

The Effect of Aspect on the Abundance of Texas Madrone (*Arbutus xalapensis*) at Wild Basin

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Purpose – The purpose of this project is to document the status of the *Arbutus xalapensis* population at Wild basin and to determine factors that might affect its distribution.

Introduction – *Arbutus xalapensis* (Texas madrone) occurs throughout western Texas and the Edwards Plateau. Populations diminish toward the east, just west of “the” Balcones Escarpment. Wild Basin might represent the eastern limit of its distribution. Its abundance in the Preserve has been documented in the past, but little information has been collected recently, and so trends in the population have been difficult to assess. In addition, several factors (including aspect) have been suggested to influence its distribution (Whitenberg and Hardesty, 1978), but very few, if any, observations regarding those factors has been made in association with the *A. xalapensis* at Wild Basin. This project was designed not only to establish some certainty about how many individual *A. xalapensis* plants exist at Wild Basin, but also to provide information about their specific locations and environmental variables that prevail there.

Methods – Prior to this project, locations of madrones had been recorded at the site of Wild Basin Creative Research Preserve as far back as the 1970's. We used this information to establish the general location for transects through the Preserve in the areas where they had been previously reported. We used these transects as benchmarks in an exhaustive search for all individuals of the species at the Preserve, and we established them at twenty meter intervals in a direction that was perpendicular to the major drainage system. We searched for every individual with ten meters of each transect, so that we developed a census for the entire madrone population at the parts of the Preserve that were even remotely likely to have any individuals.

When we encountered an *A. xalapensis*, we recorded the GPS location (using a Trimble Juno SB handheld GPS unit) at the base of its trunk. We also determined the site aspect and slope (using a clinometer) and we measured the overall height of each plant. We also counted the number of living stems and measured the diameter and length of each. We also noted the general health of the plant (excellent, good, fair, poor and dead) and we noted the dominant species in the immediate (two meter diameter) area.

We classified the aspect values that we had recorded into four categories: north (325° to 55°), east (55° to 145°), south (145° to 235°) and west (235° to 325°). We also quantified our subjective classifications of health so that trees in excellent health were scored as “4”, those in good health were scored as “3”, those in fair health were scored as “2”, and those in poor health were scored as “1”. Trees that were dead were not used in this analysis. We tested whether or not trees on slopes facing north and east had a higher health rating than trees on slopes facing south and west using ANOVA. We also determined the percentage of dead trees in each slope class.

Results – The locations of seventeen madrone plants has been established at Wild Basin, as has their vigor, their conspecific environment and the slope and aspect of the sites which they grow. Preliminary data are reported in Table 1. The statistical analysis reveals no significant differences in plant vigor with aspect, but that is to be expected with a census that includes only seventeen individuals, some of which were not used in the statistical analysis because they were dead.

Table 1. Preliminary data regarding location, status and other variable of *Arbutus xalapensis* individuals at Wild Basin.

Tag Name	Date	Tree no	7/18/13 lat	7/18/13 Long	Site Aspct	Site Slope	Height in Meters	Condition, Remarks
Arxa01	27-Jun	1	30° 18' 12.458"	97° 49' 28.711"	285°	10°	3.23	55% crown loss; tree diameter ~ 6 in.
Arxa02	27-Jun	2	30° 18' 12.648"	97° 49' 28.968"	260°	20°	4.5	crown is dead; tree diameter ~ 7 in.
Arxa03	27-Jun	3	30° 18' 12.7020"	97° 49' 29.5260"	250°	40°	6	tree diameter ~ 6 in.
Arxa04	28-Jun	4	30° 18' 12.738"	97° 49' 29.844"	48°	20°	5.5	stems all <1 in. diameter; tree diameter ~ 3 in.

Arxa05	28-Jun	5	30° 18' 12.6060"	97° 49' 28.44"	257°	7°	2.8	dead; tree diameter ~ 4 cm
Arxa?2	28-Jun	6	30° 18' 11.6040"	97° 49' 29.79"	24°	47°	1.8	tree diameter ~ 2 in., very near 2nd line
Arxa?6	28-Jun	7	30° 18' 10.29"	97° 49' 29.406"	34°	18°	2.5	tree diameter ~ 6 in.
Arxa?7	28-Jun	8	30° 18' 10.1040"	97° 49' 29.928"	20°	12°	4.5	tree diameter ~ 9 in.
Arxa?5	28-Jun	9	30° 18' 11.526"	97° 49' 30.816"	251°	3°	0.61	very young; tree diameter < 1 in.
Arxa?3	28-Jun	10	30° 18' 11.76"	97° 49' 30.66"	255°	11°	3.9	completely dead; tree diameter ~10 in. ; diameter of major dead stem- .21 m
Arxa?4	28-Jun	11	30° 18' 11.202"	97° 49' 29.822"	226°	12°	0.87	tree diameter < 1 in.
Arxa?1	28-Jun	12	30° 18' 12.36"	97° 49' 30.6401"	210°	12°	0.72	dead; tree diameter ~ 1 in.
Arxa18	28-Jun	13	30° 18' 11.114"	97° 49' 30.51"	33°	12°	2.1	dead; tree diameter ~ 2 in.
Arxa14	31-Jun	14	30° 18' 37.5"	97° 49' 32.766"	210°	8°	2.9	fair; road cut from 360 (right next to tree 15); tree diameter ~ 5 in.
Arxa15	31-Jun	15	30° 18' 37.48"	97° 49' 32.658"	210°	8°	3.1	fair; tree diameter ~6 in.
Arxa16	31-Jun	16	30° 18' 37.272"	97° 49' 32.458"	195°	19°	2.2	bad; road cut from 360, diameter of all sprouts < 1 in; tree diameter ~ 6 in.
Arxa17		17	30° 18' 11.64"	97° 49' 29.346"				
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Arxa03	27-Jun	3	30° 18' 12.7020"	97° 49' 29.5260"	250°	40°	6	tree diameter ~ 6 in.
Arxa04	28-Jun	4	30° 18' 12.738"	97° 49' 29.844"	48°	20°	5.5	stems all <1 in. diameter; tree diameter ~ 3 in.
Arxa05	28-Jun	5	30° 18' 12.6060"	97° 49' 28.44"	257°	7°	2.8	dead; tree diameter ~ 4 cm

Reference

- Whitenberg, D. C. and W. D. Hardesty. 1978. *Environmental factors affecting growth and development of the Texas madrone. II. Interaction of light intensity and water stress.* Texas Journal of Science. 30: 347-350.