



# Persistent Problems Demand Consistent Solutions: Evaluating Policies to Mitigate Occupational Segregation by Gender

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## Abstract

This study focuses on two grant programs administered by the Women's Bureau of the U.S. Department of Labor: the Non-Traditional Employment for Women (NEW) program and Women in Apprenticeships in Non-Traditional Occupations (WANTO). These two grant programs were created to increase the numbers of women in nontraditional fields, and this analysis seeks to determine whether they had effects on women's participation in nontraditional occupations (NTOs): jobs where men dominate, usually blue-collar crafts and skilled trades, though not exclusively crafts and skilled trades. The study finds that WANTO and NEW substantially increased the chances that a woman obtained employment in an NTO.

*JEL classification:* J16; J78; J42; C23

*Keywords:* occupational segregation by gender; employment and training programs for women

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## I. Programs for Women in Nontraditional Occupations (NTOs) from the Women's Bureau

The Women's Bureau of the U.S. Department of Labor is the single unit at the federal level exclusively concerned with serving and promoting the interests of working women. Throughout its history, the bureau has offered programs to expand women's job opportunities through training and other outreach activities. It was established in 1918 to manage female labor deployment; "the sole reserve force of labor to be called upon . . . in the face of the withdrawal of men for military service at the rate of a quarter of a million a month" (Woman in Industry Service 1919: 25). As NTO scholar Brigid O'Farrell (1999:

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699) observed, the current programs to increase women's participation in NTOs represent "the third time the government sought to encourage women into nontraditional fields," the first two being World Wars I and II, when women were needed in factories due to labor shortages.

On average, jobs defined as nontraditional for women bring higher wages, advanced and valuable training, and greater opportunities for advancement. The bureau has compiled lists of NTOs regularly for several years. Appendix A lists NTOs by percentage of women employed in the occupation, as well as several of the occupations targeted by past Women in Apprenticeships in Non-Traditional Occupations (WANTO) and Non-Traditional Employment for Women (NEW) projects. Grant-funded projects have focused on better-paying jobs, for instance, drafting occupations versus meter readers; and jobs that did not require extensive postsecondary schooling, construction occupations versus dentists and physicists. Women supporting themselves and families, either on their own or as part of multiple-earner households, would benefit from increased access to these types of jobs.

Both WANTO and NEW were passed in the early 1990s, under Bush-appointed Women's Bureau Director Elsie Vartanian. Longtime advocacy groups in the Washington, D.C., area drafted the proposals that resulted in these two acts, and Republican Congresswoman Connie Morella provided the leadership to usher these bills through the legislature. That these programs were voluntary, competitive grants to states and community-based organizations and not "unfunded mandates" further increased their appeal to policymakers from across the ideological spectrum.

The Non-Traditional Employment for Women Act (1991) was part of the Job Training Partnership Act (JTPA). NEW created financial incentives for states to establish training programs for low-income women through grants to states and sought to streamline the delivery of services to leverage the resources available for women seeking employment in NTOs. As capacity-building grants, the rationale of NEW was to get states started on an NTO initiative, while long-term financial support of local efforts would be borne by the states themselves. Wisconsin, Ohio, and New Jersey have continued their NTO initiatives at meaningful levels, but for the most part, these states can be considered the exceptions (Mastracci 2003), particularly as state budgets face deficits and have cut programs drastically to balance budgets. When they were implemented, NEW grant monies could be spent in various ways, but the purpose was to encourage state agencies to enhance their services to JTPA-eligible women. NEW grants were competitive, and states submitted proposals describing their plans for initiating NTO-related initiatives over the long term.

The expressed purpose of the Women and Apprenticeships in Non-Traditional Occupations Act (1992) was "to assist businesses in providing women with opportunities in apprenticeship and nontraditional occupations." Unlike NEW, which awarded grant monies to states for the provision of skills training to women interested in nontraditional employment, WANTO funds projects for technical assistance to employers and labor unions to recruit, train, and retain women in NTOs. Whereas the NEW demonstration grants helped state governments launch nontraditional employment programs for women, WANTO grants are awarded to community-based, union, or employer organizations that provide technical assistance to employers and labor unions to prepare *them* to recruit, select, train, and retain women in apprenticeships and NTOs and prevent sexual harassment in the workplace.

## 2. Explaining the Existence of NTOs

Orthodox theory has no explanation for NTOs except to defer to women's tastes and preferences. Rational working women and men would enter training and education programs according to their tastes, preferences, and wage requirements, while employers would hire according to the cost of that worker in terms of her wages and her marginal productivity given the demand for the things the firm produces. Any incidences of mismatch between potential workers and employers would be worked out in the labor marketplace over time. Such faith in the wisdom of the market is blind. Occupational segregation exists and persists, so clearly orthodox theory fails to account for the very problems that WANTO and NEW were created to address.

Alternatively, in segmented labor market theory (SLM), which is part of the larger institutionalist critique, "emphasis . . . is placed on the roles of class struggle, institutional forms and processes, and the sphere of reproduction in labor market structurization, representing an increasingly credible and nuanced alternative to the orthodox paradigm" (Peck 1996). SLM explains the occurrence and persistence of occupational segregation by gender by observing that there is no such thing as a single, freely competitive labor market, no big pot where all workers compete with one another and where the only thing differentiating them is their so-called human capital endowments: their education, experience, and skill sets, which provide employers information about their workplace productivity. Indeed, rather than a freely competitive labor market, internal labor markets exist within capital-intensive industries and in larger firms. An internal labor market is its own hierarchy within a firm where individuals can apply for and obtain new jobs. Most large firms contain good, primary-tier jobs that, for the most part, are only available to current members of the firm, while secondary-tier, entry-level jobs with limited upward mobility are accessible to anyone (Doeringer and Piore 1971; Gordon, Edwards, and Reich 1982). If a woman cannot break through to a primary-tier job with promotion prospects, whether in a firm or an industry, then she cannot compete for job openings because she does not even know about them.

SLM theory is consistent with the empirical evidence, and it provides a theoretical basis for explaining long-term, persistent, and systematic unevenness in the distribution of women and men over occupations. Women do not gain access to NTOs in the primary sector because they *cannot*. Women lack the social capital networks necessary to gain access to and information about primary-tier jobs, and even when women enter higher-mobility jobs, they have been excluded from training, resources, and networking opportunities that would secure their success. Susan Eisenberg (1998: 23) reports, for example, that "while the sons of construction workers knew when and how to apply for apprenticeship programs, women had to make extraordinary efforts to submit applications." Online bulletin boards developed by tradeswomen have been used to create networks in the absence of mentors and support on the job (see particularly [hammeringitout.com](http://hammeringitout.com); [tradeswomennow.org](http://tradeswomennow.org); [iwitts.com](http://iwitts.com); Cathy Stephenson's *The Forbidden Zone: Construction Web site*, *TheForbidden Zone: Construction.net*; and the links and bulletin boards at Marianne C. Rafferty's *Women Operator Web site*, [womanoperator.com](http://womanoperator.com)).

Although NEW and WANTO target many occupations in the trades, the dynamics of exclusion are not restricted to blue-collar jobs: women in the sciences, engineering, and

mathematics have developed alternative networks to generate career-related social capital as well (see [systers.org](http://systers.org), for example). Sue Rosser and Mireille Zieseniss (2000: 95) find that women scientists and engineers seek formal and informal networks to develop camaraderie with other female colleagues, to help them manage priorities, and to learn the “rules of the game to survive in a male-dominated environment” where rules only tend to be shared with junior colleagues who are male. Mary Frank Fox and Vincent Ferri (1992) also find that childbearing, child rearing, and general family caretaking expectations of women are perceived to be inconsistent with the demands of knowledge-creation in the sciences, which has been based on men’s experiences. Women scientists often fail to receive sufficient laboratory space or research assistance and have not been included on academic collaboration teams or high-profile committee assignments, as their male counterparts have. Similarly, tradeswomen have been denied essential resources and training to support their success such as safety guidelines or new equipment operation, and expectations about their childbearing and child-rearing responsibilities have been considered inconsistent with the demands of trades work. Robert W. Glover (1989) explains male workers’ intentional refusal to train and support tradeswomen as a function of perceived threats to traditional sex roles. He notes that although many jobs in the skilled trades pay well, their status in American culture remains low due to an “antimanual” bias. This leads men working in the skilled trades to “draw dignity from pride in their craftsmanship.” Entry of women into these occupations can be threatening to incumbent male workers, as their craftsmanship becomes more “closely associated with manliness” (284).

Together, these dynamics have restricted women’s entry into higher-skilled, higher-paying, primary-tier jobs with promotion potential. Dynamics of exclusion are institutionalized by employers as well: Nancy Folbre (1994: 21) observes, “Large firms often hire from within, using personnel departments to specify job ladders. This makes it easy for them to divide workers by gender, race/ethnicity, and age, which discourages unified resistance from workers in general.” Again, women cannot apply for jobs they do not know about, and upwardly mobile male workers and human resource professionals may not even be aware of the presence of an immobile secondary tier, restricted information flows, the implications of tier hierarchy, or how their actions and policies sustain such structures.

In labor-intensive industries, such as those where women workers are highly concentrated, the bulk of jobs are entry-level or involve limited upward mobility (Goldin 1986; Dean 1991). Women in secondary-tier jobs can gain access to primary-tier jobs; however, as Barbara Reskin and Patricia Roos (1990: 317) observe, job integration has occurred where the circumstances or the women themselves were somewhat extraordinary. Reskin and Roos specify a model of the dual-queueing process that describes how certain workers are ranked by employers and must wait to gain access to primary labor market occupations and how those same workers have nearly free access to secondary labor market occupations.

SLM theory has been criticized for failing to provide a consistent policy framework (Tilly and Tilly 1994). It suggests that a policy intervention may not have any impact unless the fundamental structures of the primary and secondary labor markets are altered. The success of the WANTO and NEW programs, however, suggests that they helped undermine the cultural, sociological, and economic processes that have contributed to the current non-competitive structure in the first place. These programs did so through sustained outreach to tradeswomen and potential women trainees, raising awareness about discriminatory

practices, providing educational materials to demonstrate women's abilities in NTOs, and providing skills training to women. They also helped women to discover the economic and psychological benefits to working in nontraditional fields (O'Farrell 1999). Policy interventions, even modest ones like WANTO and NEW, have taken small but effective steps toward mitigating occupational segregation by gender.

### 3. Empirical Evaluation of the NEW and WANTO Programs

In this study, difference-in-difference estimation techniques were used to evaluate NEW and WANTO's effectiveness. "Difference" estimation examines the change in a policy target, such as women's employment in NTOs, and compares it between the relevant populations before and after a treatment or policy intervention. It is estimated as a probit model, where the key probabilities indicate whether an outcome is more or less likely after an event. The technique is especially useful to analyze the effects of policy, and this study finds that these small programs increased women's employment in NTOs.

Very simply, evaluating the impact of a program is akin to clinical tests where, say, blood is drawn before the intervention of a drug or other substance, a treatment is administered, then blood is drawn afterward. By controlling for external factors, any differences between the "before" and "after" specimens can be attributed to the treatment. In the present analysis, employment of women in NTOs is gauged before and after the implementation of a grant-funded project, which is a discrete intervention applied to a well-defined area, and differences between women's levels of employment before and after are compared, holding constant the effects of the economy overall by using never-treated areas and male workers as controls. The basic model is as follows:

$$Y_{iat} = \alpha + (X_{iat}) + \gamma_1(T_{iat}) + \gamma_2(A_{iat}) + \gamma_3(P_{iat}) + \gamma_4(T_{iat}A_{iat}) + \gamma_5(T_{iat}P_{iat}) + \gamma_6(A_{iat}P_{iat}) + \gamma_7(T_{iat}A_{iat}P_{iat}) + \epsilon, \quad (1)$$

where  $i$  is an individual,  $a$  is an area, and  $t$  is time: before and after treatment ( $T$ ).  $Y$  equals one if the individual observation represents the intended effect of the policy intervention and zero if not. As in Gruber (1994) and Hamermesh and Trejo (2000), a vector of demographic data on individuals in both treatment and nontreatment areas is also included, and is depicted by  $X$ . Like  $Y$ , the variables  $A$ ,  $P$ , and  $T$  are dummy variables: treatment ( $T$ ) denotes whether the observation is in the treatment area, after ( $A$ ) denotes whether the observation is after the treatment in time, and population ( $P$ ) indicates whether the observation is an individual targeted by the policy intervention. For instance, Hamermesh and Trejo studied the impact of the California overtime law on earnings for men. Their population was composed of working men; the treatment area was California; after includes observations after 1980, when the overtime law was passed; and  $Y$  was whether the individual worked overtime. In this example, gamma-7 ( $\gamma_7$ ) from equation (1) is the key probability of interest because it will have a nonzero value only for men in California after the overtime law was passed. A negative sign on  $\gamma_7$  would indicate that, after the overtime law was passed, a man was less likely to work overtime hours, and in fact that is what the authors found.

To examine WANTO and NEW, a modified version of the basic model was used because, unlike in the above example, there was not one year when these programs became effective in an area, and treatment areas were located throughout the country (see Appendix

C). The treatments, or policy interventions, took place at different points in time as WANTO and NEW grants were awarded and grantees implemented their projects. The grant-funded projects were specific enough, however, to permit use of the difference estimator: the implementation of a \$50,000 project in Augusta, Maine, would not have influenced women's NTO employment in, say, Washington, D.C. The modified version of the model is as follows:

$$Y_{iat} = \alpha + (X_{iat}) + \gamma_1(T_{iat}) + \gamma_2(A_{iat}) + \gamma_3(F_{iat}) + \gamma_4(T_{iat}F_{iat}) + \gamma_5(A_{iat}F_{iat}) + \varepsilon, \quad (2)$$

where  $X$  is a vector of demographic variables, and  $Y$  is equal to one if the individual is in a job defined as an NTO for women and zero if not.  $T$  equals one if the observation is located in a geographic area where a grant-funded project was implemented and zero if not;  $A$  equals one if the observation is located in one of the treatment areas, after treatment, and zero otherwise. Therefore,  $A$  always equals zero for observations in never-treated areas. The interaction of  $A$  and  $T$  causes this variable to equal zero for all observations except those in treatment areas, after treatment, allowing one to focus on individuals in treatment areas after the implementation of a WANTO or NEW project. Female ( $F$ ) denotes whether the observation is female, the population of interest.  $F$  equals one if the observation is female and zero if male. Since  $A$  implies  $T$  (all observations for which  $A$  equals one already have  $T$  equal to one), the variables  $(A_{iat}T_{iat})$  and  $(A_{iat}T_{iat}F_{iat})$  are unnecessary and in fact undesirable, as they would introduce redundancy into the model. Therefore,  $(A_{iat}F_{iat})$  is the key variable of interest, as this interaction term equals zero for all observations except those for women in treatment areas, after treatment. Gamma-5 ( $\gamma_5$ ) is therefore the coefficient of interest in equation (2) and captures the effect of a WANTO or NEW project on the probability of holding an NTO for women in treatment areas, after treatment. A positive sign on  $\gamma_5$  would indicate that, after implementation of a NEW or WANTO project, women were more likely to hold an NTO. A statistically significant and positive sign on  $\gamma_5$  would indicate that the increase in employment was not due to chance alone.

Both "double" and "triple" difference estimators can be used to gauge the effect of a treatment. Equations (1) and (2) are triple difference estimators: three "things" are interacted to capture the effects of an event. In the present study, a double-difference estimator was also used with a sample of women only, and so did not include the female variable (the "third thing"). Equation (3) is the basic double-difference model, and since the sample is made up of women only,  $\gamma_3$  captures the effect of holding an NTO in treatment areas after treatment:

$$Y_{iat} = \alpha + (X_{iat}) + \gamma_1(T_{iat}) + \gamma_2(A_{iat}) + \gamma_3(A_{iat}T_{iat}) + \varepsilon. \quad (3)$$

This would be fine, except if a positive impact of policy were found (a positive and statistically significant  $\gamma_3$ ), could one be certain that it was the effect of policy, or something else that happened to expand employment opportunities of all women, or all treatment areas? Including men in the sample allows one to control for local labor market dynamics in the treatment areas. The triple-difference estimator is used with a sample of women and men and so captures the effect of policy on employment outcomes for women in treatment areas



after treatment compared to men and women in never-treated areas, men and women in treated areas before treatment, *and* men in treated areas after treatment.

#### 4. Data and Results

Using weighted Current Population Survey (CPS) Merged Outgoing Rotation Groups (MORG) data from 1990 to 1999, impacts are isolated from grant-funded project to grant-funded project across the country. Treatment areas are located throughout the United States; in heavily unionized states and industrialized urban areas like Chicago, Philadelphia, Los Angeles, and Boston; in so-called “right to work” states like Texas; and in rural areas in West Virginia, Montana, and Vermont (variable means in Appendix B for treatment and nontreatment areas indicate that the two do not differ, except for the implementation of a grant-funded project). WANTO and NEW funded projects have operated in urban and rural settings across the United States. Appendix C lists grantees and implementation areas under both programs between 1992 and 2001.<sup>1</sup>

The means in Appendix B reveal noteworthy comparisons. Over the entire period, the sample is roughly divided evenly between women (49.04 percent) and men (50.96 percent). Mean weekly earnings over the period for men were \$635.27, or about \$33,000 per fifty-two-week year, while women’s earnings were \$432.50, or roughly \$22,500 per year. The earnings differences between women and men were consistent across subpopulations as well. An earnings gap was found among women and men in treatment versus nontreatment areas and among women and men in NTOs versus occupations not defined as NTOs. This consistency allows one to be more confident that the treatment and nontreatment areas do not differ in significant ways other than in receiving a WANTO or NEW grant. A difference-of-means test confirms this; therefore, policy impacts cannot be explained by differences in the economic and social contexts in which the grant-funded projects were implemented. Similarly, although the gap between male and female earnings was narrower in NTOs compared to occupations not defined as NTOs, there was still a gap.

Table 1 shows results for both the double and triple differences models, as well as the two definitions of “after treatment”; *t*-statistics appear italicized and in parentheses below each coefficient. The double-difference estimator is simply the model run with women only. Results from the triple-difference model are of greatest interest to control for economic changes during the period that may have affected men and women differently.

From the baseline probability of holding an NTO ( $p/Y^* = 1$ ) at the means or modes of all the independent variables, the increased probability due to being in a treatment area after treatment represents from a 5 to 15 percent increase in a woman’s chances of holding an NTO, all other things being equal and depending upon the model specification. Column (1)

1. Areas are defined “treatment areas” according to the above rationale, but observations located in them are only considered “after treatment” in years ( $t + 1$ ) and later, where grants are awarded in year ( $t$ ). One advantage of considering a treated area “posttreatment” in years ( $t + 1$ ) and later is that it allows one to isolate the treatment effects. If several years lay between the treatment and posttreatment periods, random influences of time could inflate the error term and obscure the actual effects of treatment. Since all of the grantees did not receive their grants in the same years, some observations will be in pretreatment status, while others are posttreatment, and still others are never treated.

**Table 1**

Effects of Women in Apprenticeships in Non-Traditional Occupations (WANTO) and Non-Traditional Employment for Women (NEW) Grants on Employment in Nontraditional Occupations (NTOs) with and without Controls for Demographic Characteristics and Years, Using Weighted Data, 1990–99 (*t*-Statistics)

$P[\text{NTO}] = f[\text{Treatment Area, After Treatment, Demographic Characteristics (Female, African American, Hispanic, Married, Divorced, High School Diploma, Some College, College Degree, Graduate Degree, Age), Years 1991–99}]$				
	Women Workers Only (Using the Double-Difference Model)		Working Women and Men (Using the Triple-Difference Model)	
	(1)	(2)	(3)	(4)
Women after treatment versus other women (the value of gamma-3 from equation [3])	0.00219* (2.18)	0.00252* (2.55)		
Women after treatment versus all men and all other women (the value of gamma-5 from equation [2])			0.016469** (5.41)	0.018228** (6.09)
Demographic characteristics?	No	Yes	No	Yes
Indicators for years 1991–99?	Yes	Yes	Yes	Yes
Model $F(df)$	53.21** (11)	2,203.38** (21)	228,883.31** (14)	267,367.31** (24)
Number of observations	555,189	555,189	1,132,173	1,132,173

\*Significant at the .05 level. \*\*Significant at the .01 level.

of Table 1 shows the results from estimating the probability of being in a nontraditional occupation for three groups: women in areas where NEW and WANTO programs were implemented, after they had been implemented; women in areas where programs were implemented but before they were implemented; and women in areas with no such programs available. Calculating from the baseline probability at the means, this 0.00219 percentage point change represents about a 5 percent increase in the likelihood of holding an NTO. The positive sign on the coefficient for  $\gamma_3$  indicates that women with access to NEW or WANTO programs were more likely to hold better-paying nontraditional jobs after these programs were implemented compared to women who did not have access to these programs. The coefficient is statistically significant at the 95 percent level, so this effect cannot be attributed to chance alone. Column (2) shows the results when demographic characteristics like educational attainment, age, and marital status are included in the model, and the findings of an increase in the likelihood of a woman holding an NTO are not changed by the inclusion of these demographic variables: the direction of the sign and the statistical significance do not change.

The triple-difference model does a better job of explaining the likelihood of a woman holding an NTO than does the double-difference model.<sup>2</sup> Columns (3) and (4) of Table 1

2. For all versions of the model, the *R*-squared value is low. This indicates that numerous factors exist to explain women's employment in nontraditional occupations (NTOs), and among all these factors the grant pro-



show that the magnitude of the policy impact is greater when men are included since the values of the coefficients are much larger in the triple-difference model. Again, calculating from the baseline probability of holding an NTO at the means of the independent variables, the 0.018228 point change (Column 4) represents about a 15 percent increase in the likelihood that a woman holds an NTO after program implementation. Impacts using the triple-difference estimator are three times the impacts found from the double-difference model.

Interestingly, when men were included in the sample, the effect on women's increased employment in these occupations is more pronounced than when employment outcomes for women were compared to those of other women only. A clue into the potential source of this dramatic difference may be found in the  $T$  and  $A$  coefficients (in equation [2],  $\gamma_1$  and  $\gamma_2$ , respectively—not reported here). Although the probability estimates of after are not statistically significant, those of treatment are statistically significant and *negative*. That is, the probability of all workers holding an NTO in treatment areas is less than that of non-treatment areas. Men were apparently less likely to obtain employment in these jobs between 1990 and 1999. One could speculate that total employment, in some NTOs at least, was on the decline during the period.

## 5. Conclusions and Future Research

Extensive external analysis of these programs using public data had not been done prior to the present analysis. The evidence suggests that the WANTO and NEW programs and their subsequent grant-funded projects were successful in meeting their objectives to increase women's employment in NTOs. In addition, this analysis demonstrates the potential for using the difference-in-difference estimation technique to estimate the impact of a bunch of little policy interventions instead of one big policy intervention.

It is also important to note that the effects of these two grant programs cannot be explained away by the economic growth of the 1990s. Economic growth during the period was controlled for by including "nontreatment areas" in the analysis. However, it is still possible that the economic downturn since then has affected women disproportionately. It is possible that employers hired women during the 1990s but released them first as growth slowed. Further analysis is needed to determine whether the positive impacts on women's employment found here remain and whether these programs placed most of their emphasis on job placement and not job retention (which some welfare-to-work programs have been criticized for). Further analysis could also reveal regional or industry-specific differences or effects on earnings and hours. The results of the current study demonstrate that these small grant programs bridged information gaps between potential women workers and employers. They both demonstrated to employers in the affected areas that women would function in the NTOs and spurred additional women to enter these occupations (Mastracci 2003). Without NEW and WANTO, women may not have been placed in NTOs, and evi-

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grams were small, though important, ones. Since this is a likelihood model, a pseudo  $R$ -squared is calculated, which is not quite the same as  $R$ -squared in a least squares model. For this reason,  $F$  tests were run to determine whether the effect found could be equal to zero, and the results in all cases confirmed the statistically significant and positive impacts reported above.

dently *were not* where no programs were available, despite the economic growth of the 1990s. Government involvement was evidently necessary to achieve this goal. The economy grew during the 1980s too, yet women made no great strides in the trades then; nor did they in the nontreatment areas during the 1990s.

To its credit, the Women's Bureau has maintained the WANTO program since its creation in the early 1990s, but not without resistance. In January 2002, the Bush administration proposed budget cuts that would have phased out the Women's Bureau altogether. The resulting groundswell of support from women's advocacy organizations and a letter signed by sixty-nine representatives of Congress restored funding to the bureau. Although funding to WANTO is modest at \$1 million per year and has never increased, the program does not appear in the administration's proposed budget for the fiscal year beginning October 1, 2003. Unfortunately, de-funding WANTO now that the current recession makes employment and training programs all the more important only disrupts a consistent policy initiative for women in NTOs. A persistent barrier to economic equality like occupational segregation by gender warrants a consistent policy initiative to produce the demonstrated effects of WANTO and NEW. A society that prioritizes sex equity cannot wait for market forces to resolve discriminatory gender imbalances across occupations.

### Appendix A

#### Nontraditional Occupations (NTOs) Where Women Constitute 25 Percent or Less of Total Employment to the Occupation, March 2001

Occupation	Percentage Female
Textile cutting machine operators	25.0
Inspectors, agricultural products	25.0
Guards and police, excluding public service	24.0
Sales representatives in mining, manufacturing, and wholesale	23.7
Hand molding, casting, and forming occupations	23.5
Architects	23.4
<b>Production helpers</b>	<b>22.8</b>
Correctional institution officers	22.6
Supervisors, guards	22.6
Atmospheric and space scientists	21.4
Sheriffs, bailiffs, and other law enforcement officers	21.3
Laborers, excluding construction	21.2
Metal plating machine operators	21.0
Metalworking and plastic-working machine operators	20.1
<b>Drafting occupations</b>	<b>20.0</b>
Dentists	20.0
Agricultural and food scientists	20.0
<b>Supervisors, production occupations</b>	<b>19.7</b>
<b>Electrical and electronic technicians</b>	<b>19.6</b>
Forestry and conservation scientists	19.2
Extruding and forming machine operators	18.7
Hand cutting and trimming occupations	18.2

(continued)

## APPENDIX A (continued)

Occupation	Percentage Female
Broadcast equipment operators	17.3
Managers, horticultural specialty farmers	16.7
Purchasing agents and buyers, farm products	16.7
Motion picture projectionists	16.7
Miscellaneous woodworking machine operators	15.8
Printing press operators	15.4
Baggage porters and bellhops	14.6
Auctioneers	14.3
<b>Police and detectives, public service</b>	<b>14.1</b>
Mixing and blending machine operators	14.0
<b>Freight, stock, and material handlers<sup>a</sup></b>	<b>13.6</b>
Vehicle washers and equipment cleaners	13.6
Sawing machine operators	13.6
<b>Fabricating machine operators<sup>a</sup></b>	<b>13.6</b>
<b>Surveying and mapping technicians</b>	<b>13.2</b>
Horticultural specialty farmers	13.0
Supervisors, farm workers	12.8
Meter readers	12.7
Separating, filtering, and clarifying machine operators	12.7
Taxicab drivers and chauffeurs	12.5
Announcers	12.2
<b>Crushing and grinding machine operators</b>	<b>12.2</b>
<b>Precision woodworking occupations</b>	<b>11.4</b>
Sales workers	11.2
<b>Motor transportation occupations<sup>a</sup></b>	<b>11.1</b>
Painting and paint spraying machine operators	11.0
Furnace, kiln, and oven operators, excluding food	10.5
Sales workers, motor vehicle and boats	10.0
Heat treating equipment operators	10.0
<b>Supervisors, police and detective</b>	<b>9.9</b>
Parking lot attendants	9.8
Fishers, hunters, and trappers	9.5
Drivers-sales workers	9.0
<b>Supervisors, mechanics and repairers</b>	<b>8.8</b>
Groundskeepers and gardeners	7.9
Forestry and logging occupations	7.8
Physicists and astronomers	7.7
Garage and service station-related occupations	7.5
Helpers, mechanics and repairers	7.4
Supervisors, related agricultural occupations	7.3
Air traffic controllers	7.1
<b>Precision metal working occupations</b>	<b>6.8</b>
Stevedores	6.7
Sales engineers	6.4
Compressing and compacting machine operators	5.5

(continued)

**APPENDIX A (continued)**

Occupation	Percentage Female
Garbage collectors	5.4
<b>Truck drivers</b>	<b>5.3</b>
Mechanical engineering technicians	5.3
Material moving equipment operators	4.9
Mechanics and repairers, excluding supervisors	4.7
Plant and system operators	4.5
Rail transportation occupations	4.5
Pest control occupations	4.5
<b>Helpers, construction and extractive occupations</b>	<b>4.3</b>
Airplane pilots and navigators	3.7
<b>Welders and cutters</b>	<b>3.6</b>
<b>Construction laborers</b>	<b>3.5</b>
<b>Firefighter occupations</b>	<b>2.8</b>
<b>Supervisors, firefighting and fire protection</b>	<b>2.6</b>
<b>Construction trades</b>	<b>2.4</b>
<b>Extractive occupations</b>	<b>2.3</b>
Water transportation occupations	1.7
Tool programmers, numerical control	<1.0

*Note:* Shading indicates examples of occupations that were targeted by grant-funded projects.

a. Not elsewhere classified.

**Appendix B**  
**Means for Selected Variables Using Weighted Data, 1990–99**

	<i>N</i>	Weekly Earnings (\$)	Usual Weekly Hours	High School Education (%)	Four-Year Degree (%)	Hispanic (%)	Black (%)	Married (%)	Divorced (%)
Entire sample	1,132,173	538.36	38.7	32.21	18.23	2.78	12.45	56.61	14.66
Men	576,984	635.27	41.1	31.41	18.25	2.87	11.17	60.22	10.06
Women	555,189	432.50	36.2	33.09	18.21	2.67	13.85	52.67	19.68
Treatment areas	382,330	551.27	38.6	31.20	18.82	3.17	8.42	56.33	14.42
Men	197,159	647.18	40.7	30.27	18.83	3.29	7.64	59.69	10.03
Women	185,171	444.47	36.0	32.24	18.80	3.04	9.29	52.60	19.31
Nontreatment areas	749,843	531.46	38.8	32.75	17.92	2.57	14.60	56.76	14.79
Men	379,825	628.82	41.2	32.03	17.94	2.65	13.08	60.51	10.07
Women	370,018	426.18	36.3	33.54	17.90	2.48	16.25	52.70	19.88
Nontraditional occupations (NTOs)	241,918	593.00	41.7	40.29	10.59	3.20	10.95	62.88	12.23
Men	220,759	599.52	41.9	40.78	10.23	3.23	10.69	64.12	11.28
Women	21,159	520.72	39.7	34.86	14.45	2.86	13.80	49.22	22.67
In treatment areas	7,046	553.36	39.6	32.48	15.59	3.35	8.72	49.80	22.42
Before treatment	4,310	509.25	39.4	35.14	14.17	3.92	8.05	49.59	22.58
After treatment	2,736	609.84	39.9	29.07	17.41	2.62	9.57	50.06	22.21
In nontreatment areas	14,113	503.41	39.8	36.13	13.84	2.60	16.49	48.91	22.80
All other occupations	890,255	522.94	37.9	29.93	20.39	2.66	12.87	54.84	15.34
Men	356,225	657.81	40.6	25.50	23.31	2.65	11.47	57.77	9.28
Women	534,030	428.96	36.0	33.02	18.36	2.67	13.85	52.80	19.57
In treatment areas	178,125	440.09	35.8	32.23	18.93	3.02	9.32	52.71	19.19
Before treatment	112,304	410.83	35.7	33.96	17.76	3.56	8.40	52.81	19.07
After treatment	65,821	482.22	36.0	29.73	20.60	2.26	10.64	52.57	19.35
In nontreatment areas	355,905	423.10	36.1	33.43	18.06	2.48	16.24	52.85	19.76

**Appendix C**  
**Grant Recipients under Women in Apprenticeships in**  
**Non-Traditional Occupations (WANTO) and Non-Traditional Employment**  
**for Women (NEW), 1992–2001**

NEW	Washington	Statewide, Spokane, Seattle, Tacoma
1992	Louisiana	Shreveport, Baton Rouge
	Maryland	Baltimore
	Texas	Waco
	Wyoming	Statewide
	California	Sacramento, Stockton, Oakland, San Jose, Visalia
NEW	Illinois	Champaign-Urbana, Joliet, Kankakee
1993	Iowa	Waterloo, Cedar Falls
	Missouri	Springfield, Kansas City
	New Jersey	Jersey City, Bergen-Passaic
WANTO	Tradeswomen of Purpose/WIN	Cleveland OH, New York City, Portland OR,
1994		Fort Worth TX, Providence RI, Allentown PA,
		Denver CO, West Caldwell NJ
	WRC Grand Rapids	Grand Rapids MI
	Women Unlimited	Maine, Vermont, Springfield MA, Worcester MA
	Massachusetts	Boston, Worcester MA
	Montana	Statewide
NEW &	Ohio	Toledo, Columbus, Hamilton, Mansfield, Lorain
WANTO		Elyria, Zanesville
1995	Oklahoma	Oklahoma City, Tulsa
	Wisconsin	Milwaukee, Racine
	Intl. Masonry Institute	Boston, Springfield MA, Seattle WA, Bordentown NJ
	Natl. Council of <i>La Raza</i>	Tucson AZ, Albuquerque NM, Santa Fe NM, Pima
		County NM
NEW &	Connecticut	Statewide, Hartford
WANTO	Minnesota	Statewide
1996	New Mexico	Santa Fe, Albuquerque
	Oregon	Statewide, Salem, Portland
	Utah	Salt Lake City, Provo, Orem
	Women in Nontrad. Emp. Roles	Los Angeles
WANTO	Mi Casa Resource Center	Denver CO
1997	Nontrad. Employment for Women	New York City
WANTO	Century Housing Corp.	Los Angeles
1998	Oregon Tradeswomen	Portland OR
	Strive/East Harlem	New York City
	Women in the Building Trades	Boston, Springfield MA
	Women Work!	Littleton CO, Augusta ME, Memphis TN, Portland
		OR, Pittsburgh PA
WANTO	Apprenticeship and Nontraditional	King County WA
1999	Employment for Women	
	Centro del Obrero Fronterizo	El Paso TX
	para La Mujer Obrera	
	Century Housing Corporation	Los Angeles
	Chicago Women in the Trades	Chicago

(continued)



**APPENDIX C (continued)**

	Mi Casa Resource Center	Denver CO, Colorado Springs CO, Greeley CO, Fort Lupton CO
	Nontrad. Employment for Women	New York City, Long Island NY
	N. New England Tradeswomen	Vermont statewide
	Oregon Tradeswomen, Inc.	Portland OR
	Resource Center for Women	Pinellas County FL
	Women Helping Women, Inc.	Houston TX
	Women in the Building Trades	Boston, Lowell MA
	WORD Center	Western Montana
	WomenVenture & MN Teamsters	Minnesota statewide
	YWCA of Omaha	Omaha NE, Douglas & Sarpy Counties NE
WANTO 2000 <sup>a</sup>	Women in the Building Trades	Boston, Lowell MA
	N. New England Tradeswomen	Vermont
	Women Venture	Minnesota
	Hard Hatted Women	Cleveland OH
	WORD Center	Montana statewide
	Nontrad. Employment for Women	New York City
	Oregon Tradeswomen, Inc.	Portland OR
	YWCA of Omaha	Omaha NE
	Chicago Women in Trades	Chicago
	Pennsylvania Women Work!	Pittsburgh PA
	West Virginia Women Work!	West Virginia statewide
WANTO 2001 <sup>a</sup>	Resource Center for Women	Largo FL
	Oregon Tradeswomen, Inc.	Portland OR
	YWCA Omaha	Omaha NE
	Nontrad. Employment for Women	New York City
	Resource Center for Women	Largo FL
	Maui Economic Development Board	Kihei HI
	Women in the Building Trades	Boston, Dorchester MA
	The Access Agency, Inc.	Williamantic CT
	Women Work!	Washington, D.C.
	Century Housing Corp.	Los Angeles
	Women Venture	St. Paul MN
	Women in Community Service	Washington, D.C.

a. For FFY 2000 and 2001, the implementation areas are not exact—locations listed are the locations of the grant recipients themselves, which have not always been the same as the implementation areas.

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