=127&ty=46)
  - c. Business Guide to Paper Reduction (Tufts U.) <http://sustainability.tufts.edu/downloads/BusinessGuidetoPaperReduction.pdf>
  - d. Microsoft paper-saving settings: <http://office.microsoft.com/en-us/templates/TC102872781033.aspx>

## Appendix D – Data

Dept	0% PCW	30% PCW	100% PCW	Total Reams	Total Cost	Dept	0% PCW	30% PCW	100% PCW	Total Reams	Total Cost
ADM	24	1,293	0	1,317	\$4,871	FAC	0	29	0	29	\$117
AFM	0	40	0	40	\$140	FAD	228	11	0	239	\$981
ALU	22	34	0	56	\$236	FAO	10	198	0	208	\$839
ANT	0	140	0	140	\$429	FAP	243	10	220	473	\$1,809
ARC	322	201	0	523	\$2,447	FLL	200	129	0	329	\$1,339
ART	0	2	500	502	\$1,953	FOU	351	15	0	366	\$1,348
ATH	683	46	0	728	\$2,963	FPA	100	5	1	106	\$385
AUX	680	231	70	981	\$3,397	GGR	290	26	100	416	\$1,414
BAO	190	861	492	1,542	\$5,678	GLG	317	1	0	318	\$1,012
BIO	0	1,044	0	1,044	\$3,649	GSR	21	369	31	421	\$1,532
BOX	0	0	29	29	\$117	HON	0	60	10	70	\$222
BST	181	0	0	181	\$623	HOU	20	41	20	81	\$369
CAR	102	20	0	122	\$527	HRC	6	559	60	625	\$2,259
CDC	1	0	0	1	\$6	HST	0	10	0	10	\$50
CDF	7	268	0	275	\$1,230	IAF	204	17	0	221	\$744
CEN	160	210	60	430	\$1,576	IAS	0	213	50	263	\$1,101
CFA	0	150	0	150	\$534	IEP	20	2	0	22	\$85
CFS	0	10	50	60	\$225	IMS	2	50	10	62	\$235
CHE	61	322	0	383	\$1,379	INT	229	38	0	267	\$988
CMP	430	0	0	430	\$1,322	IOA	0	6	0	6	\$30
CNF	2	156	0	158	\$570	ISP	163	18	0	181	\$625
COM	0	30	0	30	\$100	IST	20	0	0	20	\$62
CSS	122	0	0	122	\$417	JUS	141	0	0	141	\$445
CUS	2	32	53	87	\$383	LAS	352	31	0	383	\$1,254
DEN	1	0	0	1	\$253	LIB	850	604	0	1,454	\$4,914
DEV	280	2	0	282	\$916	LIN	193	5	0	198	\$707
EAS	201	121	0	322	\$1,183	MAX	42	13	10	65	\$226
ECN	390	8	0	398	\$1,228	MPH	11	4	0	15	\$126
EDC	272	109	0	381	\$1,286	MTH	0	1,183	0	1,183	\$3,691
EDU	2,206	89	0	2,295	\$8,051	OAA	0	360	10	370	\$1,146
EEN	471	5	0	475	\$1,499	OCD	0	66	244	310	\$1,321
EEP	0	0	100	100	\$396	OIR	490	4	0	494	\$2,174
EMP	200	8	0	208	\$634	OIS	223	0	10	233	\$755
ENG	1	933	40	974	\$2,901	OMB	0	0	20	20	\$100
ESL	977	322	0	1,299	\$4,746	OSA	40	13	40	93	\$347
ESR	0	0	470	470	\$2,230	PAD	21	70	20	111	\$382

Dept	0% PCW	30% PCW	100% PCW	Total Reams	Total Cost		Dept	0% PCW	30% PCW	100% PCW	Total Reams	Total Cost
PHE	801	452	0	1,253	\$4,081		SPH	232	4	0	236	\$767
PHL	0	131	0	131	\$450		SSS/EOP	162	12	0	174	\$550
PHY	4	536	0	540	\$1,899		SSW	849	240	0	1,089	\$4,334
POF	103	0	0	103	\$319		TAD	110	0	0	110	\$336
POL	0	101	0	101	\$323		TEC	450	31	10,730	11,211	\$45,487
PRC	0	240	50	290	\$1,086		TEL	11	60	20	91	\$324
PRK	56	49	160	265	\$1,139		UGE	5	582	220	807	\$2,905
PSY	0	760	0	760	\$2,661		UPA	0	1,264	491	1,755	\$6,459
RES	120	72	0	192	\$686		USP	120	147	0	267	\$891
RRI	101	57	630	788	\$3,023		VGD	146	5	0	151	\$535
SBA	248	3,220	0	3,468	\$12,126		WSC	202	5	0	207	\$693
SCC	56	690	130	876	\$3,055		XAR	210	165	50	425	\$1,478
SCS	1,051	0	0	1,051	\$3,314		XCD	90	20	0	110	\$358
SDO	467	211	10	688	\$2,509		XIN	38	2	0	40	\$159
SEC	10	0	110	120	\$550		XPC	4	3	0	7	\$43
SHC	6	235	520	761	\$2,865		XPR	0	4	0	4	\$47
SLS	120	7	0	127	\$406		XSS	2,218	1,008	50	3,276	\$11,020
SOC	0	460	0	460	\$1,552		Misc	106	333	14	453	\$1,640
SOG	27	106	0	132	\$540		<b>Total</b>	<b>20,896</b>	<b>22,050</b>	<b>15,905</b>	<b>58,851</b>	<b>\$215,835</b>