WOOD FEEDSTOCK SUPPLY ASSESSMENT FOR YAVAPAI COUNTY

Upper Verde River Watershed Task Force

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PRESENTATION OVERVIEW

- Overview of Assessment
- Target Study Area
- Vegetation Cover
- Landownership
- Findings
  - Feedstock Supply
  - Feedstock Competition
  - Delivered Costs
- Observations
- Questions

FEEDSTOCK SUPPLY ASSESSMENT

Tasks completed:

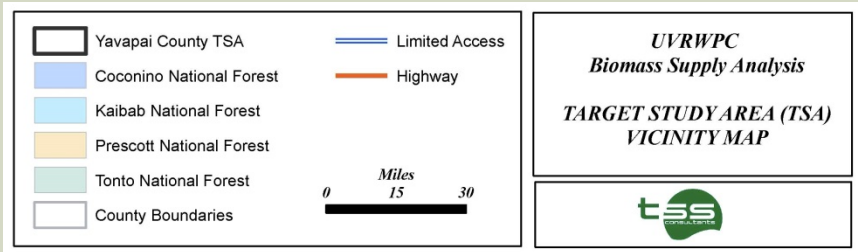
- Biomass feedstock supply analysis
- Feedstock competition analysis
- Feedstock Delivered cost analysis
- Draft and Final Report

TYPES OF WOOD WASTE CONSIDERED

- Forest residuals from management operations (limbs, tops, small diameter stems)
- Wood waste from hazardous fuels reduction activities (limbs, small stems)
- Woodland restoration residuals (pinyon-juniper removals)
- Urban wood waste (pallets, clean construction wood)
- Residential tree trimmings

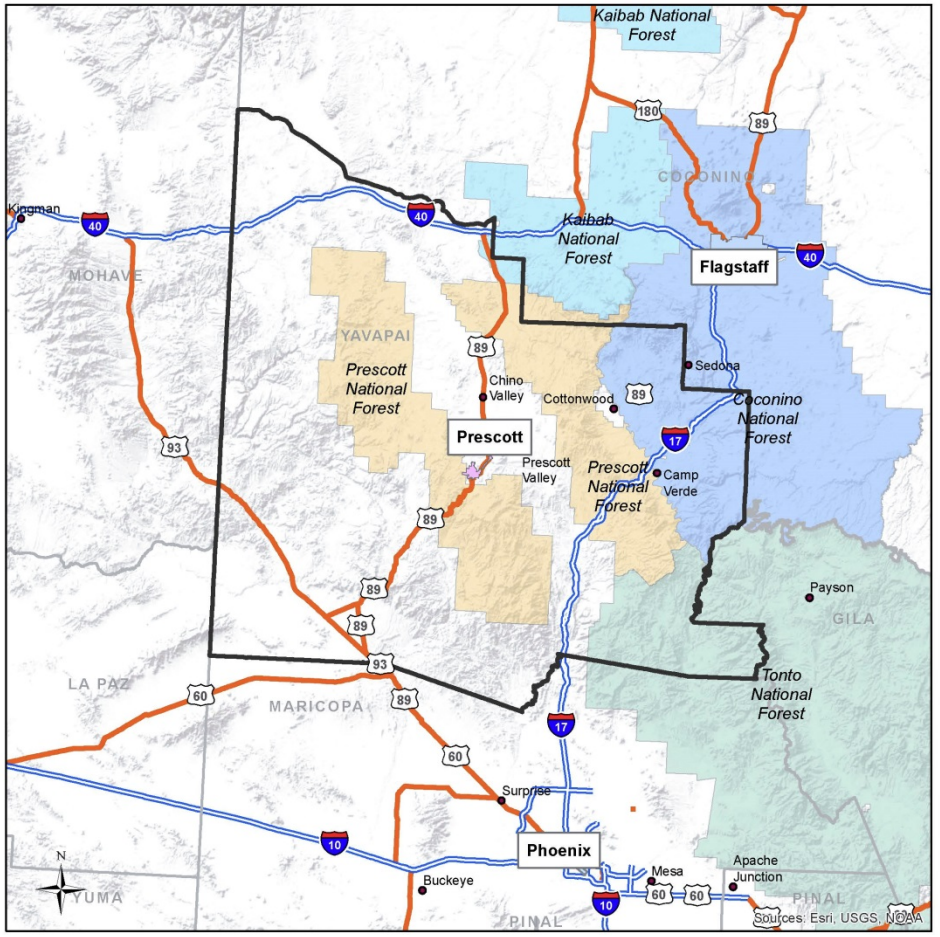
TARGET STUDY AREA

- Target Study Area (TSA) is Yavapai County
- 5,201,920 acres
- Includes portions of the Prescott, Coconino and Tonto National Forests



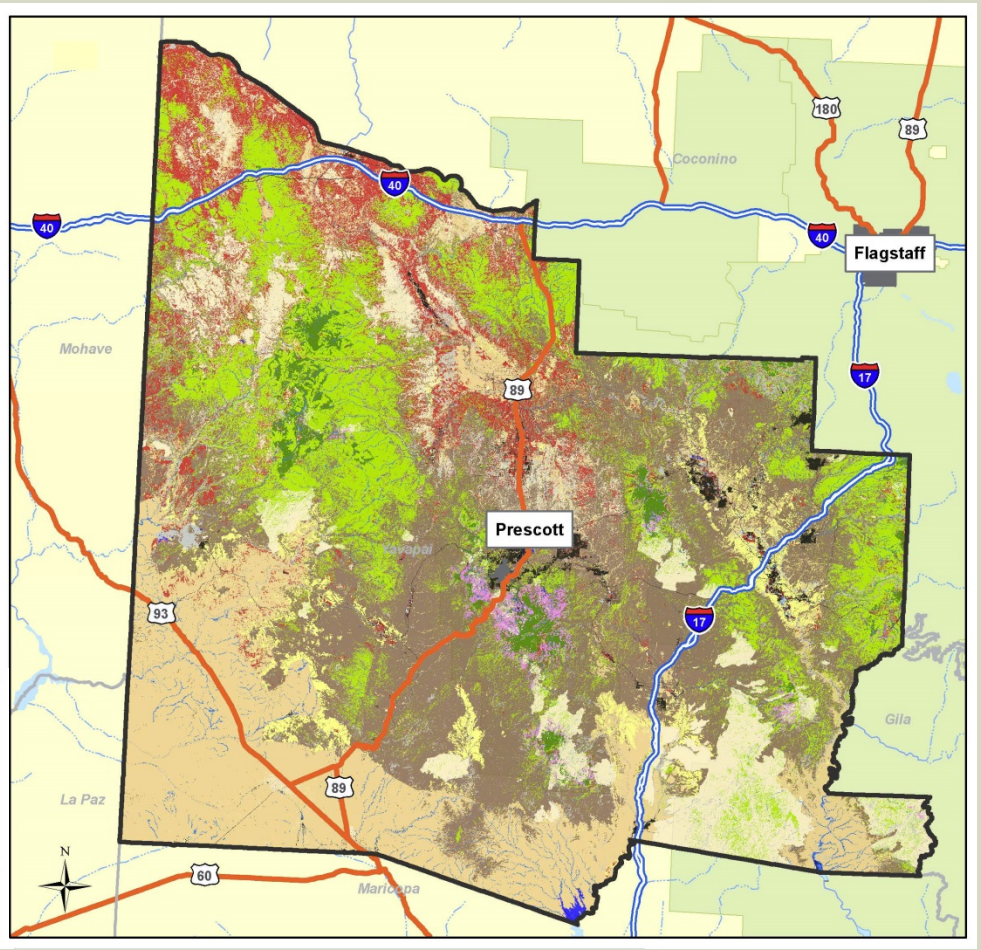
UVRWPC
Biomass Supply Analysis

TARGET STUDY AREA (TSA)
VICINITY MAP



VEGETATION COVER MAP

- Vegetation cover types include: tree-covered - conifer forest, pinyon-juniper woodland, juniper woodland, oak woodland; shrub-covered - shrubland, chaparral, mesquite, desert scrub; and grass-covered - native grasslands and grassland-steppe
- Pinyon-Juniper woodlands lie mostly in the northern and eastern portions of the county.

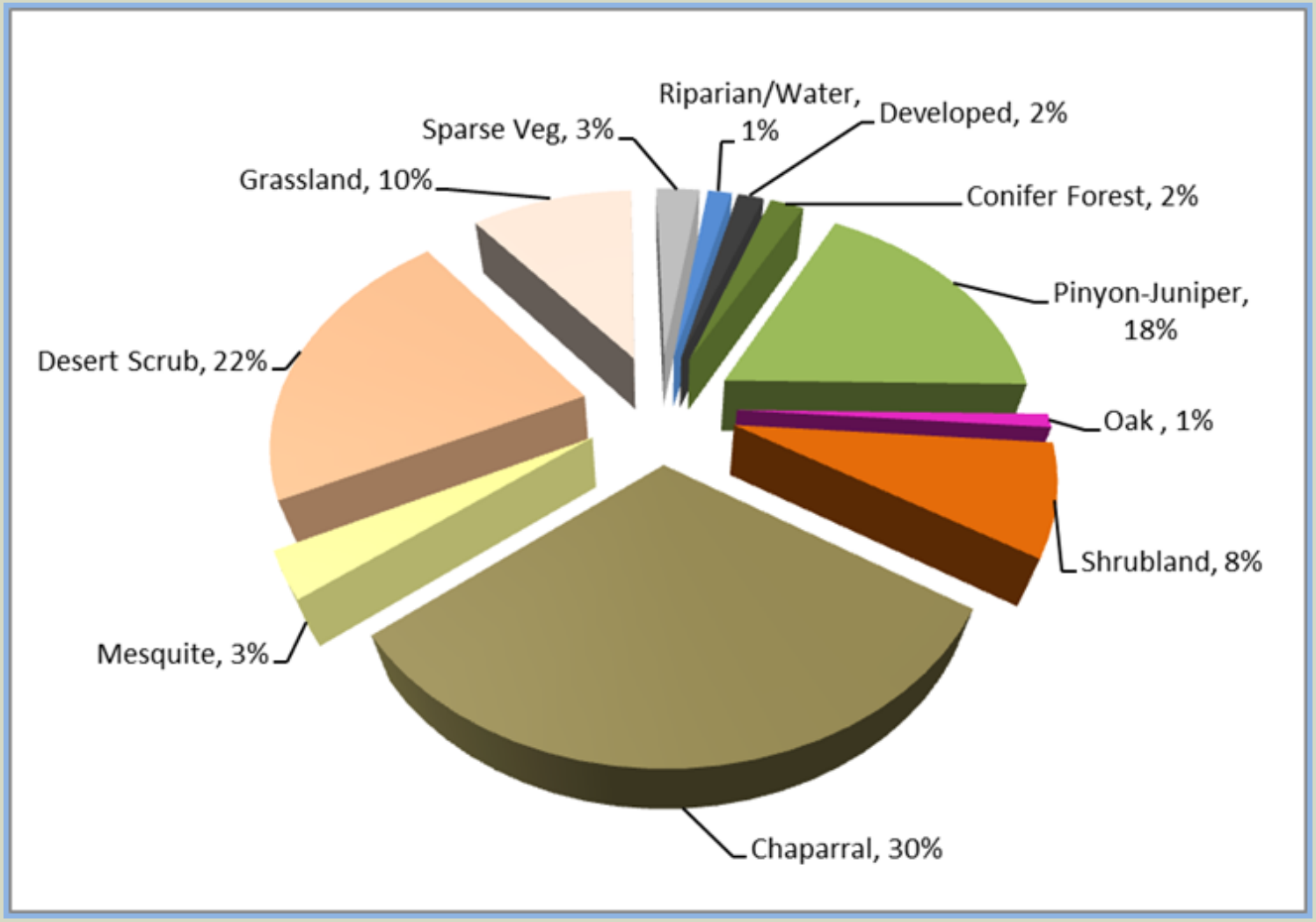


Shrubland
Chaparral
Conifer Forest
Desert Scrub
Developed
Grassland
Pinyon-Juniper
Mesquite
Oak Woodland
Open Water
Riparian
Sparsely Vegetated
Interstate
US Highway
Yavapai County TSA
Miles
0 10 20

UVRWPC
Biomass Supply Analysis
Target Study Area

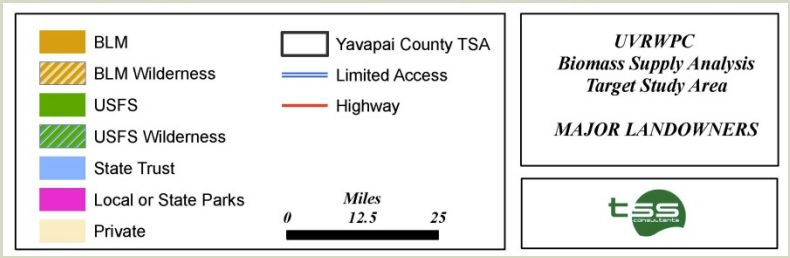
VEGETATION
USGS Landfire Data

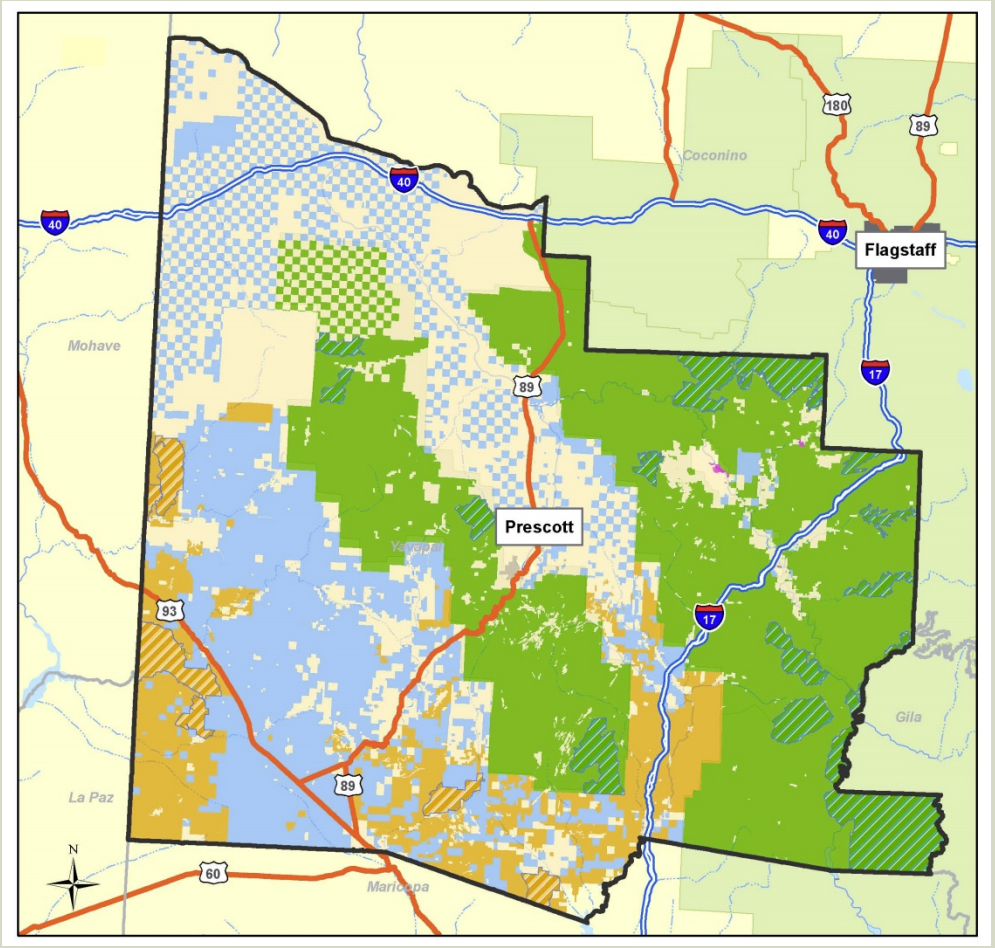
VEGETATION COVER FINDINGS



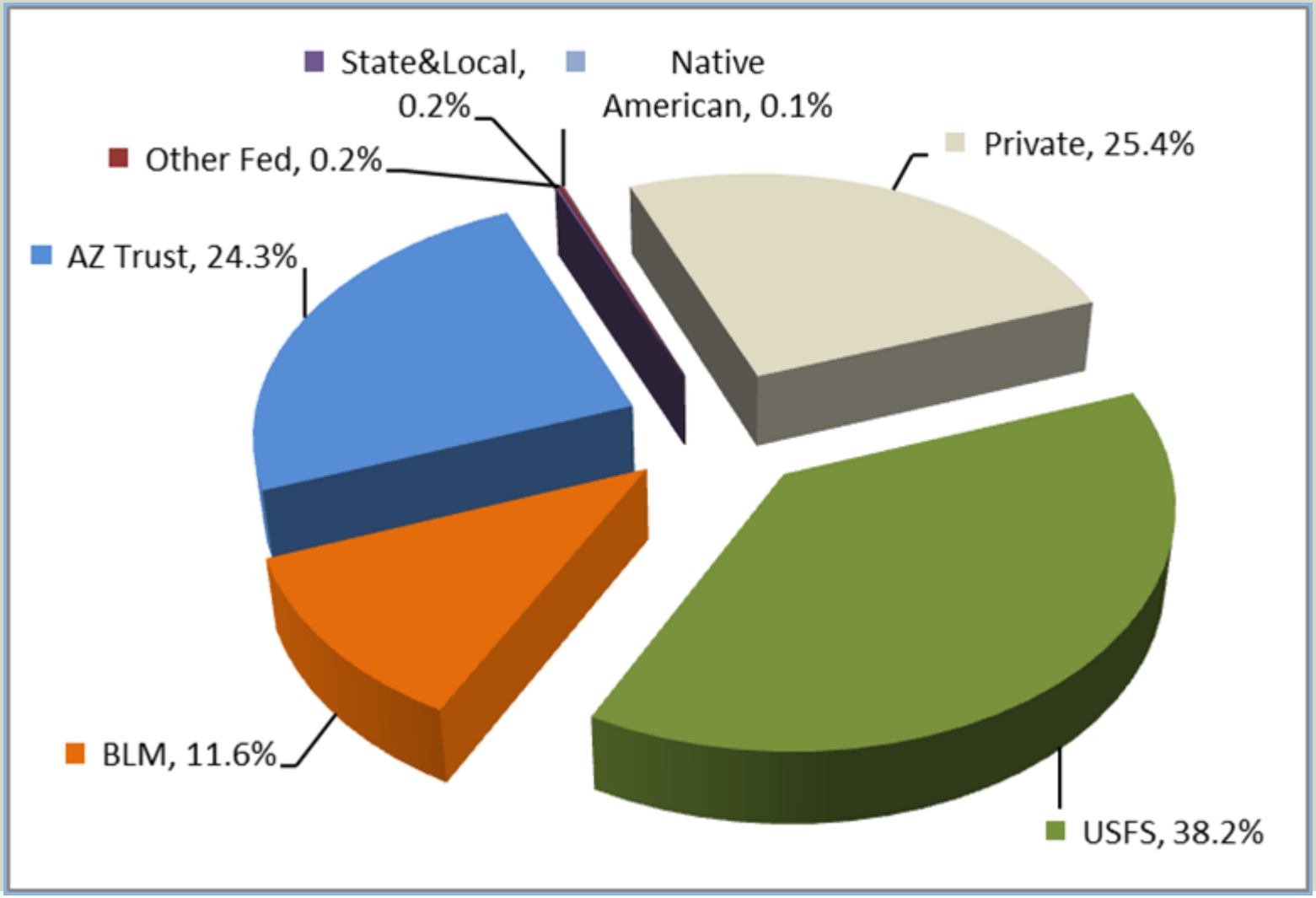
LANDOWNERSHIP MAP

- Major Landowners are the USFS, BLM, Arizona State Trust Lands and Private
- In the TSA landownership is dominated by federal and state managed public lands





LANDOWNERSHIP FINDINGS



VEGETATION BY LANDOWNER

- Land ownership of vegetation types with biomass potential - pinyon-juniper woodlands and conifer forest

Ownership	Pinyon-Juniper Woodlands		Conifer Forest	
	ACRES	%	ACRES	%
BLM	14,984	1.6%	11	<0.1
USFS	546,247	56.8%	85,094	76.4%
Private	247,848	25.8%	24,256	21.8%
State Trust	148,299	15.4%	1,780	1.6%
TOTAL	957,377	99.5%	111,142	99.9%

* PERCENT calculation:
Using the total vegetation type acres in the TSA, what percent is found in specified ownership class.

KEY FINDINGS – BIOMASS FEEDSTOCK SUPPLY AVAILABILITY

FEEDSTOCK SOURCE	POTENTIALLY AVAILABLE (BDT/YEAR)	TECHNICALLY AVAILABLE (BDT/YEAR)	ECONOMICALLY AVAILABLE (BDT/YEAR)
Timber Harvest Residuals	3,421	2,053	1,553
Forest Management and Restoration	1,500	975	800
Juniper and Pinyon-Juniper Woodlands Treatment	23,365	15,187	15,187
Urban C&D Wood Waste	11,081	1,662	1,662
Residential Tree Trimming	30,159	6,032	6,032
TOTALS	**69,526**	**25,909**	**25,234**

KEY FINDINGS – COMPETITION FOR BIOMASS FEEDSTOCK

COMPETITION	SIGNIFICANCE	COMMENT
Firewood - personal Use and commercial	Very	Nat'l forests issue thousands of permits/year
Landscape cover and soil amendment	Minor	Occasional processed green waste delivered to Phoenix are landscape and soil amend enterprises
Biomass power generation	Minor	Novo BioPower at Snowflake occasionally procures fuel from Yavapai County area
Biomass power generation	Potential	Drake Cement may consider co-firing on biomass
Densified fuels	Potential	Densified fuel bricks, pellets or torrefied fuels show promise
Essential oils	Potential	Niche use for juniper as an aromatic extract

KEY FINDINGS – BIOMASS FEEDSTOCK DELIVERED COST FORECAST

FEEDSTOCK TYPE	DELIVERED COSTS BASE CASE (MID TO HIGH DENSITY STANDS)		DELIVERED COSTS WORST CASE (LOW DENSITY STANDS)	
	LOW RANGE ($/BDT)	HIGH RANGE ($/BDT)	LOW RANGE ($/BDT)	HIGH RANGE ($/BDT)
Timber Harvest Residuals	$45	$50	$50	$55
Forest Management and Restoration	$45	$50	$50	$55
Juniper and Pinyon-Juniper Treatment	$55	$75	$60	$85

OBSERVATIONS

- Juniper and PJ veg cover represents 960,000 acres in Yavapai County. This amounts to just over 18% of the County.
- Conifer forest type is just over 111,000 acres, amounting to about 2% of the County.
- Planned Projects:
  - Prescott NF – Chino Restoration Project covers about 430,000 acres and will likely treat 90,000 acres (much of this is PJ veg cover).
  - Kaibab NF – South Zone Restoration Project covers about 270,000 acres with small portion in Yavapai County.
- As noted above, USFS is trending towards larger scale project areas. NEPA analysis can require up to 36 months, so lead time planning is critical.
- Drake Cement alternative fuels testing project results will be important.
- 4FRI Project wood fiber output may jump start commercial-scale landscape cover and soil amendment markets in Phoenix.

RECOMMENDATIONS

- Monitor 4FRI Project progress and market development.
- Consider Forest residuals from management operations (limbs, tops, small diameter stems)
- Wood waste from hazardous fuels reduction activities (limbs, small stems)
- Woodland restoration residuals (pinyon-juniper removals)
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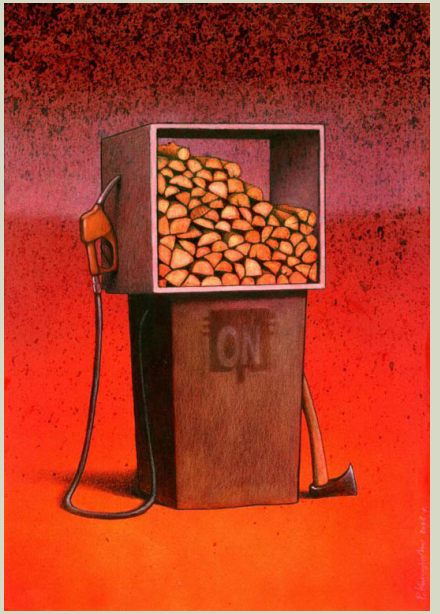
EXAMPLES OF VALUE-ADDED OPTIONS

- Power and thermal energy
- Soil amendments (e.g., compost and biochar) and landscape cover
- Biochar as filtering media
- Animal bedding
- Post/pole products for agricultural use
- Post/pole products for architectural use (such as vigas)
- Fencing products

EXAMPLES OF VALUE-ADDED OPTIONS (cont'd)

- Firewood and densified fuel logs
- Wood pellets for heating and/or power
- Community-scale combined power and heat production
- Greenhouse and native plants nursery
- Rustic furniture/outdoor recreation sets
- Small log sawmill
- Advanced biofuels for transportation
- Bioproducts (biochemicals, nanocellulose)



QUESTIONS or HECKLING REMARKS?

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