

TREE WARDENS AND UTILITY ARBORISTS: A MANAGEMENT TEAM WORKING FOR STREET TREES IN MASSACHUSETTS

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Abstract. Public trees along streets and roads are often jointly managed by municipalities and electric companies. This research obtained information about community forestry programs and assessed the level of cooperation between the two management entities. The study queried electric utility staff arborists and municipal tree wardens, the arboricultural professionals in Massachusetts who are directly responsible for the planting, maintenance, and removal of street trees in urban and community forests. Results showed that the majority of communities still lack street tree inventories and management plans. Major advances in utility arboriculture have resulted in the need for trained and qualified arboricultural professionals to implement the new practices and techniques. Municipal arboriculture professionals give high ratings to the cooperation between communities and electric utilities when the private companies employ trained arborists on staff.

Key Words. Municipal arboriculture; utility arboriculture; urban forestry; tree inventories; tree management plans; street tree maintenance.

The responsibility for vegetation management along streets and roads is a central concern in community forestry. Many of the public trees along streets and roads are planted under electric distribution lines, the links between high-voltage transmission lines and end consumers. Street trees that coexist with wires along public roadways account for about half the value of the publicly owned urban forest (Moll 1988).

For the past 100 years, all municipalities in the Commonwealth of Massachusetts have been required by law to elect or appoint a tree warden to be responsible for public shade trees. This official is assigned to monitor and control all activities related to trees that are in, or within 20 ft (6 m) of, the public rights-of-way. Although the primary domain of the tree warden is the rights-of-way, it may (and often does) also include public parks or open spaces if requested by the Park Commission. State law requires that trimming or pruning on any public shade tree must be approved by the tree warden, effectively

designating this official to oversee utility company line-clearance operations in the community.

Many electric companies have qualified arborists or system foresters as full-time staff employees whose responsibility is to keep the wires free from tree interference. In this capacity, the utility arborist usually supervises one or more arboricultural crews of certified line-trimmers. Concern has been expressed that electric companies probably trim and remove more trees in the urban landscape than all other tree industry segments combined (Eng 1990). Management and maintenance of public street trees is thus a shared effort between the municipalities and the electric companies. The cooperation is not always smooth, however, and in some communities there is none at all.

METHODS

The purposes of the study were to solicit information about street tree planting, maintenance, and removal, and to assess the amount and quality of cooperation between municipal and utility arborists. Surveys were mailed to the two critical groups actively managing street trees in Massachusetts—one to tree wardens and the other to all the utility arborists that could be identified on staffs of the privately owned electric companies. Each questionnaire consisted of sections about tree plantings and removals, routine cooperation, storm emergencies, and information about tree programs and budgets (in either the community or the electric company).

A total of 200 surveys were mailed, to the tree wardens in all 168 communities over 10,000 population and to tree wardens in a sample of convenience of 32 communities under 10,000. Recent state legislation requires that appointed tree wardens in towns with populations greater than 10,000 be qualified, although the 1996 amendment does not specify what levels of training and experience should constitute qualification. The tree wardens' survey in-

cluded a question to determine their opinions of qualifications needed to do their jobs. The results of this question were used by their professional association to help formulate qualifications recommendations to be made available to cities and towns (Ryan and Bloniarz 1999).

To allow for analysis of the results by population marker under or over 10,000, the community's name was handwritten at the top of the first page of each tree warden survey. The identification of returned questionnaires by community also allowed analysis by electric company.

Response Rates

Responses were received from tree wardens in 45% (76 of 168) of the communities with populations greater than 10,000, and from 55% (6 of 11) of the polled utility arborists. Tree wardens in 50% (16 of 32) of the sampled communities with populations less than 10,000 responded to the survey.

RESULTS

There are two principal findings of the study. The first has to do with inventories and management plans, the second with cooperation and partnerships between electric companies and municipalities.

Inventories and Management Plans

Research and experience have shown that tree inventories and street tree management plans are keys to maximizing use of limited funds and maintaining a sustainable level of community forest health. The use of microcomputers and the development of user-friendly software make these tools ever more available and affordable, yet the survey revealed that communities by and large are not taking advantage of these resources. Almost three-fourths of communities over 10,000 population (72%) have no street tree inventory at all, and only 12% have one that is partially or entirely computerized (Figure 1). Even more communities (83%) have no documented street tree management plan (Figure 2). Knowing exactly what tree resources exist and then planning to manage those resources, however, are necessities for effective street tree maintenance.

Cooperation with Utility Staff Arborists

Responses to the tree wardens' survey show that the three electric companies with identified staff ar-

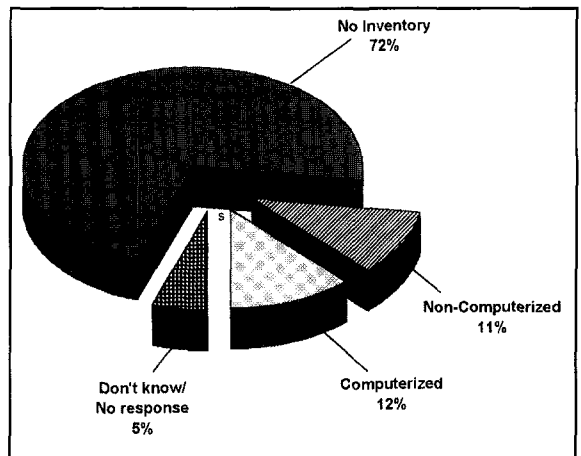


Figure 1. Street tree inventories. Results from municipal arborists in communities over 10,000 population.

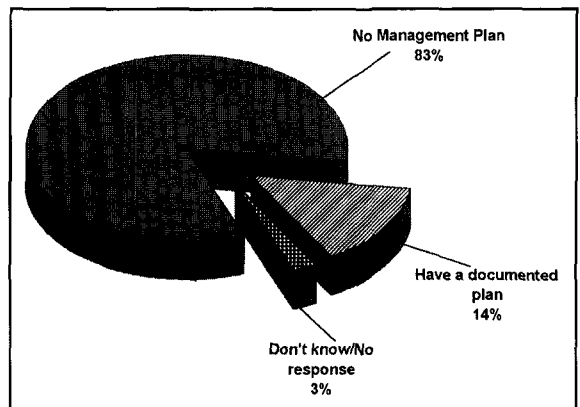


Figure 2. Street tree management plans. Results from municipal arborists in communities over 10,000 population.

borists (Massachusetts Electric, WMECO, and Eastern Utilities) have established a strong cooperative network. Initial research failed to identify any utility arborists on staff with the other two companies (Boston Edison and Commonwealth Electric), and the results of the tree wardens' survey support the initial assumption that not all communities have the advantage of additional tree care assistance provided by utility staff arborists. Among respondents to the tree wardens' survey, exactly one-third (33%) of the communities over 10,000 population were served by the two companies that are assumed to have no staff arborists. Written and verbal comments from tree wardens and their answers to questions about

cooperation and partnerships give support to this assumption as well.

Working together. Of the communities served by the two utilities without staff arborists (Boston Edison and Commonwealth Electric), there is an almost even division between those who identify some working cooperation and those who do not. Tree wardens in half of the communities over 10,000 population that identified these utilities as their electric providers answered no to the question of whether they work cooperatively with the utility staff arborists, yet the other half obviously did note that there was cooperation. When asked what type of cooperation could be envisioned, a tree warden from one Boston Edison community expressed a desire for "utility companies [that] have in-house staff which would be available."

One explanation for the inconsistency may be that some tree wardens, rather than reporting on the routine state of affairs at present, are remembering cooperation either during years past or as part of specific storm emergencies. Another explanation may be that they are referring to cooperation with arborists subcontracted from an independent consulting firm by the electric company. One tree warden wrote that the community "enjoys a great relationship with Boston Edison from Waltham. We are responsive to their needs and in turn when we need to activate their contractors for pruning of dead wood or remove dead trees from above wires, they respond." Following a period of inactivity in line clearing, Commonwealth Electric has recently hired contractors from an arboricultural consulting firm (Ohio-based ACRT) to perform services in its Cape Cod area. It is thus unclear how much distribution-line tree maintenance or removal is being done by either utility, both of which operate in the eastern end of the state. While the three responding electric companies reported pruning cycles of 4 to 5 years, the existence or length of a pruning cycle could not be determined for either Boston Edison or Commonwealth Electric.

A tree warden from another Boston Edison community wrote in the survey margin, "power co. does line-clearing," but did not specify what personnel are involved. Utilities tend to break up their service territories into geographic management units, and those without staff arborists also tend to have decen-

tralized tree programs. In these cases, the managers in each unit would be responsible also for directing line clearance, and they may or may not take the time to learn about trees or network with the professional arborists in their service territory. Therefore, some of the inconsistency found in this study might be due to the variability in the quality or dedication of the people managing the line-clearance program for the utility in each respective management unit.

Sharing costs. Among communities with populations greater than 10,000, 72% reported that they work together with utility staff arborists. A somewhat smaller number (56%) reported that they share the costs of tree work with their electric companies. The pattern of cooperation is similar on both questions. As they did on the question of working together, the tree wardens in communities over 10,000 population served by Massachusetts Electric, WMECO, and Eastern Utilities also reported high levels of cost sharing, with this kind of cooperation reported by 76%, 83%, and 100%, respectively (Figure 3). Once again, those in the communities served by Boston Edison and Commonwealth Electric reported lower levels of cooperation, 26% and 29%, respectively.

Sharing tasks. The same pattern of cooperation by electric companies emerged when tree wardens were asked to identify the tasks they generally share with utility staff arborists, and to identify specifically which tasks they consulted on in 1997 (Figure 3). On both task-sharing and consultations, the communities served by Massachusetts Electric, WMECO, and Eastern Utilities again reported high levels of cooperation. As they did on the previous questions, Boston Edison and Commonwealth Electric had relatively low records of cooperation on these as well. The tasks most often shared are pruning (64% of communities over 10,000) and removal (58%), with planting a distant third (13%). When tree wardens were asked about the specific tasks they share, the pattern of cooperation by electric companies was repeated yet again (Figure 4).

A further indication of cooperation levels can be seen by the amount of response to the questions of shared tasks and 1997 consultations. The highest levels of response among communities with over 10,000 population came from those served by the three companies with staff arborists, with substan-

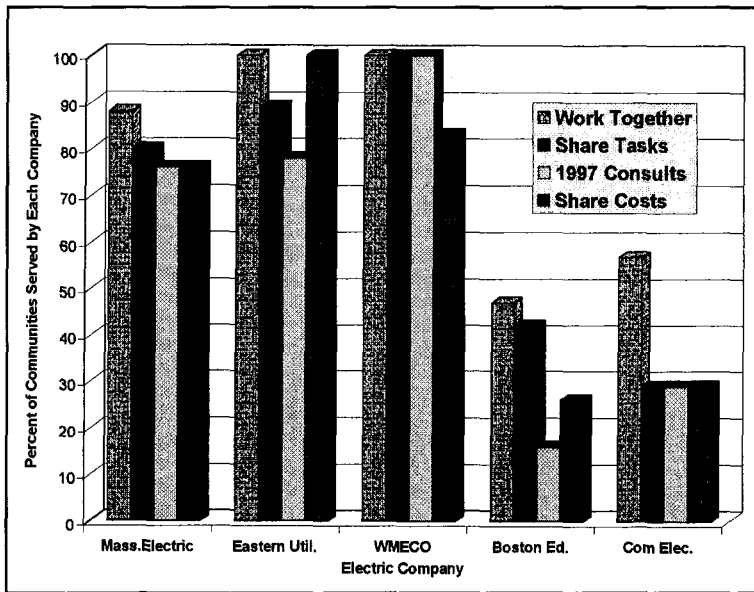


Figure 3. Cooperation with utility arborists, by electric company. Results from municipal arborists in communities over 10,000 population.

tially lower levels of response coming from those served by the two companies without staff arborists.

Degree of cooperation. Tree wardens and other municipal arborists were generally positive in rating the degree of cooperation they experience with utility staff arborists (Figure 5). Overall, 65% of the communities with populations greater than 10,000 rated the present level in one of the two top categories, "very cooperative" or "extremely cooperative." Utility staff arborists were also asked to describe the overall level of cooperation between them and tree wardens in communities they serve, rating that cooperation on the same 1-5 Likert scale. Their responses came very close to those of the tree wardens, with 66% rating it in the top two categories.

The previous pattern of cooperation was repeated yet again when this question was analyzed by the electric company that serves each community (Figure 6). Among tree wardens in

communities with over 10,000 population and served by Massachusetts Electric, 72% agreed that the level of cooperation was either "very cooperative" or "extremely cooperative." Among those in communities served by WMECO and Eastern Utilities, the percentage was 100%. Tree wardens in communities served by Boston Edison and Commonwealth Electric were less positive. Exactly one half of tree wardens in communities over 10,000 population that identified one of these two providers either did not respond to the question or rated the relationship "not at all cooperative." Only 31% rated the relationship "very cooperative" or "extremely cooperative," and another 19% were lukewarm, rating it only "somewhat cooperative."

Tree wardens' interest in future cooperation. The final two questions about routine cooperation between communities and electric companies asked tree wardens to specify their interest in

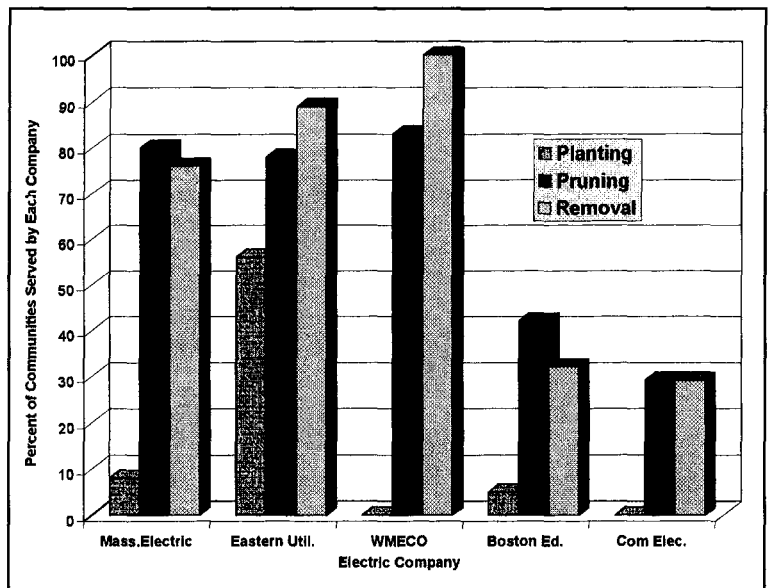


Figure 4. Tasks shared with utility arborists (nonemergency), by electric company. Results from municipal arborists in communities over 10,000 population.

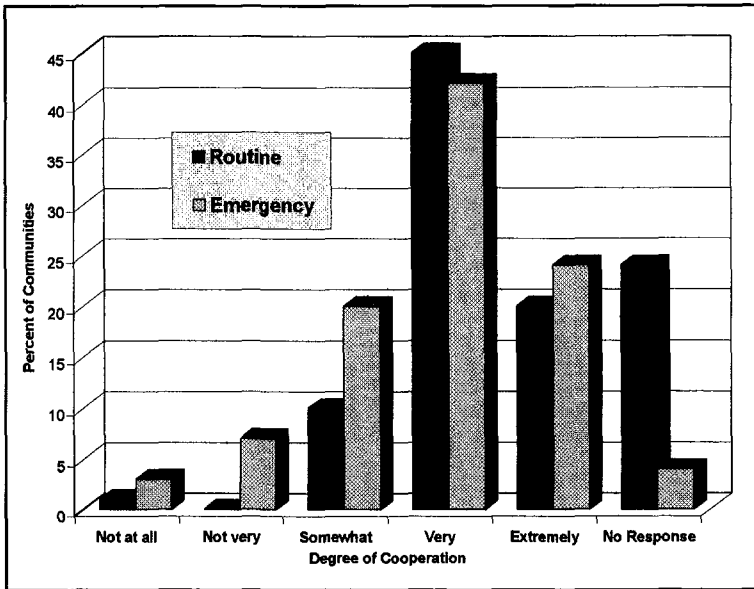


Figure 5. Ratings of routine versus emergency cooperation. Results from municipal arborists in communities over 10,000 population.

establishing a working relationship and their interest in sharing costs. Both of these questions received a high response rate, although paradoxically it should have been much lower. Strictly following the survey instructions, the response rate among communities over 10,000 population should have been 28% (those who previously answered no to the question of whether they already work cooperatively). If they answered yes to that question, respondents were directed to skip these two questions.

Instead of the expected low response numbers, however, a high level of interest was expressed: 70% of the tree wardens in communities with populations greater than 10,000 were interested in establishing a working relationship, and a somewhat smaller group of 59% expressed interest in sharing costs with the electric companies. In both cases, responses came from well over twice as many tree wardens as were expected to answer the questions.

The fact that so many chose to answer these questions, and answered them positively, seems to indicate a strong level of interest in building on cooperation that already exists. Among communities over 10,000 population served by the various electric companies, the pattern was different on these two questions than it had been on the earlier ones. The results indicate a desire for cooperation among generally substantial percentages of communities served by every one of the electric companies, whether they already enjoy that cooperation or not (Figure 7).

Storm emergencies. In recent years, a number of severe, wide-ranging storms have affected large geographic areas in Massachusetts. Communities from every area of the state responded to the tree wardens' survey. All of them said that one or more of these storms

caused tree damage in their communities, and all of them said that one or more of these storms caused power outages in their communities.

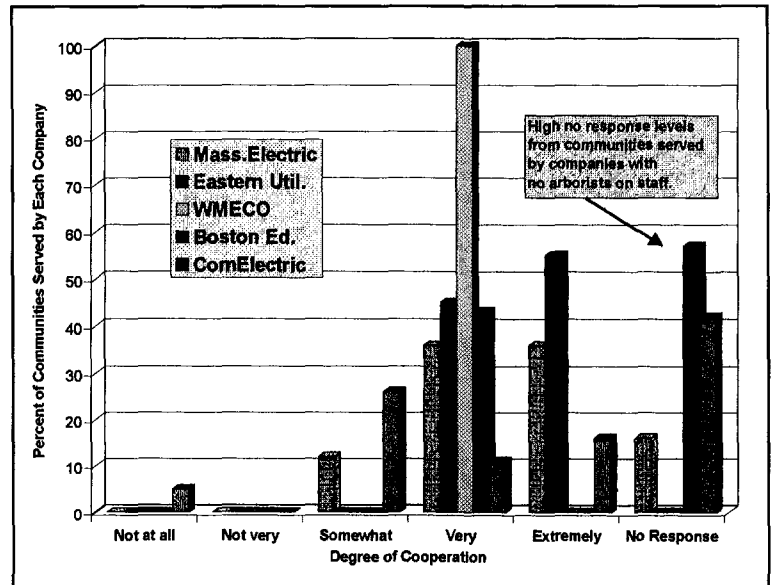


Figure 6. Ratings of routine cooperation with utility arborists, by electric company. Results from municipal arborists in communities over 10,000 population.

Emergency cooperation and the electric companies. The previously seen pattern of cooperation by electric companies is only partially repeated during emergencies (Figure 8). Boston Edison rated considerably lower than the other companies in both routine cooperation (with 47% of its communities) and emergency cooperation (with 68%). Commonwealth Electric was rated low (57%) for routine cooperation; however, its rating during emergencies soared to 100%, indicating that the company cooperates better with local authorities when it needs to repair downed wires. In addition, the restoration of power is the first priority during storms, and it is likely in such emergencies that tree wardens lower their professional expectations of sound arboricultural practices.

Summary. The results show that the amount of cooperation between municipal arborists and electric companies is considerably greater in communities where the utilities employ professional staff

arborists to manage their line clearance programs. When mean responses from municipal arborists who have access to utility staff arborists (in communities served by Massachusetts Electric, Eastern Utilities, and WMECO) are compared to the mean responses from municipal arborists who do not have such access (in communities served by Boston Edison and Commonwealth Electric), it is clear that the employment of professional arborists on staff results in better cooperation between the electric companies and the communities and customers they serve (Figure 9).

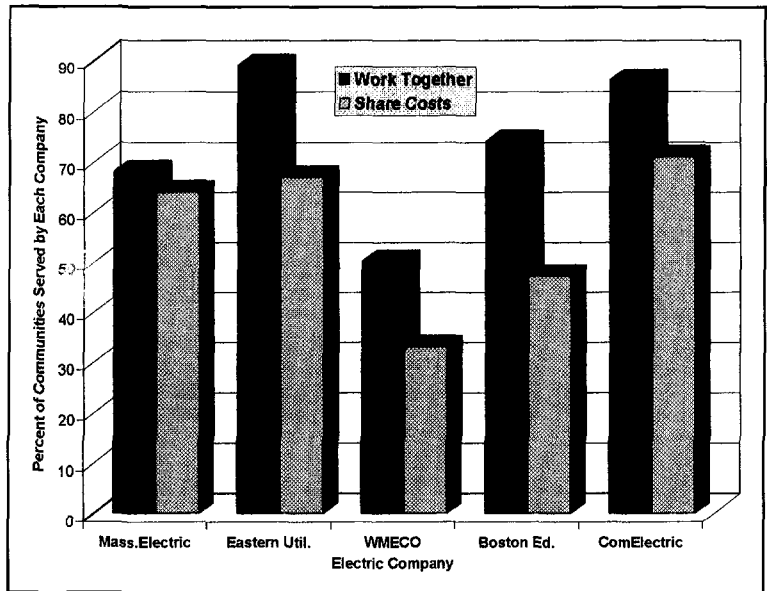


Figure 7. Interest expressed in future cooperation: working together and sharing costs with local electric company. Results from municipal arborists in communities over 10,000 population.

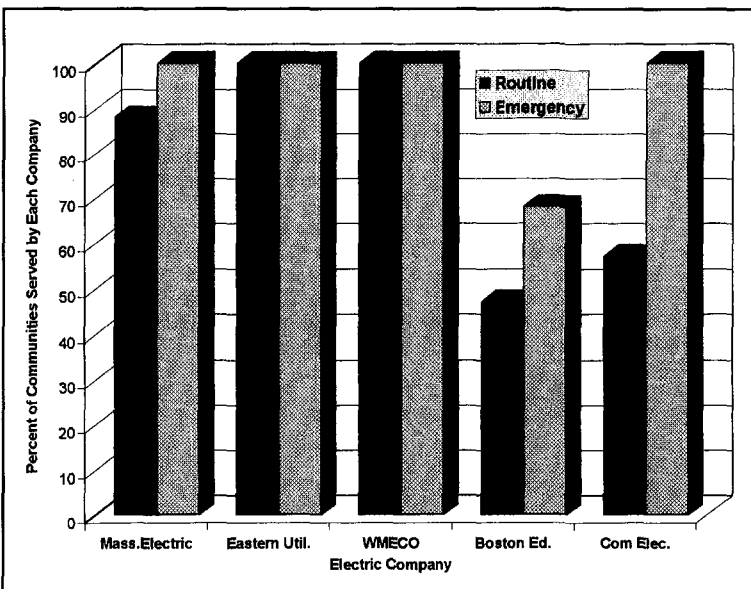


Figure 8. Routine versus emergency cooperation with utility arborists, by electric company. Results from municipal arborists in communities over 10,000 population.

DISCUSSION
Electric Companies and Trees Under Wires

Increased demands to provide both electric power quality and public safety have caused significant changes in the way the utility industry deals with trees and line clearance (Eng 1990). Companies first began to hire in-house arboricultural staff in the 1970s. The addition of qualified, pro-

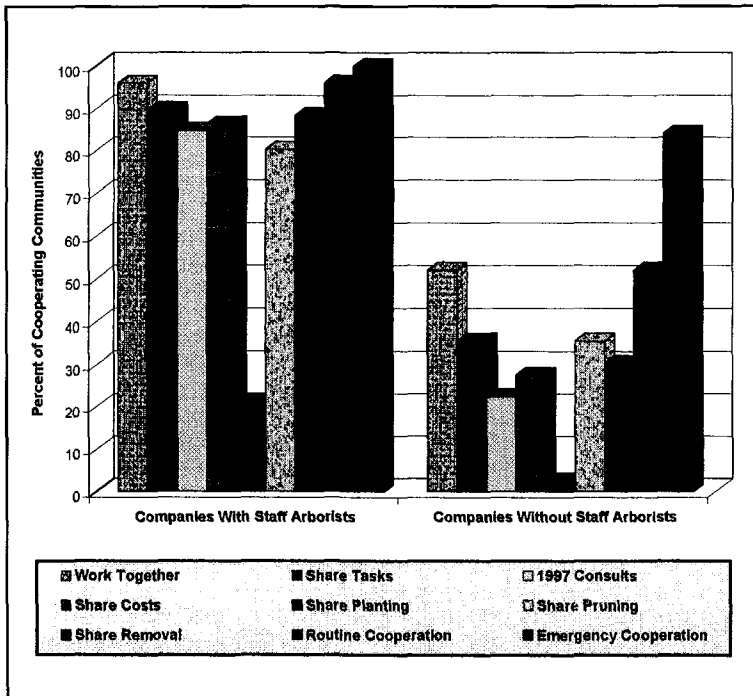


Figure 9. Municipal arborists' cooperation with electric companies. Results from municipal arborists in communities with over 10,000 population.

Professional foresters trained in arboriculturally sound planting and pruning methods provides a more tree-friendly approach to line clearance programs, one that benefits consumers and communities as well.

Pruning solutions. Historically, the strategy to keep electric wires free from tree interference consisted only of clearing the lines. To do this, one of two basic methods was used: either heading back all interfering branches on a tree to within a specified distance from wires, or rounding over to keep trees under wires from growing up in to lines (Miller 1997). Both methods were fraught with problems, including heavy suckering, serious tree damage, a need for costly frequent pruning, and high long-term costs. The resolution of the aerial conflict between branches and wires has often created an all-too-familiar picture: "tall-growing trees planted ... with visions of leafy canopies and shade ... become arboreal cripples, victims of saws and hydraulic pruners as an aerial path is cleared for utility wires" (Moll 1988).

Fortunately, other changes since the 1970s have helped ease some of these eyesores. Directional

pruning, also called utility lateral trimming, removes branches to substantial-sized laterals so as to direct future growth away from utility lines. The advantages of making lateral cuts are maintenance of overall tree shape, less disfigurement and damage, fewer suckers, and less frequent need for trimming around wires (Miller 1998).

Another step forward in line-clearance programs was institution of a cyclical approach to tree trimming, an approach that has changed the attitude of reacting to tree-related trouble spots into a proactive plan (Eng 1990). The goal of cycle trimming is to obtain a set rotation (in years) of trimming and removing trees in designated maintenance areas. Proactively trimming trees according to a regular rotation (cycle pruning every 2 to 5 years) avoids many of the crisis situations caused by trees in the past.

Planting solutions. Another approach to resolving the trees versus wires conflict is the planting concept of "right tree, right place." Planting trees of smaller mature size under wires helps avoid the major interferences caused by large-growing shade trees, and new varieties of trees that better fit the growing spaces under utility lines are constantly being sought. In recent years, tree removal and replacement programs have become a significant aspect of utility company operations (Moll 1988; Eng 1990; Hallmark 1994; Miller 1997). A report by Dodson (1999) described how one power company used a fall snowstorm to seize the initiative to institute a removal and replacement program. In this case, it was notable that the company had a staff forester who worked with the community's public works department, home owners, and a subcontractor in the effort to eliminate problem trees and replace them with site-appropriate ones.

Tree plantings set back from the right-of-way and as much as 20 ft (6 m) in from it are another solution and one that is proscribed under Chapter 87 of the Massachusetts General Laws. Such plantings have the advantage of being away from the competition of

wires that are often located directly over the traditional tree planting strips. Setback plantings are increasingly being promoted as an alternative to maintain the appearance of tree-lined streets. Sometimes referred to as offset tree plantings, they provide yet another strategy for both communities and utilities to deal with the trees versus wires conflict. A logical solution for increasing the number and longevity of street trees, the concept of planting in a location set back from the edge of the right-of-way was set forth and encouraged by Bloniarz and Ryan (1993).

Inventories and Management Plans

A tree inventory provides records of resources being managed, and the information it contains is used to locate planting sites, identify maintenance needs, locate hazardous trees for repair or removal, and increase work efficiency. Street tree resources must first be catalogued in an inventory, and only then can a management plan be created. With the knowledge that management responsibility for street trees is almost always jointly shared by communities and utilities, it becomes obvious that inventories and management plans are especially critical to keep track of this segment of the community forest.

The literature shows that the majority of communities have developed neither an inventory nor a management plan. A nationwide study in 1980 found that only 50% of municipal tree managers identified their program as systematic, and only 22% knew with certainty the number of trees in their jurisdiction (Kielbaso et al. 1982). A follow-up study 6 years later found that the percentage with systematic programs had declined to 39%, and that 80% to 85% of U.S. cities had no management plan (Kielbaso 1990). A more localized study of tree programs in Pennsylvania found that 28% of that state's communities had some type of tree care program and found it troublesome that also only 28% of communities had inventories (Reeder and Gerhold 1993). Nevertheless, 65% of respondents in that study believed that over half of their trees were in good or excellent condition, and the researchers found it interesting that so many felt qualified to judge the health of the tree population without an inventory. A study of tree programs in Connecticut found that only 19% of respondent communities maintained street tree inventories (Ricard 1994).

In a more recent nationwide study (Tschantz and Sacamano 1995), 78% of communities surveyed re-

ported spending money on tree inventories, yet only 66% could provide an estimate of the number of publicly owned trees in their community. This study also revealed that 37% of communities reported performing maintenance on an as-needed basis. The researchers therefore inferred that 63% of respondent communities had proactive or systematic programs, and they found this to be a positive development when compared to the 39% found by Kielbaso and Cotrone (1990).

RECOMMENDATIONS

Results of this survey show that when electric companies employ system foresters or arborists on their staffs, local municipal officials give high ratings to the cooperation between community and electric company. Two of the five electric companies—those for which there is no evidence of arborists on staff—rated low on cooperation with municipal tree wardens. Despite the fact that in-house arboricultural staff provides the additional advantages of a stable work force, familiarity with the local area, and quicker emergency response, most electric companies today employ contract crews because of the resulting dollar savings on line clearing (Miller 1997).

The advances that dramatically altered the face of utility arboriculture have resulted in a greater awareness and responsibility for the care of street trees by electric companies. These advances are best implemented by permanent managers who are qualified arboricultural professionals with an understanding of the necessary planting and pruning practices. Trained arborists or system foresters on permanent staff can guide contract crews to follow sound arboricultural methods, and such professionals can also guide the company to better working relationships with customers and municipal arborists in their local communities. Electric companies should therefore be encouraged to maintain in-house arboricultural professionals.

The management challenges shared by community tree wardens and electric utility staff arborists could be simplified if comprehensive information about the street tree resource were available. Communities should make a concerted effort to develop both inventories and management plans, and use them in conjunction with utility arborists.

Like the utility companies, communities should also ensure that they employ municipal tree manag-

ers who are knowledgeable about the most recent techniques and community forestry concepts. With a new generation of professionals specifically trained in community forestry and with recent advances in utility arboriculture, the future for street trees holds more promise than it has at any time in the recent past. The recognition of the natural linkage and the opening of a broader dialogue between utility arborists and municipal tree managers will help immeasurably in efforts to maintain and improve the critical street tree component of community forests.

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Zusammenfassung. Kommunen und Elektrizitätsgesellschaften bewirtschaften oft gemeinsam die öffentlichen Bäume entlang von Strassen. Diese Untersuchung enthält Informationen über die kommunalen Baumpflegeprogramme und überprüft den Grad der Kooperation zwischen den genannten Baumverantwortlichen. Die Studie befragte Baumpfleger der Elektrizitätsgesellschaften und die kommunalen Baumpfleger, die als professionelle Baumpfleger in Massachusetts direkt für die Pflanzung, Erhaltung und Fällung von öffentlichen Bäumen zuständig sind. Die Ergebnisse zeigen, daß die Mehrheit der Gemeinden keine Bauminventur und Managementpläne haben. Die Fortschritte in der Baumpflege der Versorgungsunternehmen haben zu einem Bedarf an ausgebildeten und qualifizierten Arboristen geführt, um die neuen Praktiken und Techniken zu in der Praxis zu festigen. Die kommunalen Baumpfleger befürworten sehr stark eine Kooperation zwischen den Kommunen und den Versorgungsunternehmen, wenn private Baumpflegeunternehmen die ausgebildeten Arbeiter anstellen.

Resumen. Las municipalidades y las compañías eléctricas con frecuencia manejan conjuntamente árboles públicos con los de calles y carreteras. Esta investigación obtuvo información acerca de programas forestales comunitarios y evaluó el nivel de cooperación entre las dos entidades de manejo. El estudio averiguó acerca del staff de arboristas de las compañías eléctricas y los Guardas de los Árboles de los municipios, los profesionales de la arboricultura en Massachusetts quienes son directamente responsables de la plantación, mantenimiento, y remoción de los árboles urbanos en las comunidades urbanas y rurales. Los resultados mostraron que la mayoría de las comunidades carecen aún de inventarios y planes de manejo de los árboles. Los principales avances en la arboricultura de líneas de servicios han sido la aceptación de la necesidad de profesionales de la arboricultura entrenados y calificados para implementar nuevas técnicas y prácticas. Los profesionales de la arboricultura municipal tienen altos índices de cooperación entre las comunidades y las compañías de servicios, cuando las compañías privadas incluyen arboristas entrenados en su staff.