

FLOOD CONTROL DISTRICT
of
Maricopa County

Manning's Roughness Coefficient Analysis

WATERMAN WASH

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2801 W. Durango
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Maricopa County, Arizona

March, 1990



STANLEY CONSULTANTS OF ARIZONA



Introduction

Manning's roughness coefficient (n values) have been estimated for use in backwater computations for the floodplain delineation of Waterman Wash. Separate field trips were made on October 25th and November 1st, 1989 by Stanley Consultants personnel for this purpose. FCDMC staff accompanied Stanley Consultants on October 25th to assist in "n" value determination. Additional sources referenced for "n" value determination included the project aerial contact prints, National Engineering Handbook, Section 4, and Open Channel Hydraulics by Chow.

The coefficients chosen were selected on the basis of engineering judgement. Consideration was given to the following interdependent criteria:

- A. Surface Roughness
- B. Vegetation
- C. Channel Irregularity
- D. Channel Alignment
- E. Silting and Scouring
- F. Obstruction
- G. Size and Shape of Channel
- H. Stage and Discharge

"n" values were selected in incremental values of 0.005. Both channel and overbank characteristics have been inspected to estimate the roughness values in those areas.

Photographs were taken at selected locations along the East and West prongs to document the values used and are presented along with a brief description.



Waterman Wash
Confluence

Mile 15.7

Left Overbank Area -

Looking upstream.
Typical vegetative
growth.

"n" = 0.060



Main Channel -
East Prong

Dense growth on sides.
Silty bottom, adverse
grades, partial
obstruction.

"n" = 0.055



Delta area between
East and West Prongs

Fenced rangeland with
sparse vegetative
cover.

"n" -0.045



Main Channel -
West Prong

Wide sandy bottom with
occasional growth.

"n" = 0.045



Right Overbank Area -

Looking upstream.
Sparse cover.

"n" = 0.055



Waterman Wash
East Prong

Mile 17.3

Left Overbank Area -

Looking upstream.
Average vegetation
with numerous braided
rivulets.

"n" = 0.065



Main Channel -

Silty bottom with
dense vegetative
sides.

"n" = 0.050



Right Overbank Area -

Typical vegetation.

"n" = 0.060



Waterman Wash
East Prong

Mile 19.3

Left Overbank Area -

Looking upstream.
Dense vegetation.

"n" = 0.065



Main Channel -

Dense growth on sides,
sandy bottom,
irregular.

"n" = 0.060



Right Overbank Area -

Looking upstream.

"n" = 0.065



Waterman Wash
East Prong

Mile 24.0

Left Overbank Area -
Dense vegetation.

"n" = 0.065



Main Channel -

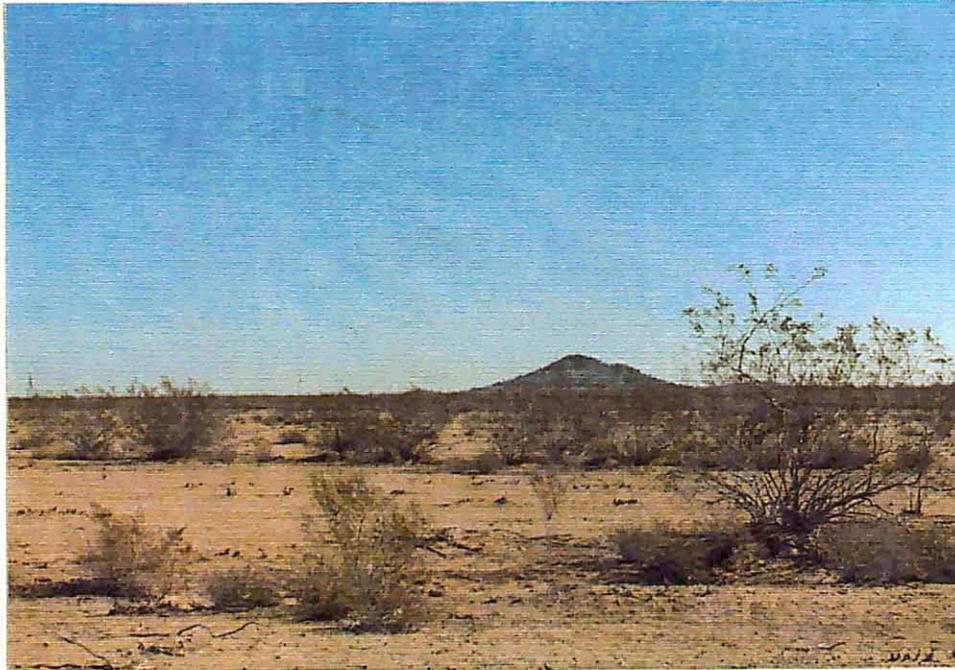
Silty bottom, dense
growth on sides.

"n" = 0.055



Right Overbank Area -
Dense vegetation.

"n" = 0.065



Waterman Wash
East Prong

End of Detailed Study

Mile 26.9

Left side looking
upstream -

Main channel has
disappeared, reverted
to shallow
flooding/sheet flow.

"n" = 0.060



Right side looking
upstream.

"n" = 0.060



Waterman Wash
West Prong

Mile 3.05

Left Overbank Area -

Looking upstream.
Typical vegetative
cover.

"n" = 0.060



Main Channel -

Typical sandy bottom
with vegetation on
side slopes.

"n" = 0.045



Right Overbank Area -

Looking upstream.
Typical vegetative
cover.

"n" = 0.060



Waterman Wash
West Prong

Mile 4.5

Left Overbank Area -

Vegetative cover
slightly dense than
average.

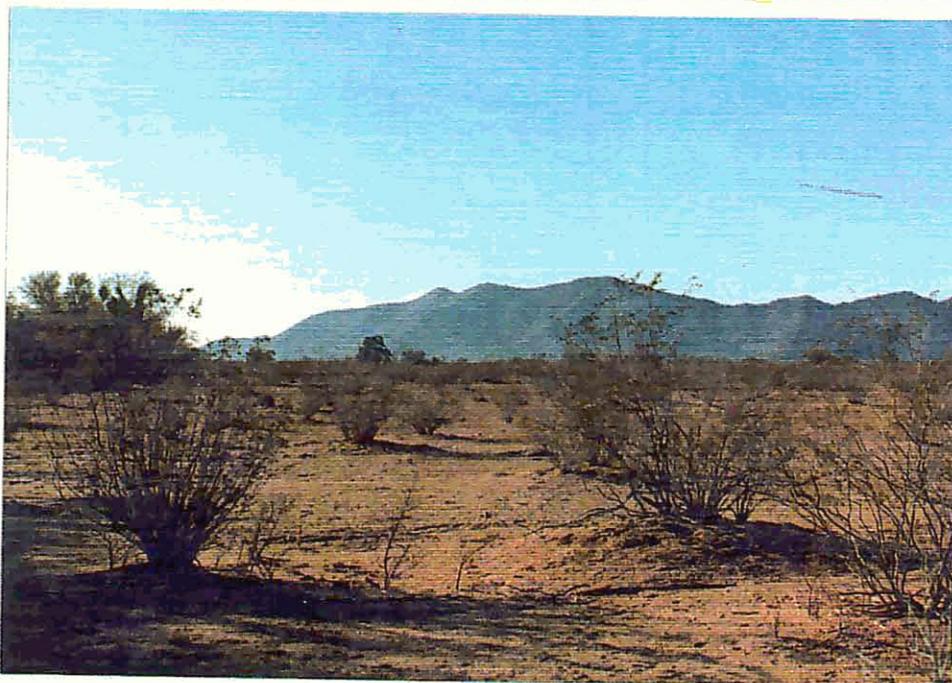
"n" = 0.060



Main Channel -

Side slopes are less
defined.

"n" = 0.045



Right Overbank Area -

Typical vegetative
cover.

"n" = 0.060

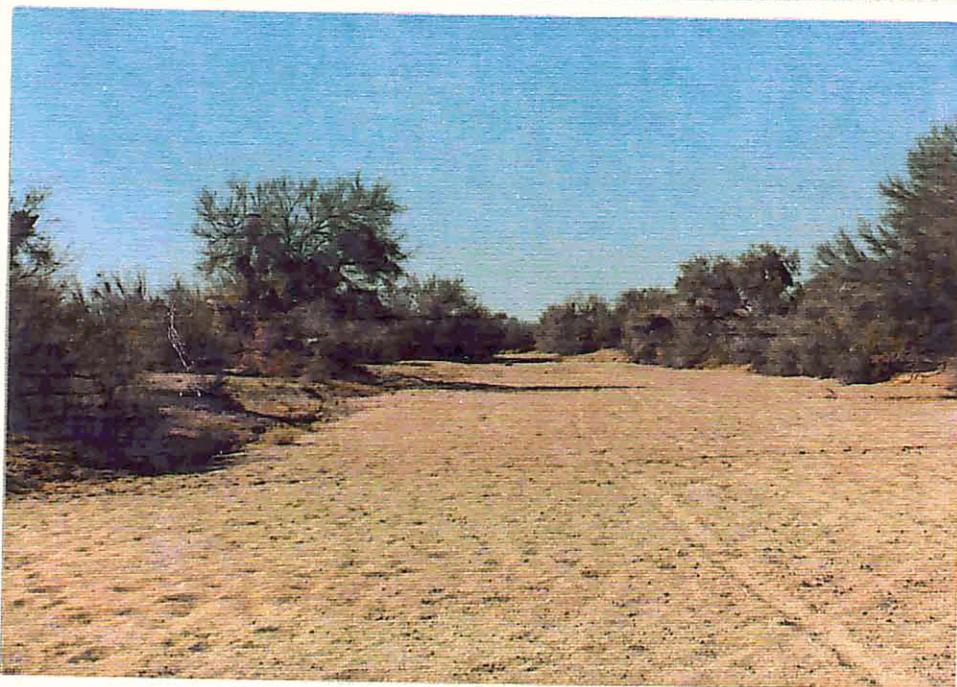


Waterman Wash
West Prong

Mile 8.5

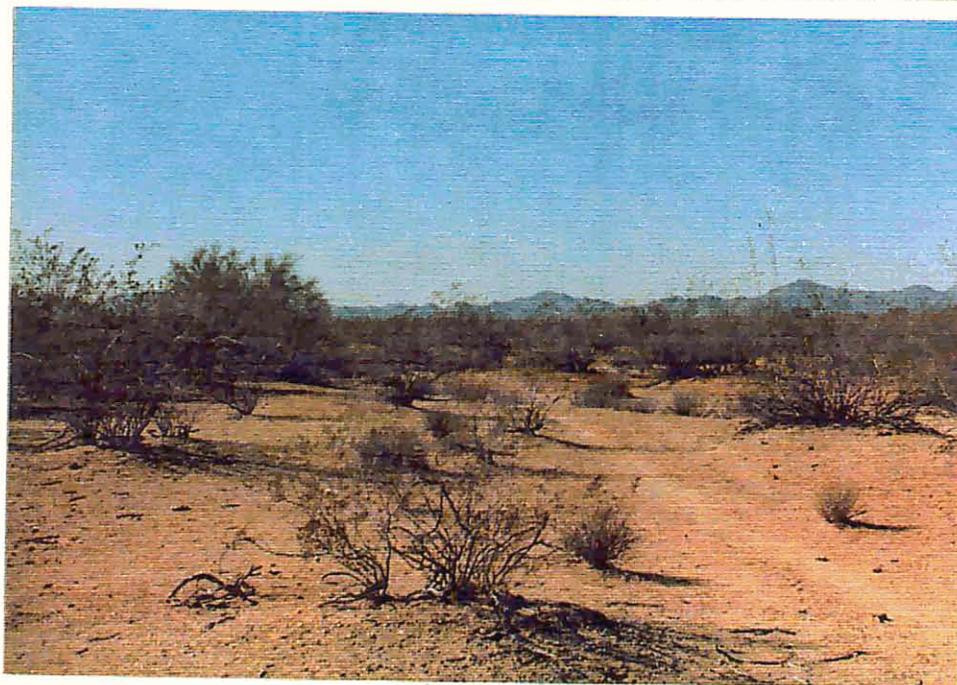
Left Overbank Area -
Sparse vegetation,
well defined rivulets.

"n" = 0.060



Main Channel -
Coarse sandy bottom,
ill defined side
slopes, shallow
depths.

"n" = 0.050



Right Overbank Area -
Typical vegetation.

"n" = 0.060