

Practices and Perceptions of Urban Forest Waste Generation and Utilization in Virginia

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- **Survey Respondents**



Overview

- **Background and rationale for the study**
- **Study methods**
- **Key findings of the study**
- **Notable limitations of the study**
- **Conclusions and Q & A**

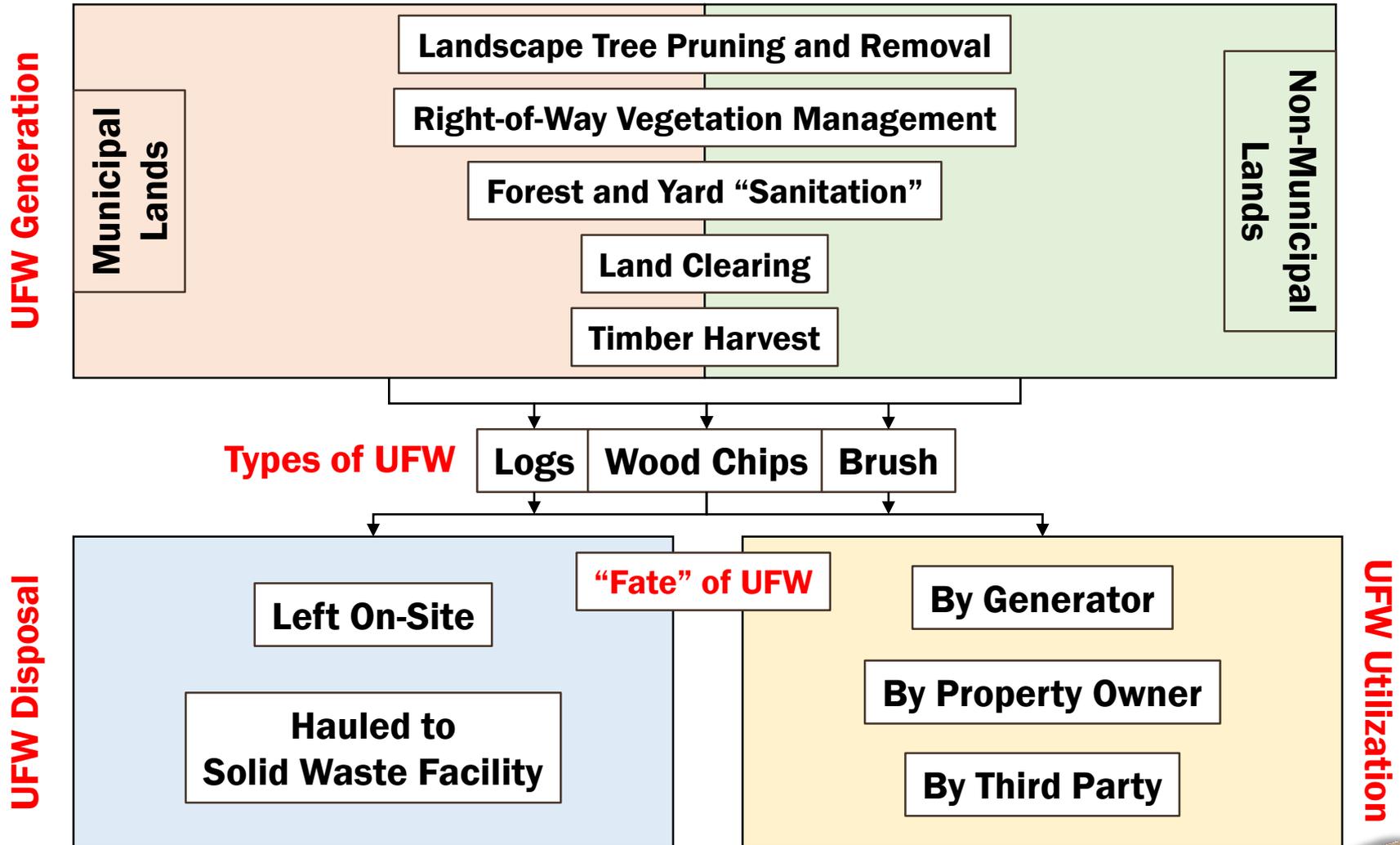


Background and Rationale for the Study

- **Issue:** no statewide empirical information about urban forest waste generation and utilization
- **Need:** reliable information to guide technical assistance and capacity building across the state
- **Study goals:**
 - Identify the *origin* and *fate* of urban forest waste (UFW)
 - Estimate the *amount* of UFW generated by primary public and private urban forestry operations
 - Identify the urban forest products (UFP) *created* when UFW is utilized rather than disposed
 - Understand the *perceptions* of urban forestry operators toward UFW and UFP

Study Methods

CONCEPTUAL MODEL



Study Methods

CONCEPTUAL MODEL



UFW Utilization



Urban Forest Products (UFPs)



Study Methods

STUDY POPULATION AND SAMPLING FRAME

- **91 “urban” municipalities in Virginia**
 - All independent cities (38)
 - All incorporated towns >2.5k population (48)
 - All counties >826 persons per square mile (5)
- **784 ISA Certified Arborists with Virginia mailing address**

Municipal Employees:

- Field arborists
- Urban foresters
- Horticulturalists
- City/town/county planners
- City/town/county managers
- Parks & rec. administrators
- Public works administrators

**61%
Response
Rate**

Private Arborists:

- Arboreta
- Institutions
- Universities
- VDOT contractors
- Utility contractors
- Tree care companies
- Landscape companies

**31%
Response
Rate**

- **Web-based survey conducted in spring of 2014**

Key Study Findings

Respondent Demographics

Position within municipal sector	Municipal (n=45)	Private (n=0)
Arborist	18%	n/a
Parks and Rec. Administrator	18%	n/a
Urban Forester	15%	n/a
Public Works Administrator	13%	n/a
Horticulturalist	9%	n/a
Solid Waste Administrator	7%	n/a
City/Town/County Manager	7%	n/a
City/Town/County Planner	4%	n/a
Other	9%	n/a
Position within private sector	Municipal (n=0)	Private (n=42)
Manager of regional operation	n/a	7%
Manager of local operation	n/a	67%
Manager of production crew	n/a	17%
Member of production crew	n/a	7%
Other	n/a	2%

Key Study Findings

Respondent Demographics

Industry sector of the local operation (p-value ≤ 0.001)	Municipal (n=45)	Private (n=75)
Municipality	100%	0%
Tree care company	0%	51%
Landscape company	0%	12%
Consulting firm	0%	8%
Institution	0%	15%
Electric service provider	0%	9%
VA Dept. of Transportation	0%	5%
Number of employees in the local operation (p-value = 0.367)	Municipal (n=45)	Private (n=75)
0-5	36%	39%
6-10	20%	22%
11-15	22%	12%
16-20	11%	7%
21+	11%	21%

Key Study Findings

Respondent Demographics

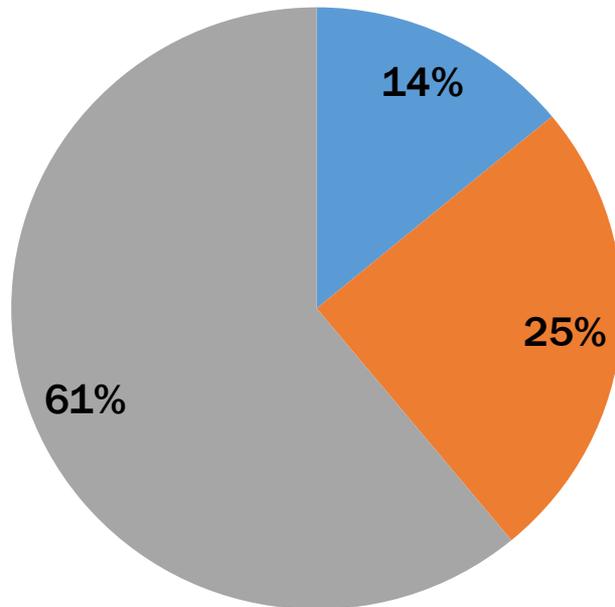
Geographic region where local operation resides (p-value = 0.327)	Municipal (n=45)	Private (n=71)
Coastal Plain	24%	21%
Northern Mountains	22%	14%
Northern Piedmont	27%	44%
Southern Mountains	11%	13%
Southern Piedmont	16%	8%
The local operation is in the Washington, DC Metropolitan Statistical Area (p-value = 0.025)	Municipal (n=45)	Private (n=71)
Yes	27%	46%
No	73%	54%

Key Study Findings

Do operators know how much UFW they are generating?

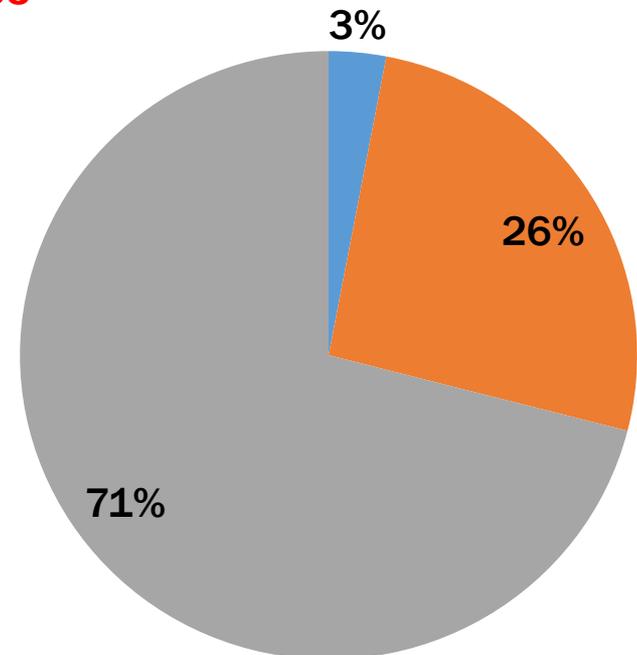
Municipal Operations

n = 44



Private Operations

n = 65



- Keep detailed records
- Can provide an estimate
- Cannot provide an estimate

p = 0.114

Key Study Findings

Where does urban forest waste originate?

Land use origin of the UFW generated by the operation	Municipal (n=45)	Private (n=66)	p-value ¹
Private residential	21%	46%	0.045
Private commercial	3%	17%	0.076
Public greenspace	34%	14%	0.001
Municipal street ROW	37%	6%	≤ 0.001
VA DOT roadside ROW	4%	8%	0.242
Electric utility ROW	1%	7%	0.191
Other	0%	2%	0.499

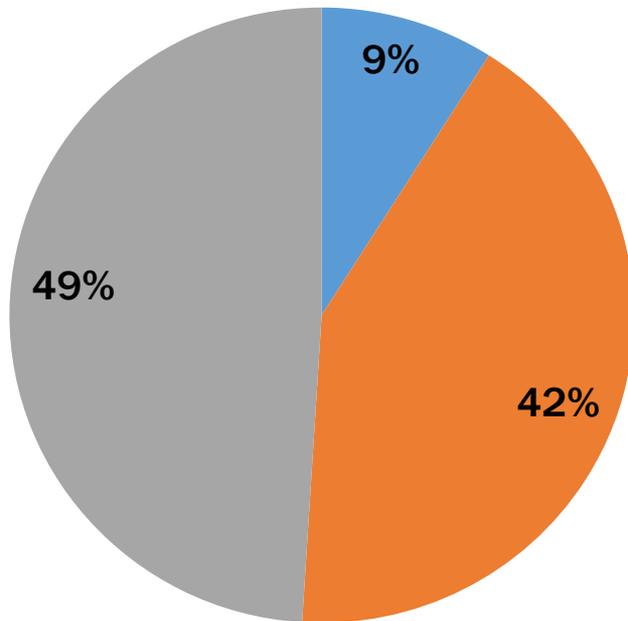
Management practices that generate the operation's UFW	Municipal (n=44)	Private (n=65)	p-value ¹
Tree pruning	31%	45%	0.235
Tree removal	32%	43%	0.443
Curbside pickup	32%	2%	≤ 0.001
Small woodlot logging	2%	3%	0.780
Land Clearing	3%	4%	0.469
Other	0%	3%	0.517

Key Study Findings

Do operators know the fate of the UFW they are generating?

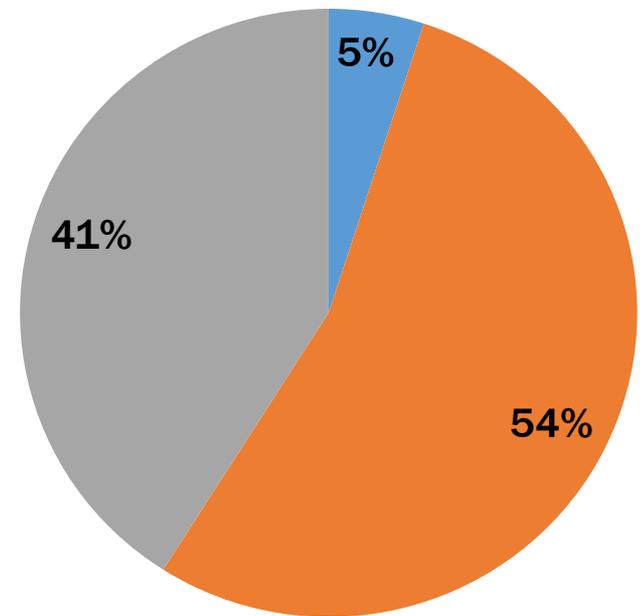
Municipal Operations

n = 44



Private Operations

n = 63



- Keep detailed records
- Can provide an estimate
- Cannot provide an estimate

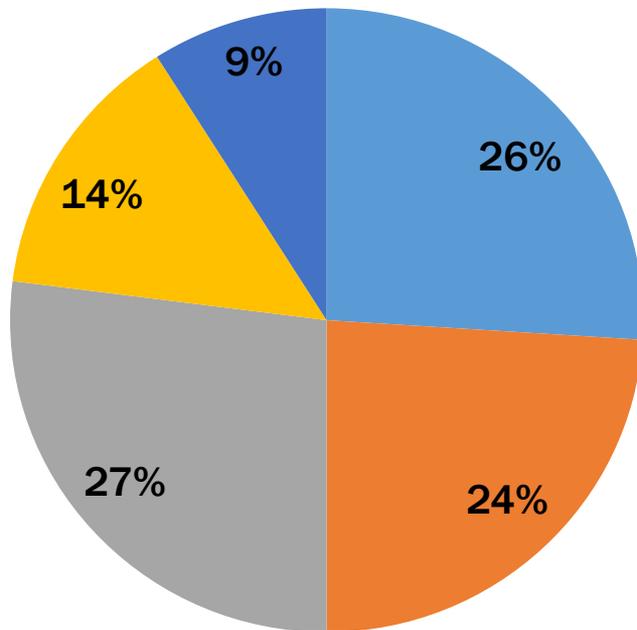
p = 0.388

Key Study Findings

What is the fate of logs generated as UFW by these operators?

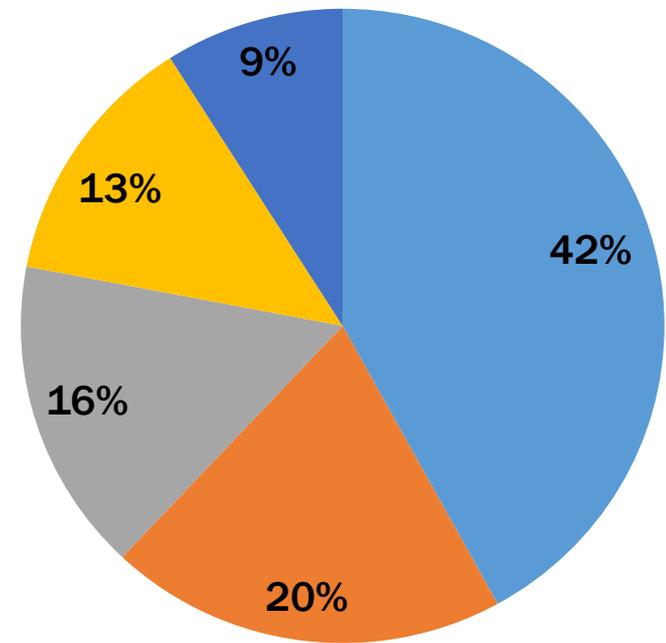
Municipal Operations

n = 19



Private Operations

n = 35



- Transferred to a 3rd party
- Disposed at MSW facility
- Utilized in-house
- Utilized on-site
- Left on-site

No distribution difference, municipal vs. private

Key Study Findings

What UFPs are created from the logs that are utilized in-house?

Municipal Operations

Top 3 UFPs:

n = 10

1. Firewood (42%)

2. Lumber (18%)

3. Mulch (8%)

Private Operations

Top 3 UFPs:

n = 12

1. Firewood (52%)

2. Lumber (17%)

3. Mulch (17%)

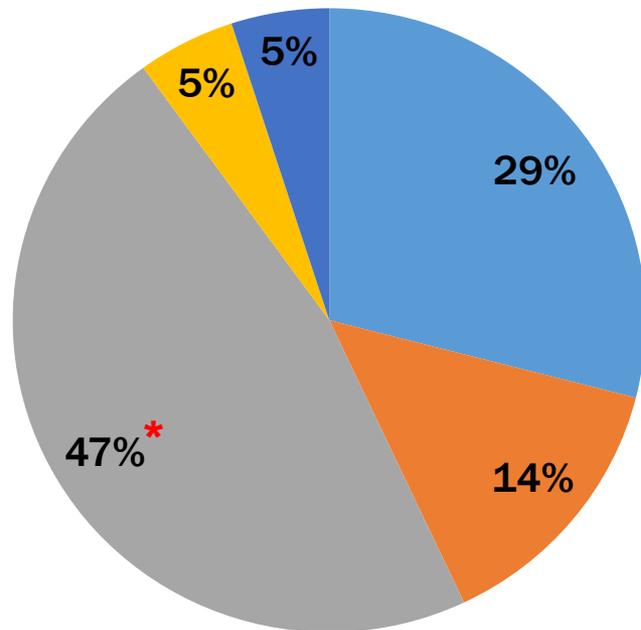
No distribution difference, municipal vs. private

Key Study Findings

What is the fate of wood chips generated as UFW by these operators?

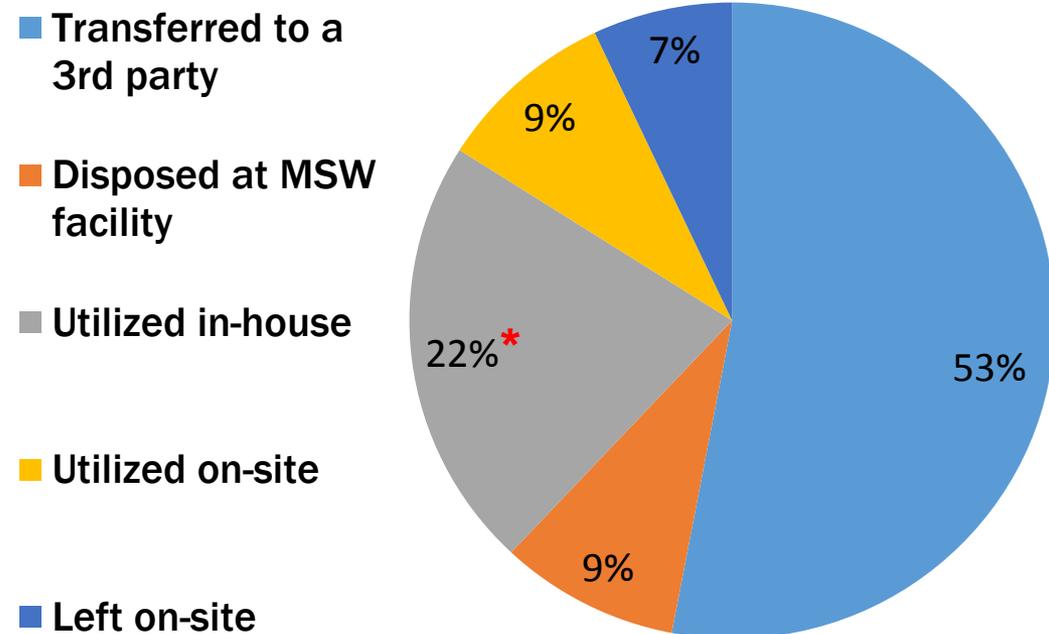
Municipal Operations

n = 18



Private Operations

n = 35



p = 0.041*

Key Study Findings

What UFPs are created from the wood chips that are utilized in-house?

Municipal Operations

Top 3 UFPs:

n = 16

1. Mulch (75%)

2. Compost (21%)

3. Pellets (3%)

Private Operations

Top 3 UFPs:

n = 15

1. Mulch (63%)

2. Compost (20%)

3. Biomass (10%)

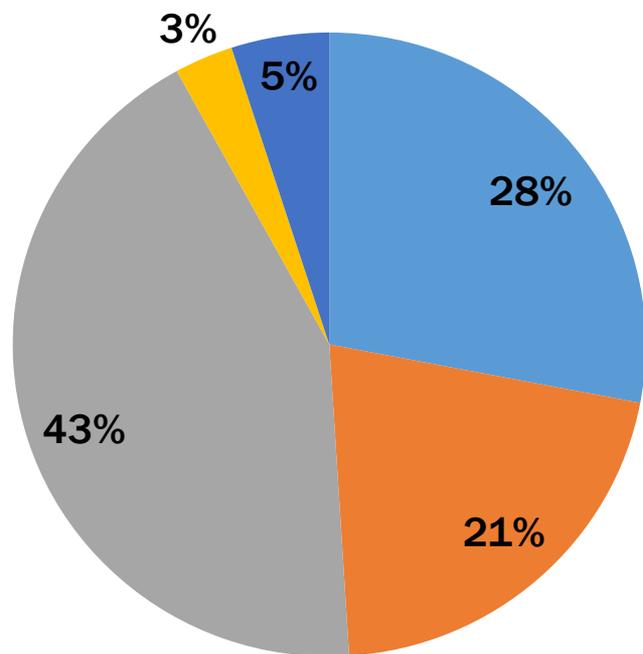
No distribution difference, municipal vs. private

Key Study Findings

What is the fate of brush generated as UFW by these operators?

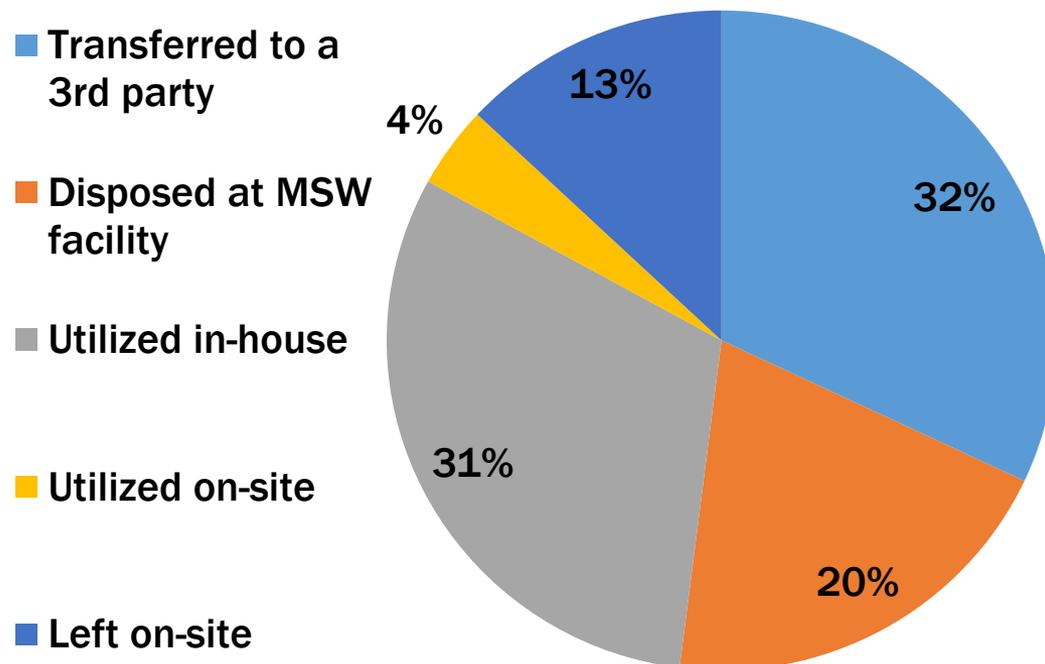
Municipal Operations

n = 20



Private Operations

n = 33



No distribution difference, municipal vs. private

Key Study Findings

What UFPs are created from the brush that is utilized in-house?

Municipal Operations

Top 3 UFPs:

n = 13

1. Mulch (76%)

2. Compost (21%)

3. Biomass (4%)

Private Operations

Top 3 UFPs:

n = 13

1. Mulch (52%)

2. Compost (28%)

3. Other (13%)

No distribution difference, municipal vs. private

Key Study Findings

How do operators perceive UFW utilization?

Level of agreement scale:

**1 = strongly agree, 2 = somewhat agree, 3 = neither agree nor disagree,
4 = somewhat disagree, 5 = strongly disagree.**

My operation seeks to increase UFW utilization...	Municipal (n=53)			Private (n=162)			p-value ¹
	Mean	Mode	Range	Mean	Mode	Range	
...for environmental reasons	2.08	2	1-4	2.28	2	1-5	0.403
...for financial reasons	2.36	2,3	1-4	2.69	2	1-5	0.275
...for logistical reasons	2.42	2,3	1-4	2.49	3	1-5	0.559
...for regulatory reasons	2.70	3	1-4	2.95	3	1-5	0.273

Key Study Findings

How do operators perceive UFW utilization?

Level of agreement scale:

1 = strongly agree, 2 = somewhat agree, 3 = neither agree nor disagree, 4 = somewhat disagree, 5 = strongly disagree.

Urban forest waste...	Municipal (n=52)			Private (n=153)			p-value
	Mean	Mode	Range	Mean	Mode	Range	
...utilization will be a major issue for the urban forestry industry in the future	2.15	2	1-4	1.97	2	1-5	0.332
...utilization is a major issue for the urban forestry industry currently	2.40	2	1-4	2.25	2	1-5	0.293
...utilization is important to my clients	2.88	2	1-5	2.70	3	1-5	0.084
...disposal is a major cost for my operation	3.19	4	1-5	2.95	3	1-5	0.299
...utilization is a major revenue source for my operation	4.04	4	1-5	3.87	4	1-5	0.557

Key Study Findings

What do operators perceive as incentives for increasing UFW utilization?

Municipal Operations

Top 3 incentives:

n = 52

1. Avoidance of disposal fees (79%)

2. Environmental sustainability of the operation or community (69%)

3. Avoidance of transportation or shipping costs (44%)

Private Operations

Top 3 incentives:

n = 137

1. Avoidance of disposal fees (69%)

2. Environmental sustainability of the operation or community (67%)

3. Avoidance of transportation or shipping costs (53%)

No distribution difference, municipal vs. private

Key Study Findings

What do operators perceive as barriers for increasing UFW utilization?

Municipal Operations

Top 3 barriers:

n = 52

1. Lack of in-house equipment for processing UFW (56%) *

2. Lack of in-house space for stockpiling UFW (52%)

3. Lack of local processors of UFW (42%)

p = 0.001*

Private Operations

Top 3 barriers:

n = 137

1. Lack of local processors of UFW (48%)

2. Lack of in-house space for stockpiling UFW (41%) *

3. Logistical difficulties of transporting UFW to processors (40%)

Notable Limitations of the Study

- **Only major urban localities were surveyed.**
 - **Selected localities account for 9% of state land area and 64% of total population**
- **Only ISA certified arborists were surveyed.**
 - **Likely excluded numerous landscaping and land clearing firms**
- **Small sample sizes for some survey questions.**
 - **High uncertainty about fate of UFW amongst these operators**
 - **Very low participation by these operators in creating UFPs from UFW**



Conclusions and Q & A

- **Municipalities and private operations reported disposing less than 25% of their UFW at a solid waste facility.**
- **The majority of logs were utilized to produce firewood or lumber, while the majority of wood chips and brush were utilized to produce mulch or compost.**
- **Regardless of operation type, UFW is rarely left on-site, indicating that UFW is being handled and transported in the majority of municipal and “arborist” operations.**



Conclusions and Q & A

- **Two-thirds of respondents (65%) agreed or strongly agreed that UFW utilization is a major issue for the urban forestry industry.**
- **Primary incentives for utilization were avoidance of disposal fees and hauling costs.**
- **Municipalities cited lack of processing equipment as their primary barrier whereas private arborists cited lack of local processors.**

