Historical changes in phreatophyte vegetation in Las Vegas Valley, Nevada

by

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Resources Department

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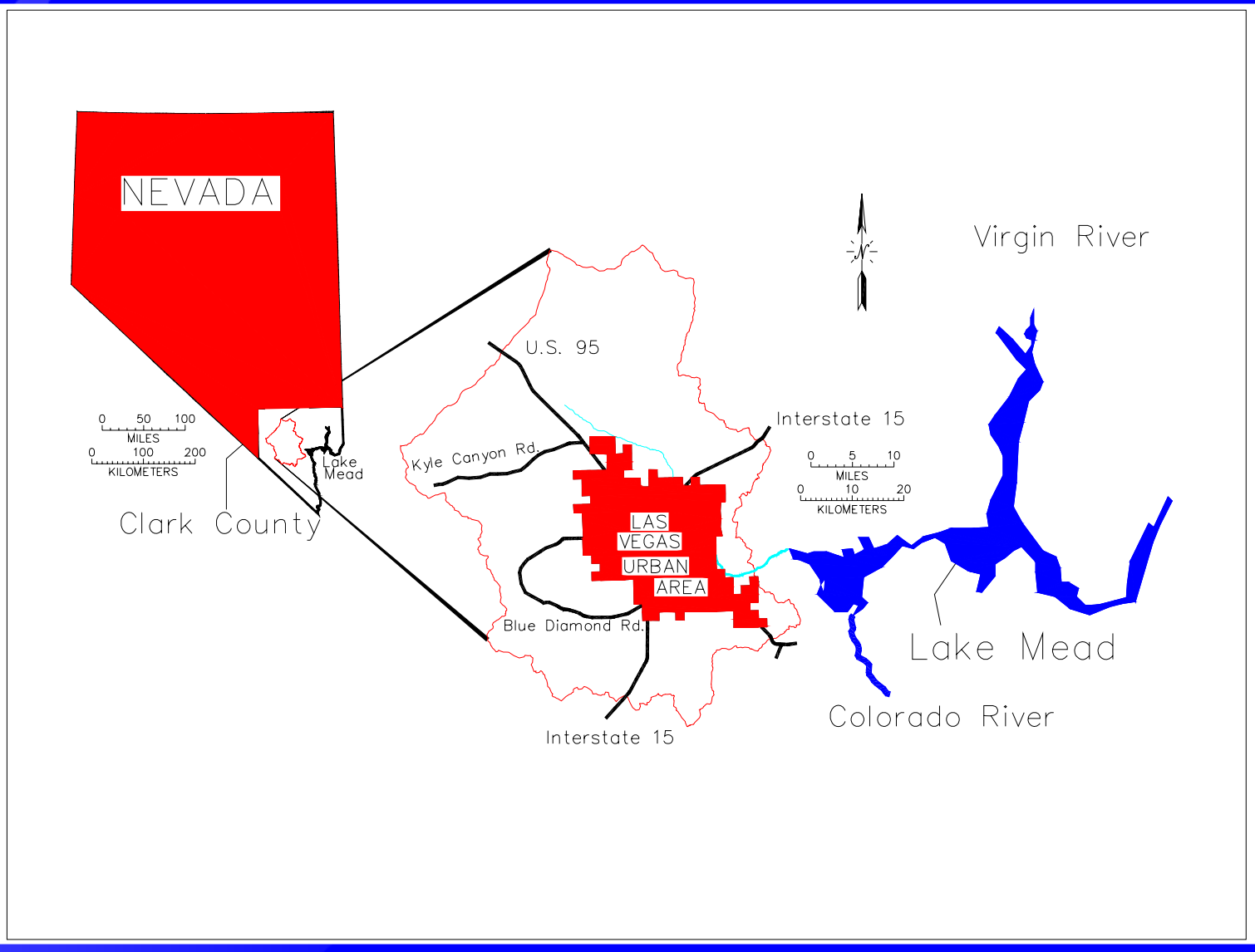
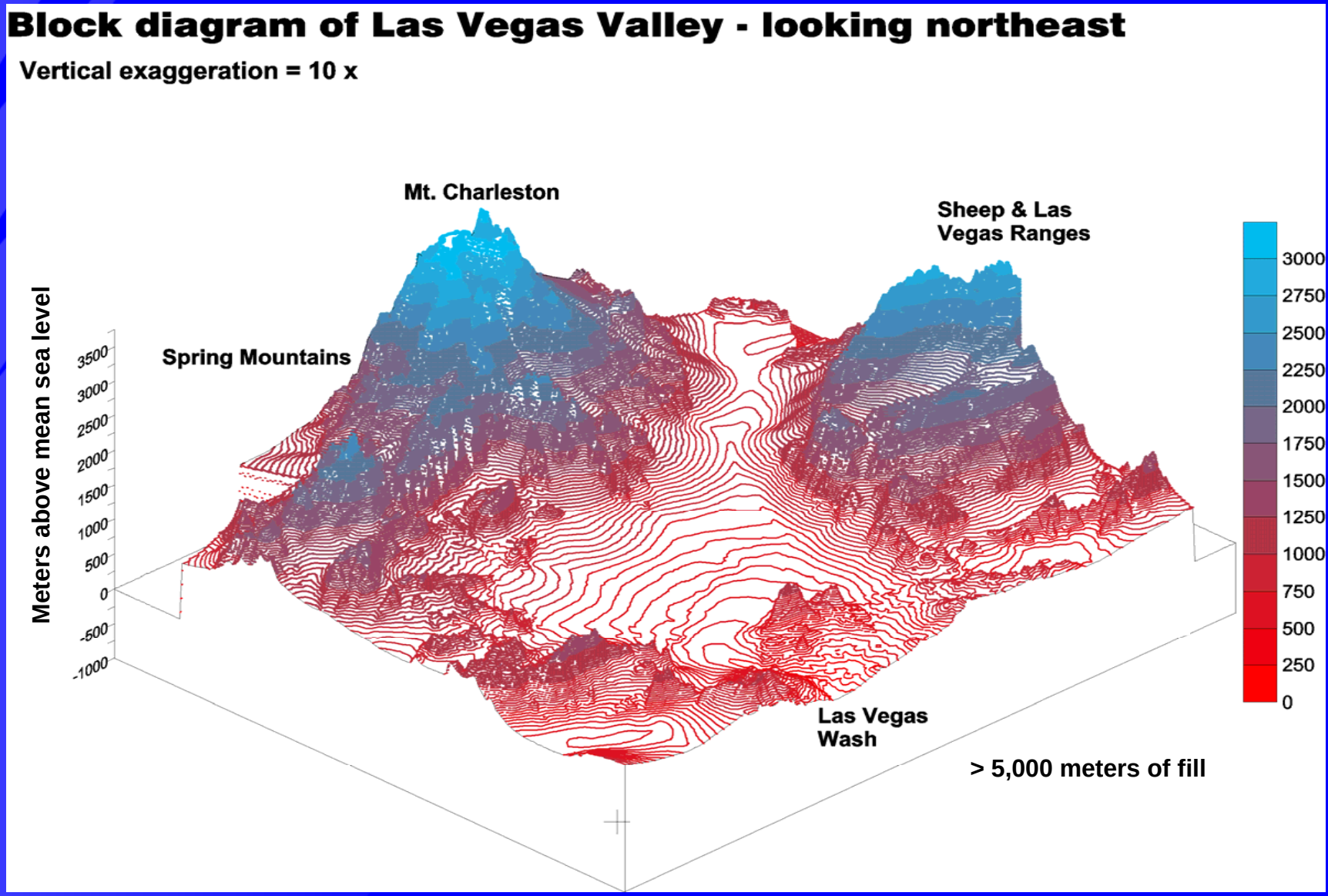
Spatial Analysis of Development

- Designed for use with ground water model of Las Vegas Valley
- Volumes and location of secondary recharge
- Volumes and location of evapotranspiration by native phreatophytes

Location of Las Vegas Valley



Topography of Las Vegas Valley



Las Vegas Valley - physical

- Area
  - Approximately 1,600 sq mi
- Highest point (west side)
  - Approximately 12,000 feet
- Lowest point (east side)
  - Approximately 1,500 feet

Las Vegas Valley - cultural

- Population
  - Approximately 1.5 Million
- Current major source of water supply
  - Colorado River / Lake Mead
- Historic major source of water supply
  - Local Ground-water

Ground Water System

- Upper 200 feet
  - Confining unit limits interaction with surface
- Confined aquifer system
  - 1000's of feet of interbedded fine and coarse grained deposits
- Carbonate Bedrock
  - Source of natural recharge

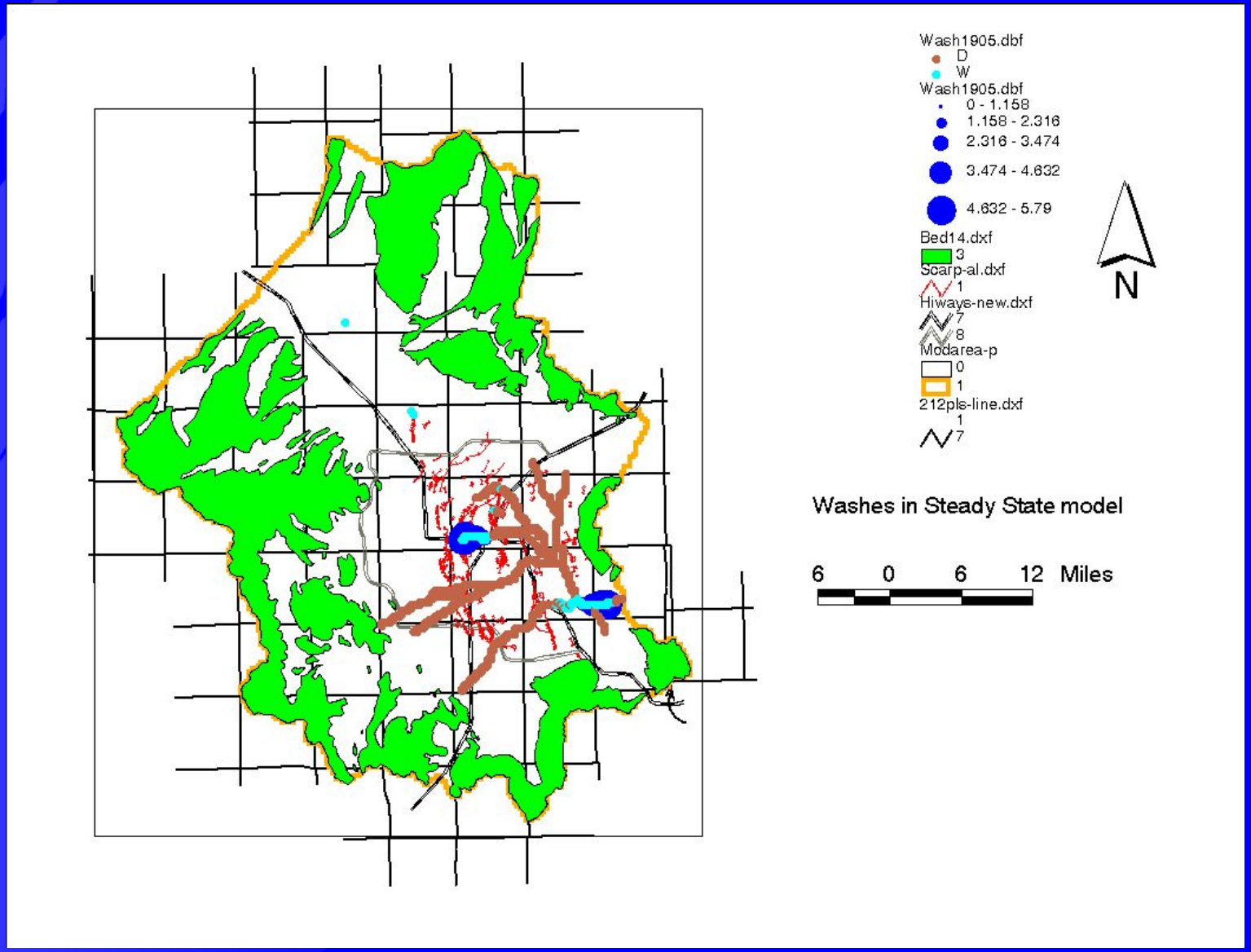
Surface Water System

- Location of springs
  - Along alluvial fault scarps in center of valley
- Major historical springs are dry
  - Associated with perennial streams and wetland areas
- Streams
  - All perennial streams and washes tributary to Las Vegas Wash

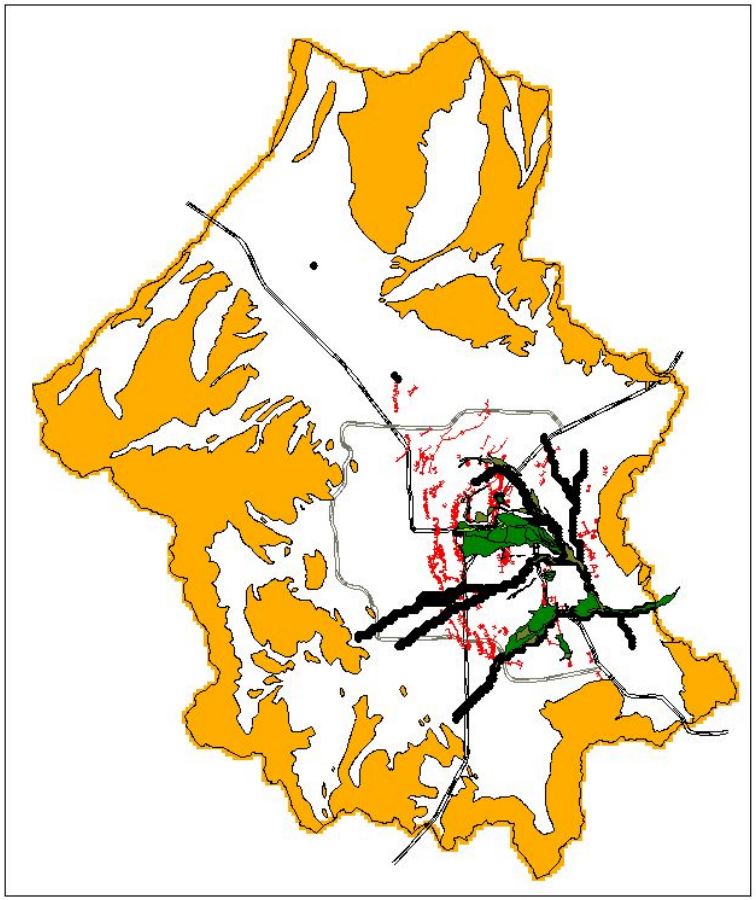
Cultural Development

- Development physically located near historic wetlands
- Urbanization removed most of native phreatophytes
- Waste water flows enhanced wetlands in lower Las Vegas Wash until 1975

In-Valley Stream Flow 1905



Native Phreatophytes 1905



Malm-x-utm
MCW
MES
NONE
SSB
Wsh2010x.shp
Bed14.dxf
3
Scarp-al.dxf
1
Hiways-new.dxf
7
8
Modarea-p
0
1

N

Historic Vegetation in 1905

6 0 6 12 Miles

Pre-development (prior to 1905) conditions

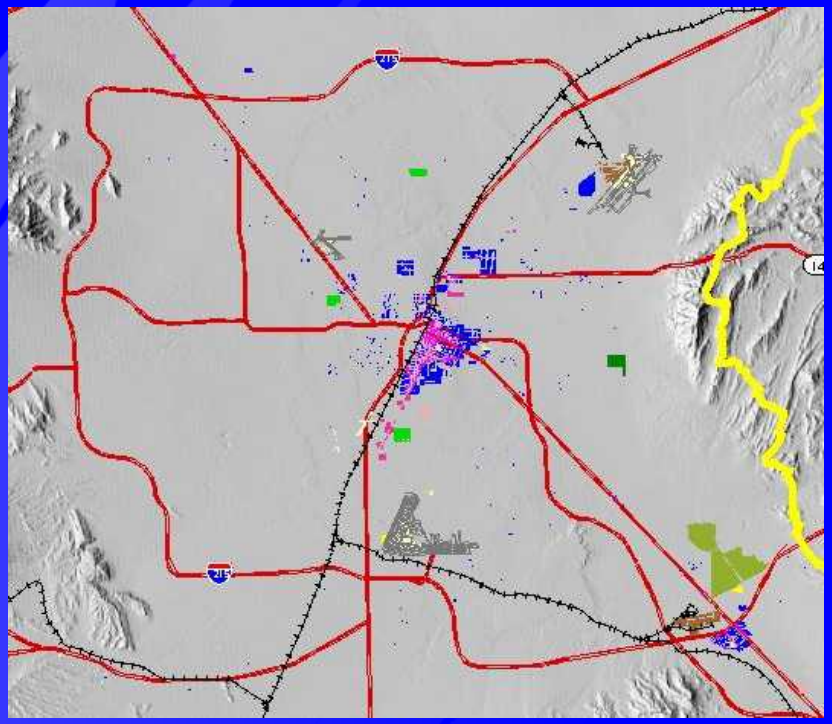
- Perennial Streams
  - Las Vegas Creek
  - Duck Creek
- Spring fed wetlands
  - Approximately 7,000 acres in North
  - Approximately 3,000 acres in South
- Minor agricultural development near springs and streams

Historical Changes 1905 - 1945

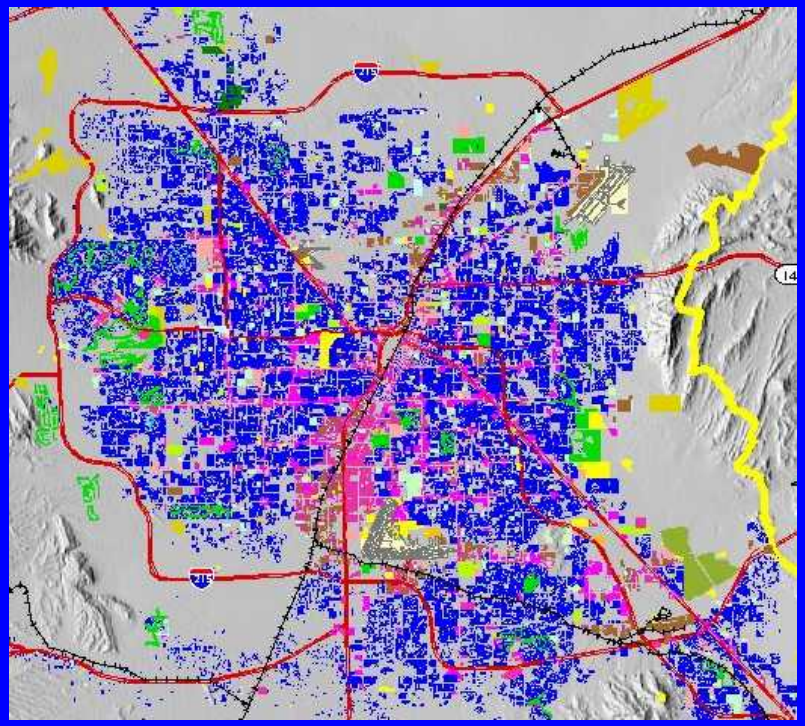
- Ground water production through wells for agricultural and municipal uses reduces artesian pressure in confined aquifers
- Minor augmentation (secondary recharge) of shallow system
- Minor loss of native phreatophytes due to changes in land use patterns

Extent of Metropolitan Area

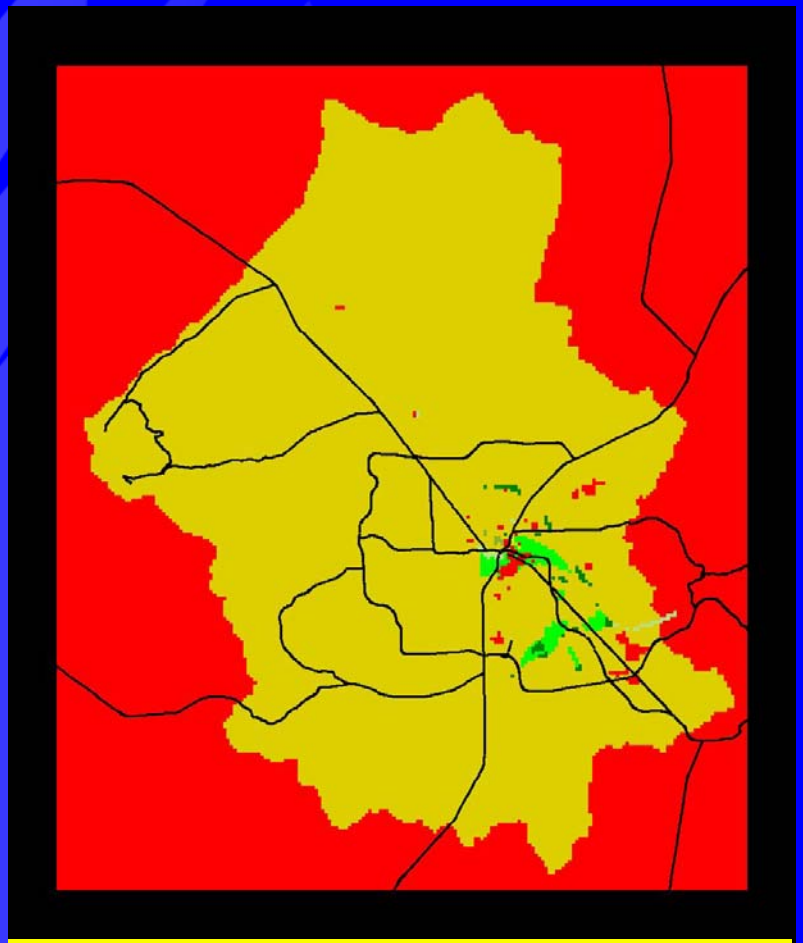
1950



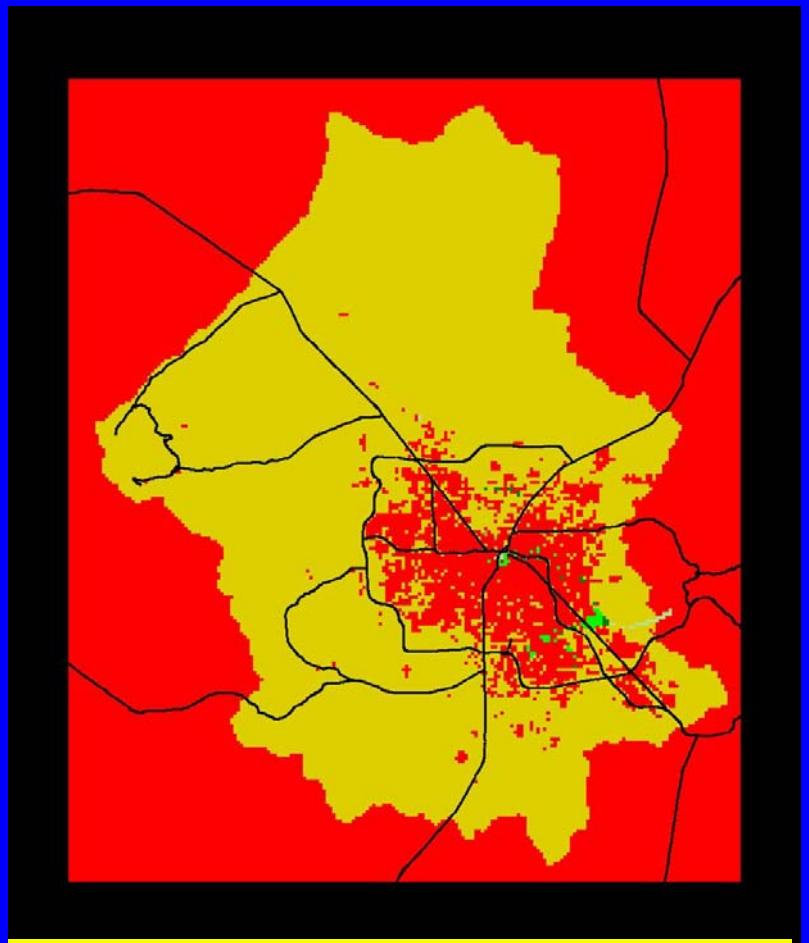
1999



Urbanization and Removal of Native Vegetation in late 20th Century



Developed Areas - 1950

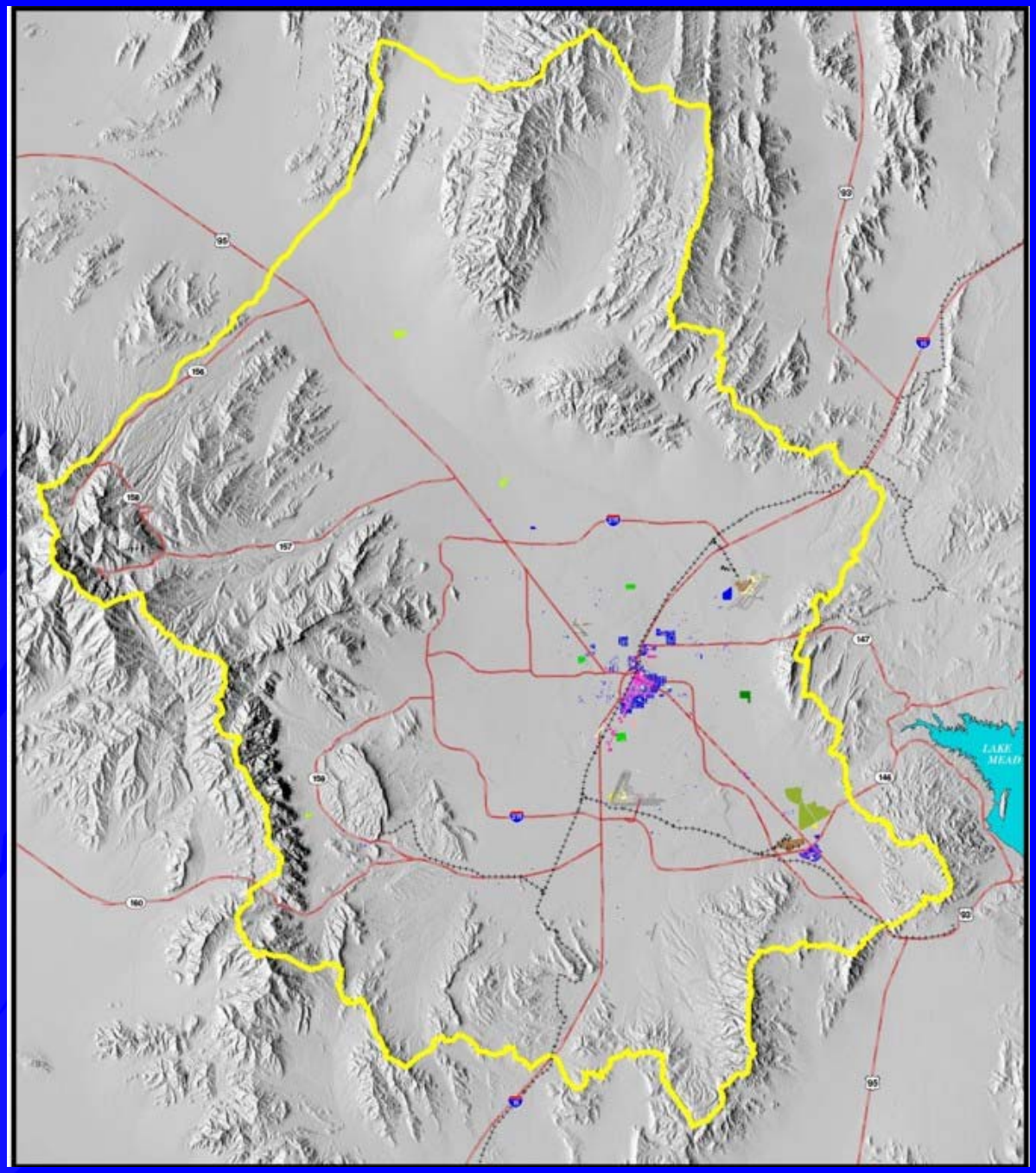


Developed Areas - 1999

Population:
41,000

Water Use:
50,000 AF

Developed
Land:
6,906 Acres



1950

Method of Analysis

- Clark County parcel database
- Aerial Photography
- Reconstructions of distributions of native phreatophytes in hydrological reports

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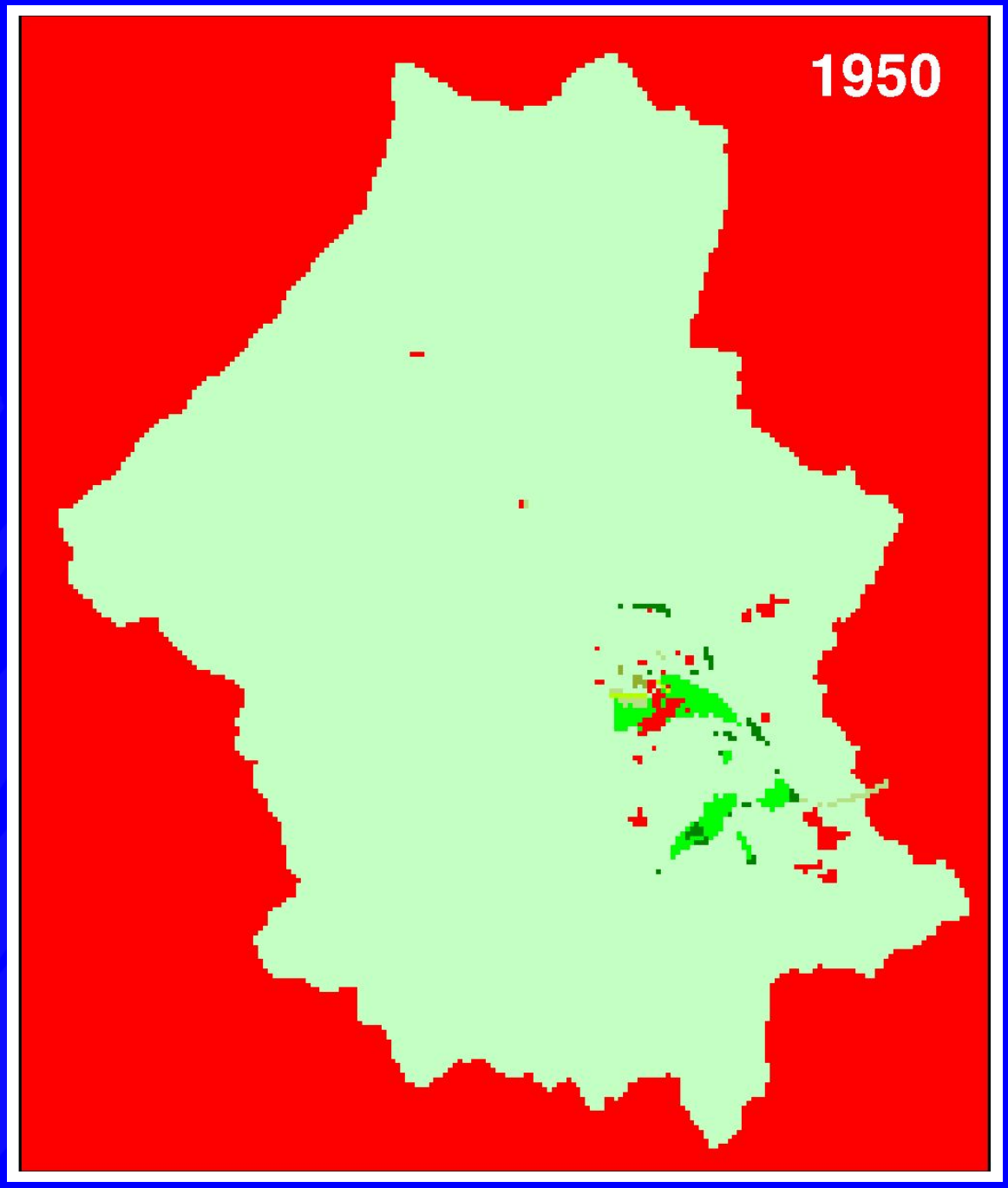
41,000

Water Use:
50,000 AF

Developed Land:
6,906 Acres

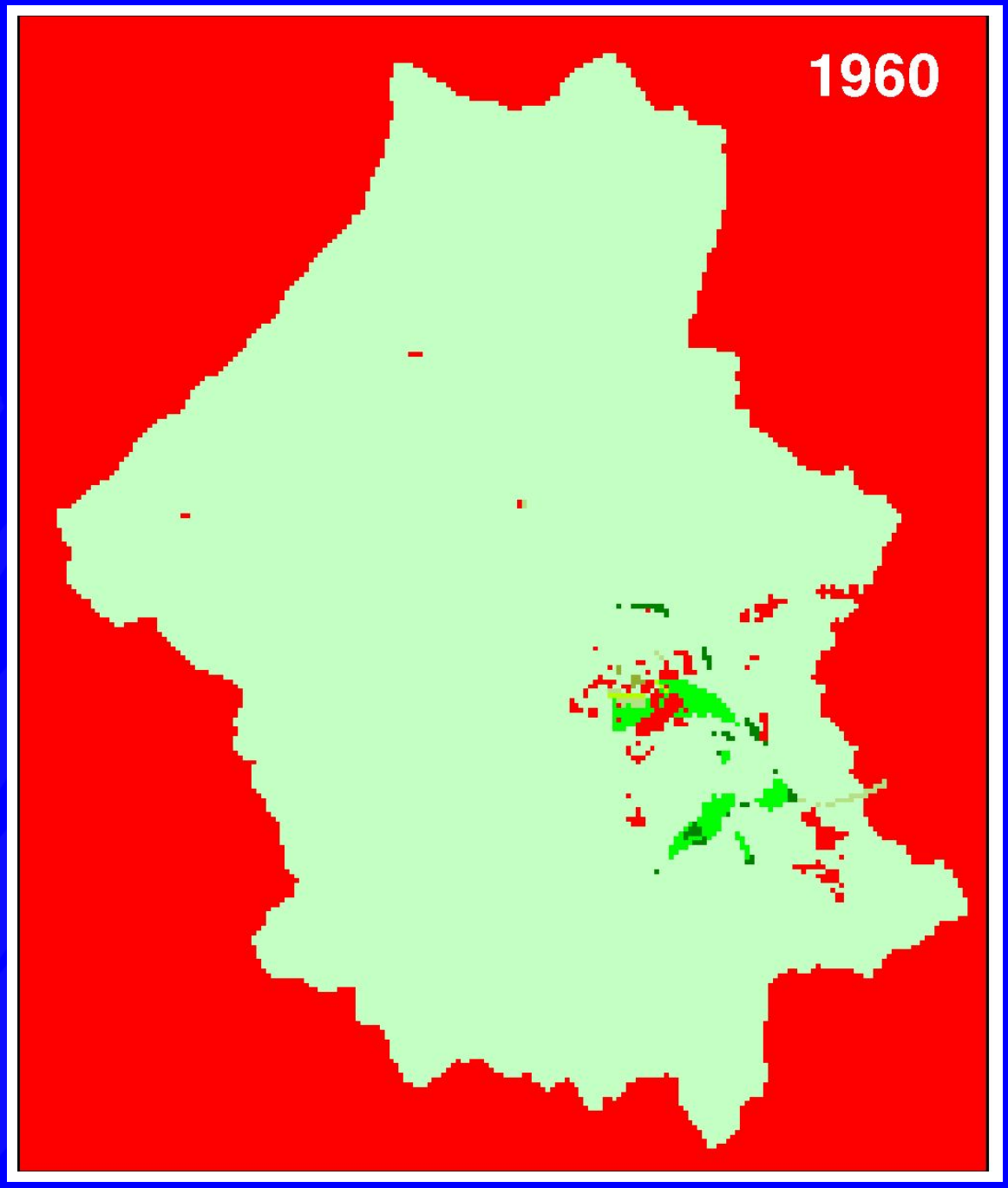


1950

Population:
119,000

Water Use:
67,000 AF

Developed
Land:
12,972 Acres

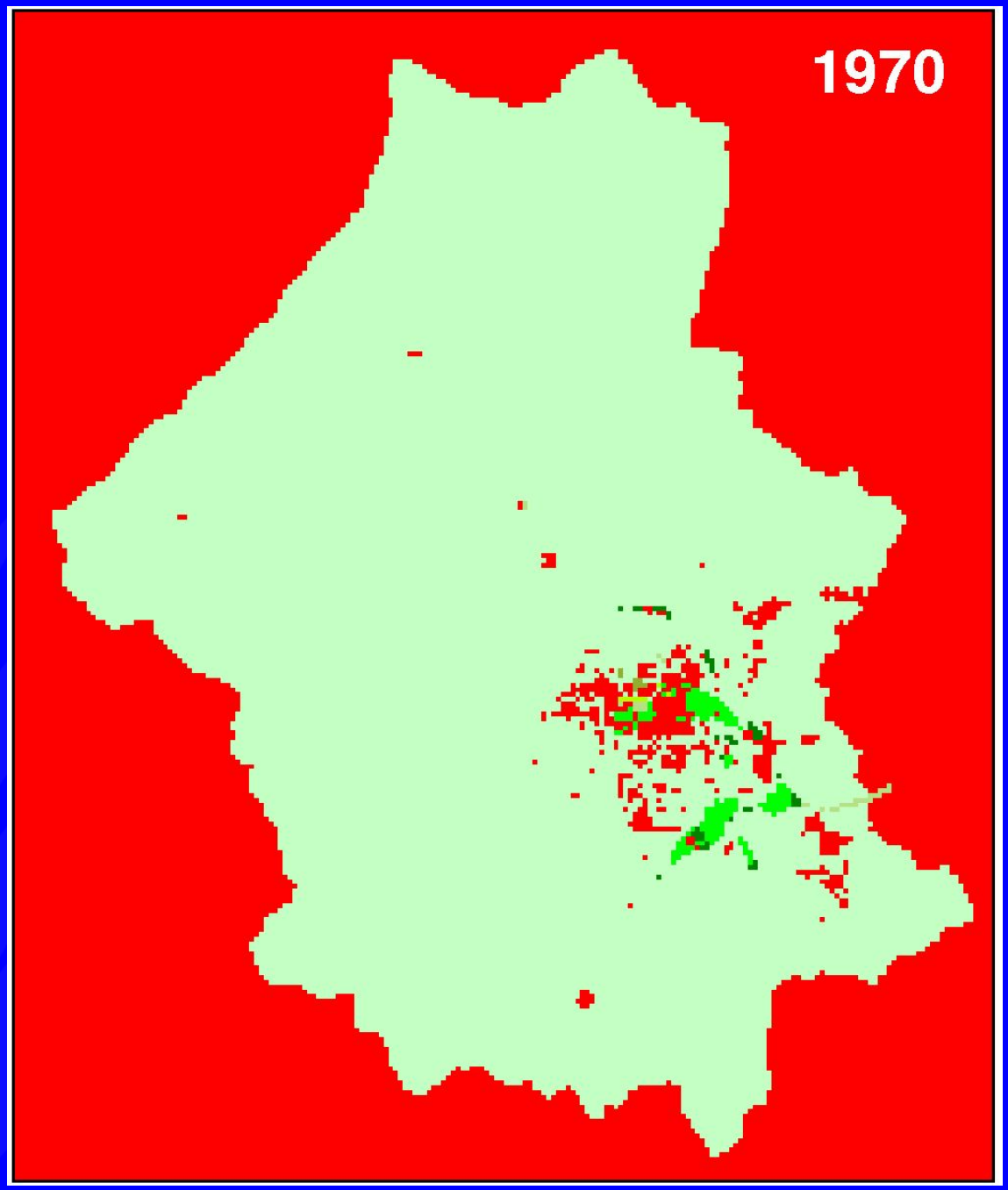


1960

Population:
263,000

Water Use:
121,000 AF

Developed Land:
28,121 Acres

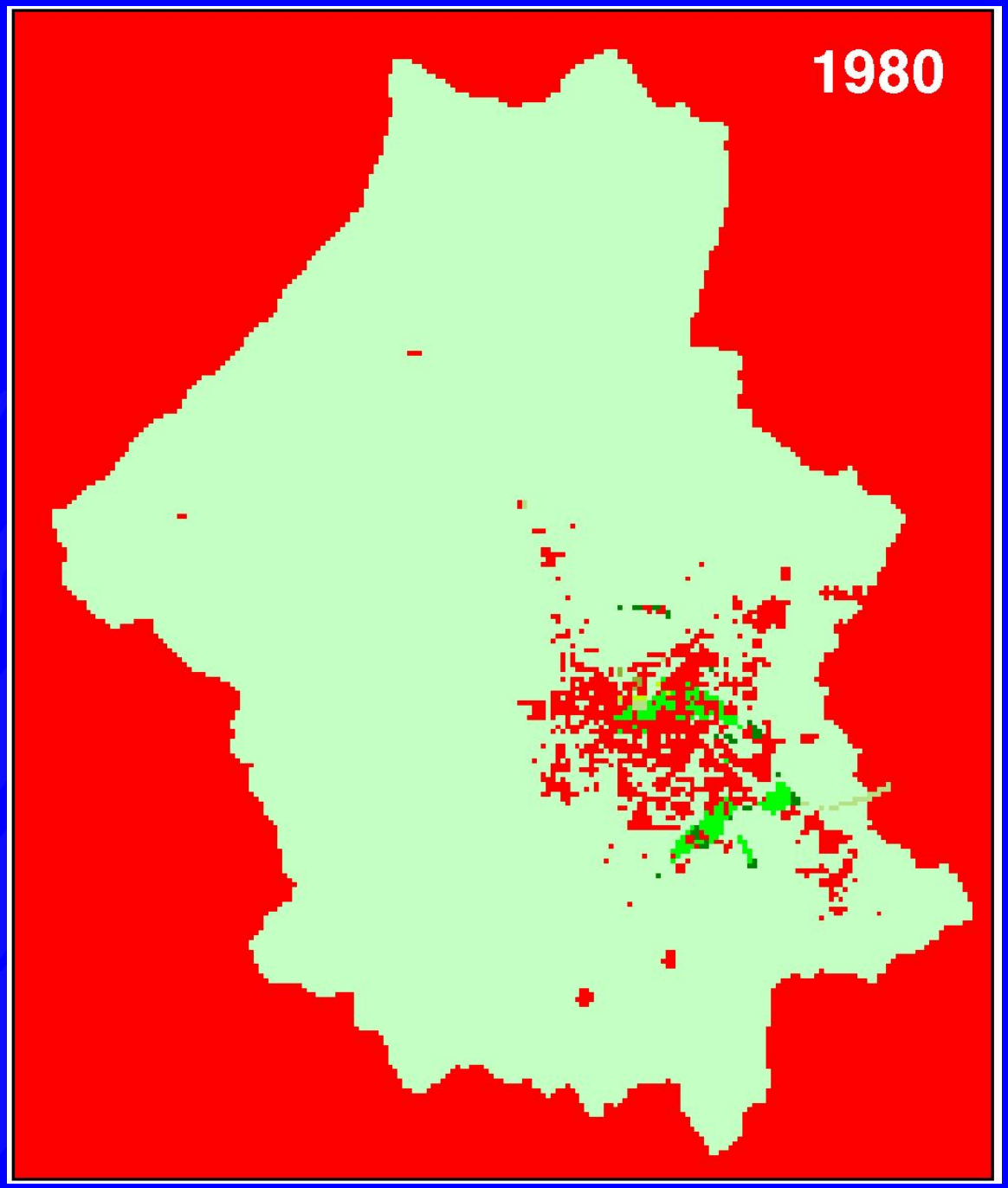


1970

Population:
444,000

Water Use:
191,000 AF

Developed Land:
48,250 Acres

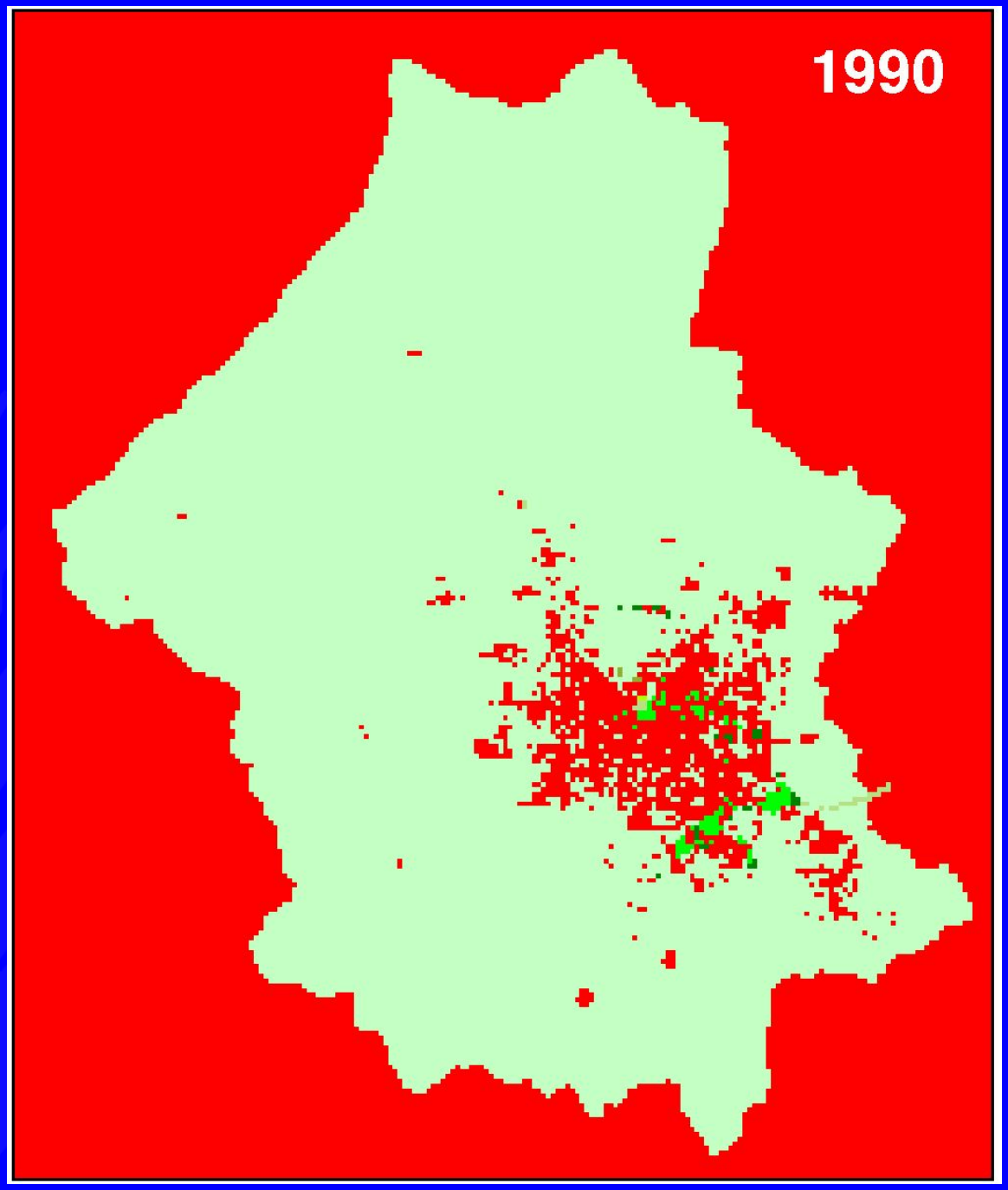


1980

Population:
748,000

Water Use:
310,000 AF

Developed Land:
71,630 Acres

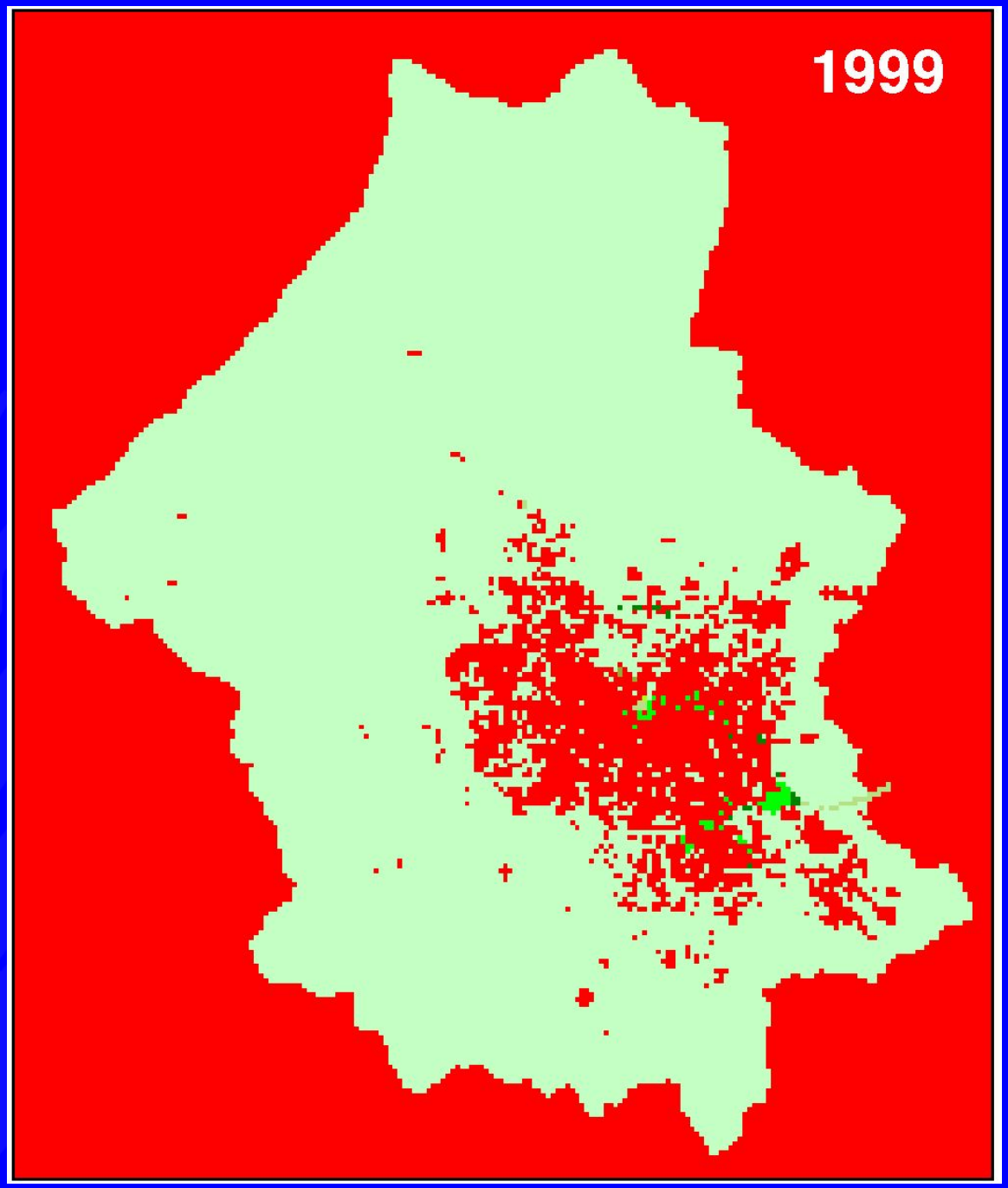


1990

Population:
1,367,000

Water Use:
480,000 AF

Developed Land:
111,201 Acres



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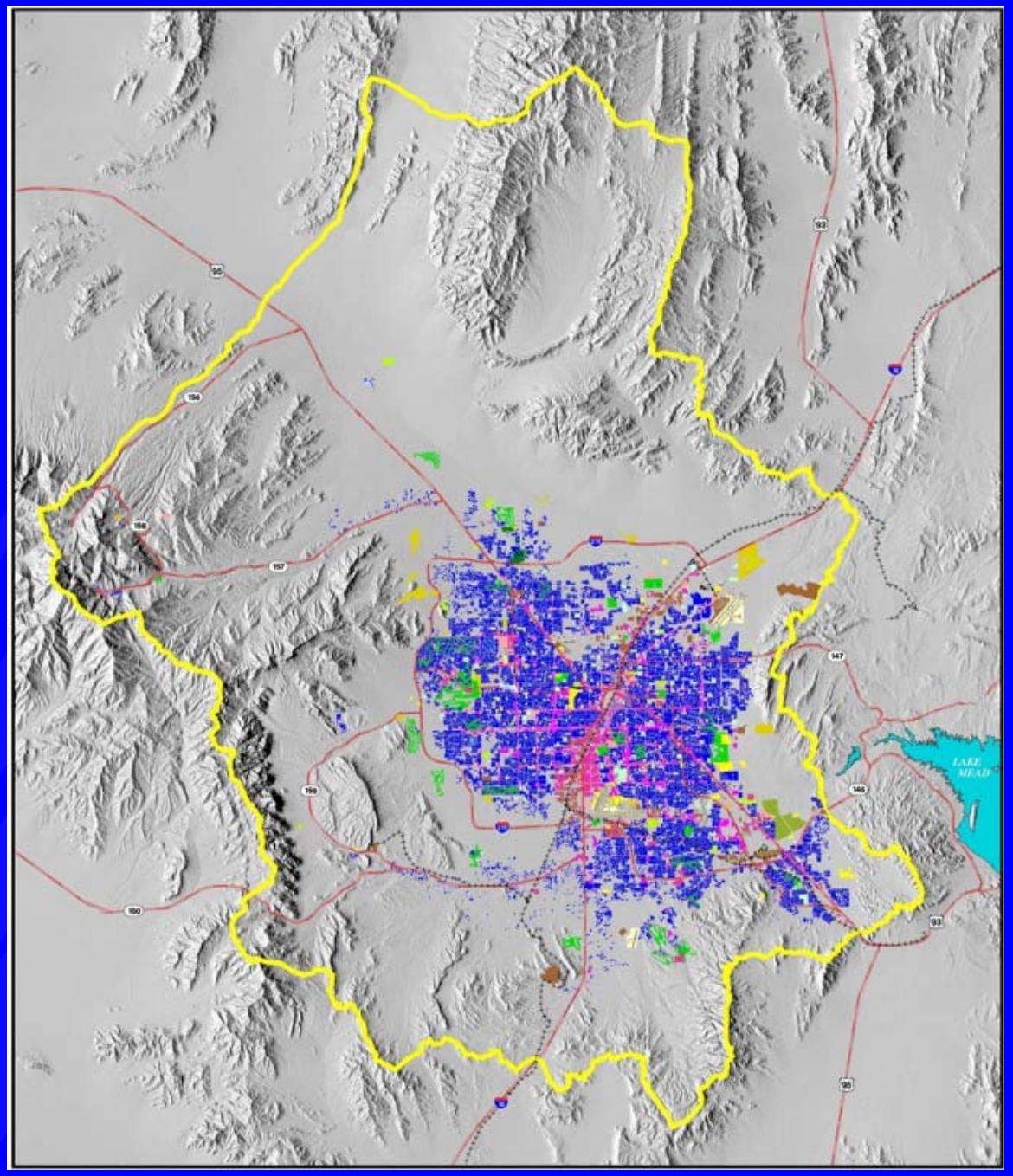
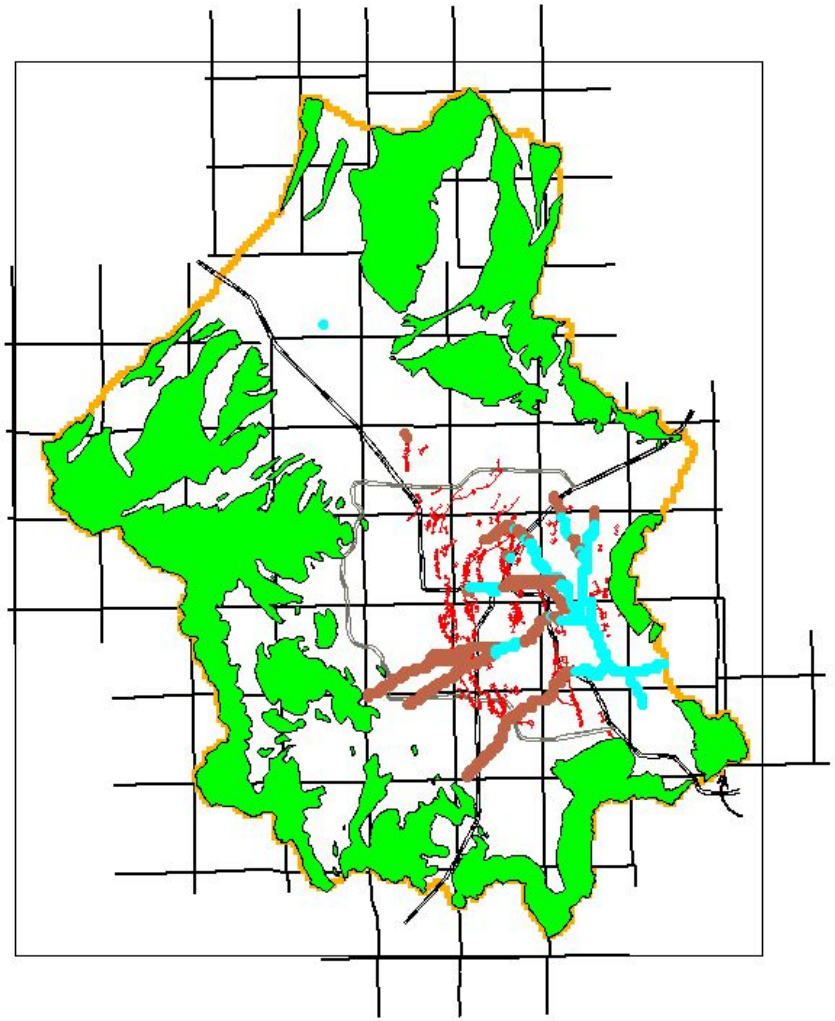


1999

In-Valley Stream Flow 1998



Wash1998.dbf
D
W
Bed14.dxf
3
Scarp-al.dxf
1
Hiways-new.dxf
7
8
Modarea-p
0
1
212pls-line.dxf
1
7

N

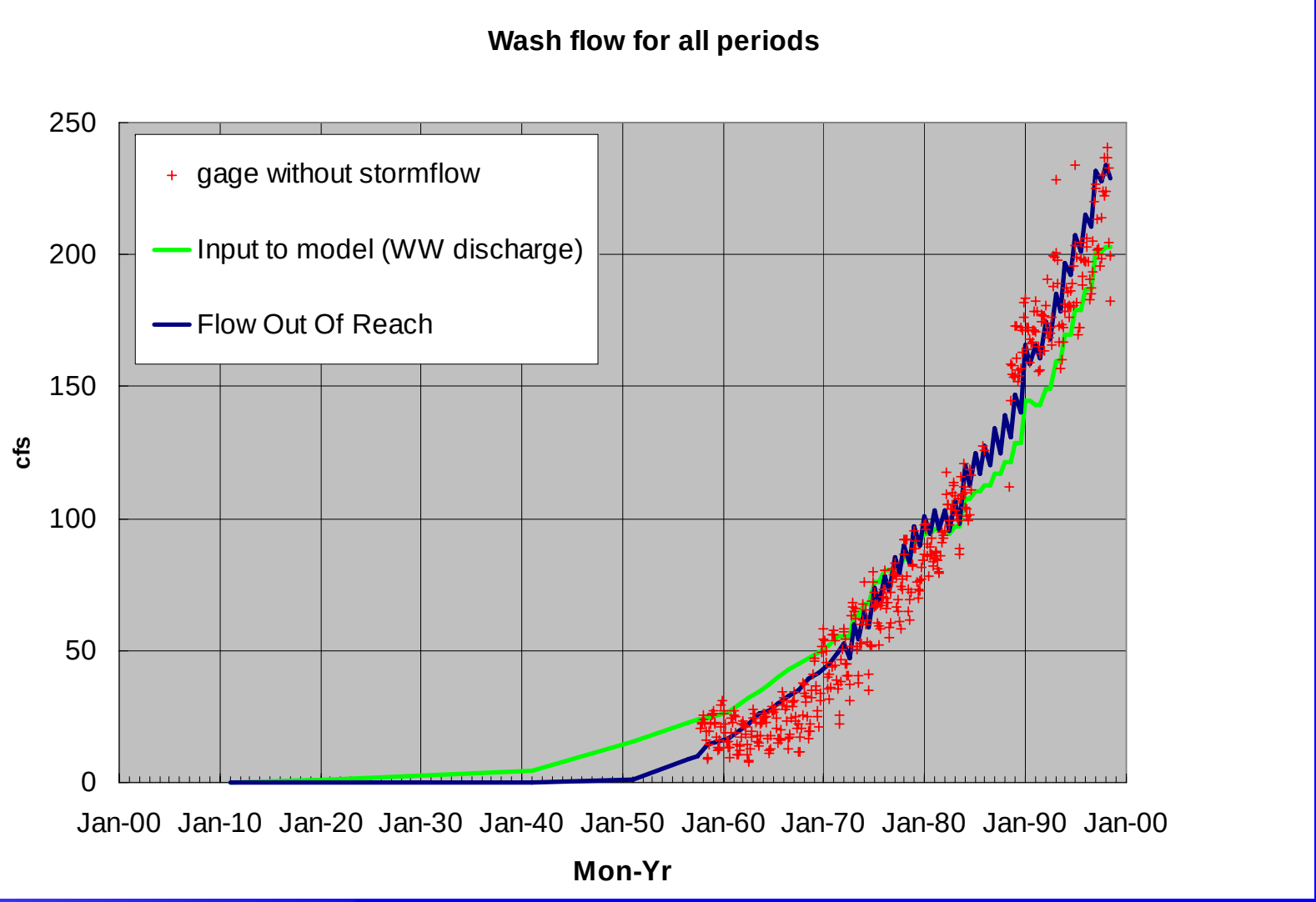
Washes in Fall 1998

6 0 6 12 Miles

Changes in lower LV Wash

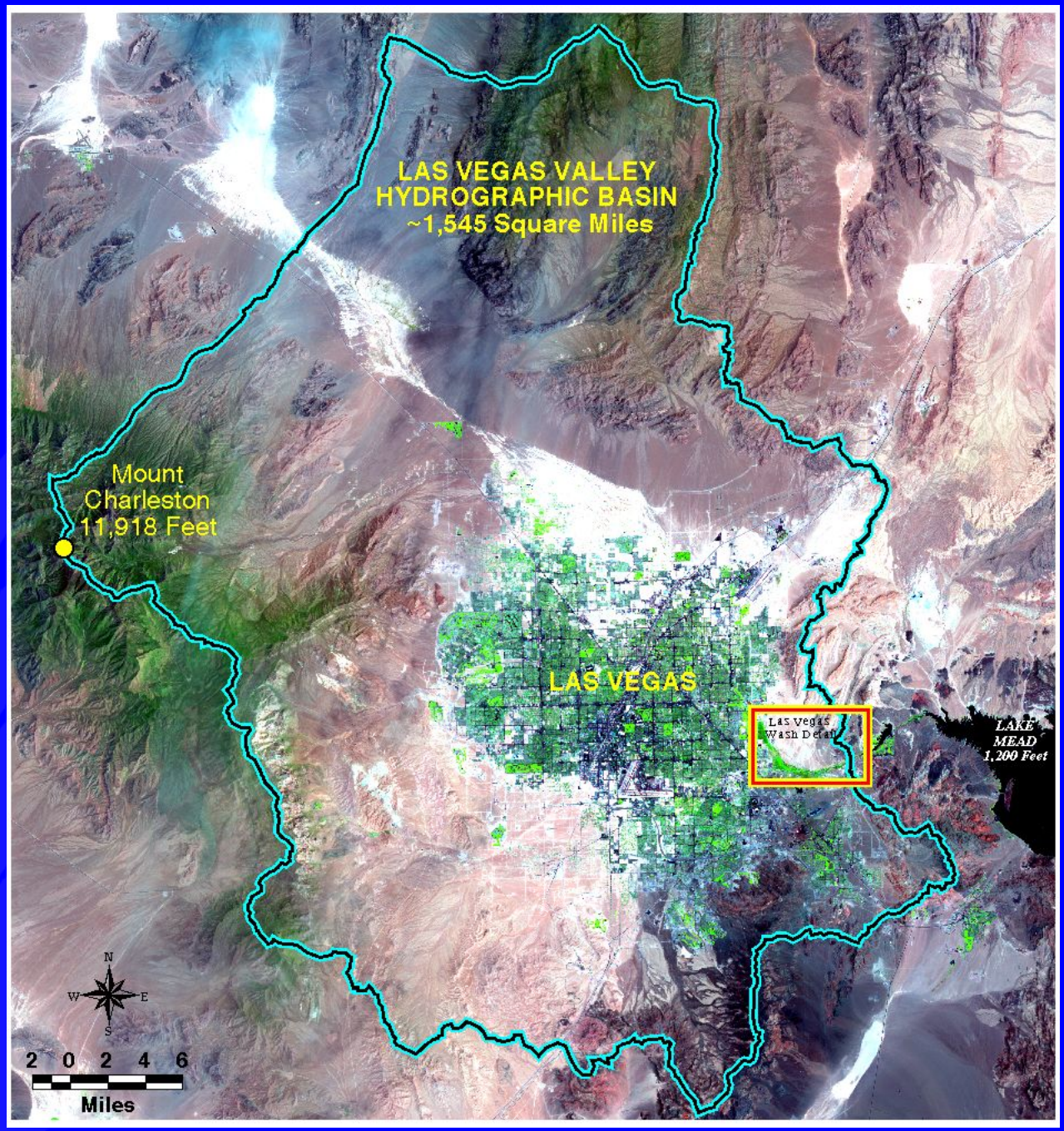
- Increase in waste water flow from ~ 5 cfs to > 200 cfs since late 1950's
- Early increase in flow enhanced vegetation
  - Before 1975
- Late increase in flow caused down cutting
  - After 1975
- Introduction of weed species (salt cedar)

Las Vegas Wash Flows 1905 - 1998



Satellite image of Las Vegas Valley

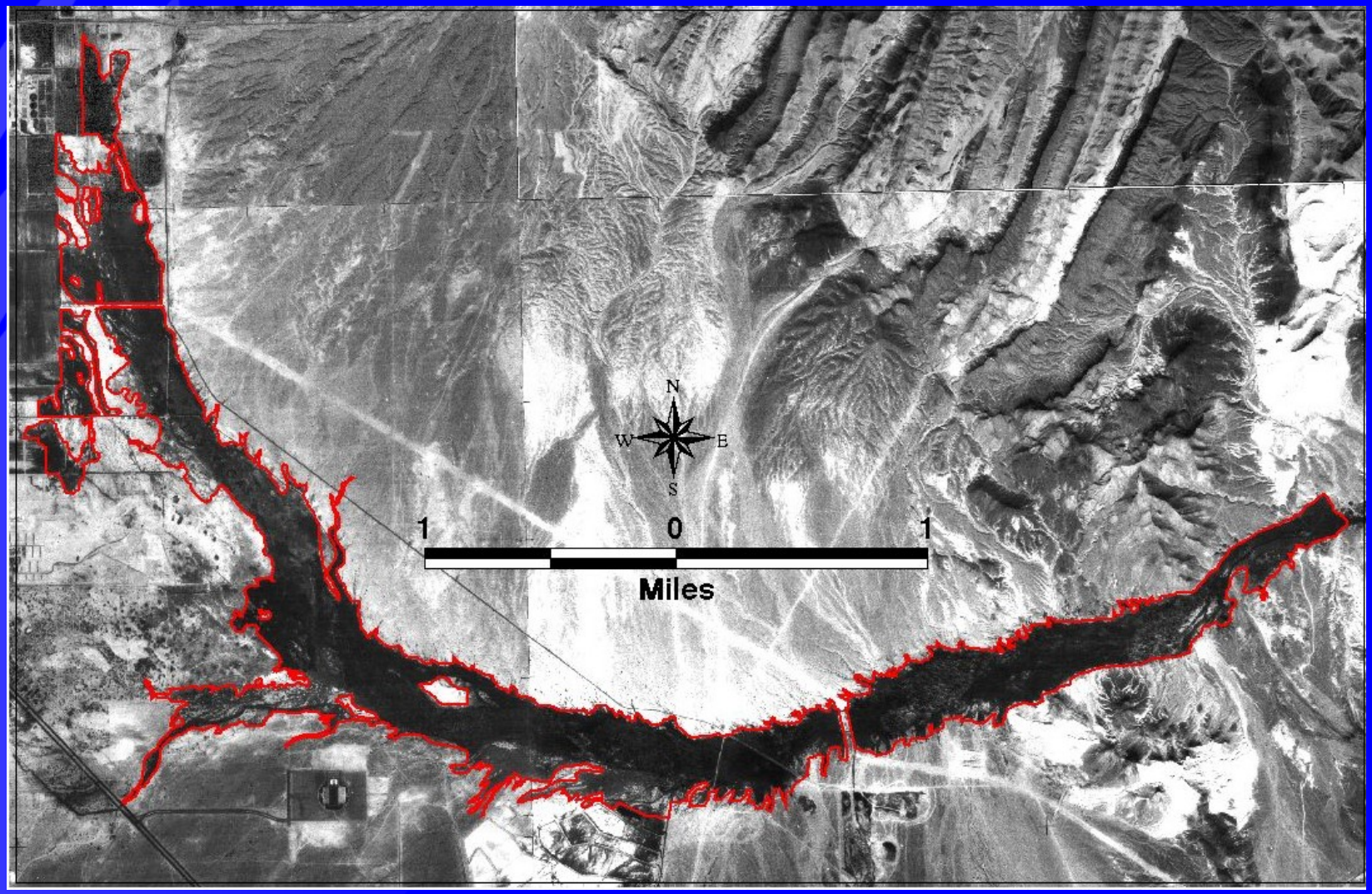
with area of detail



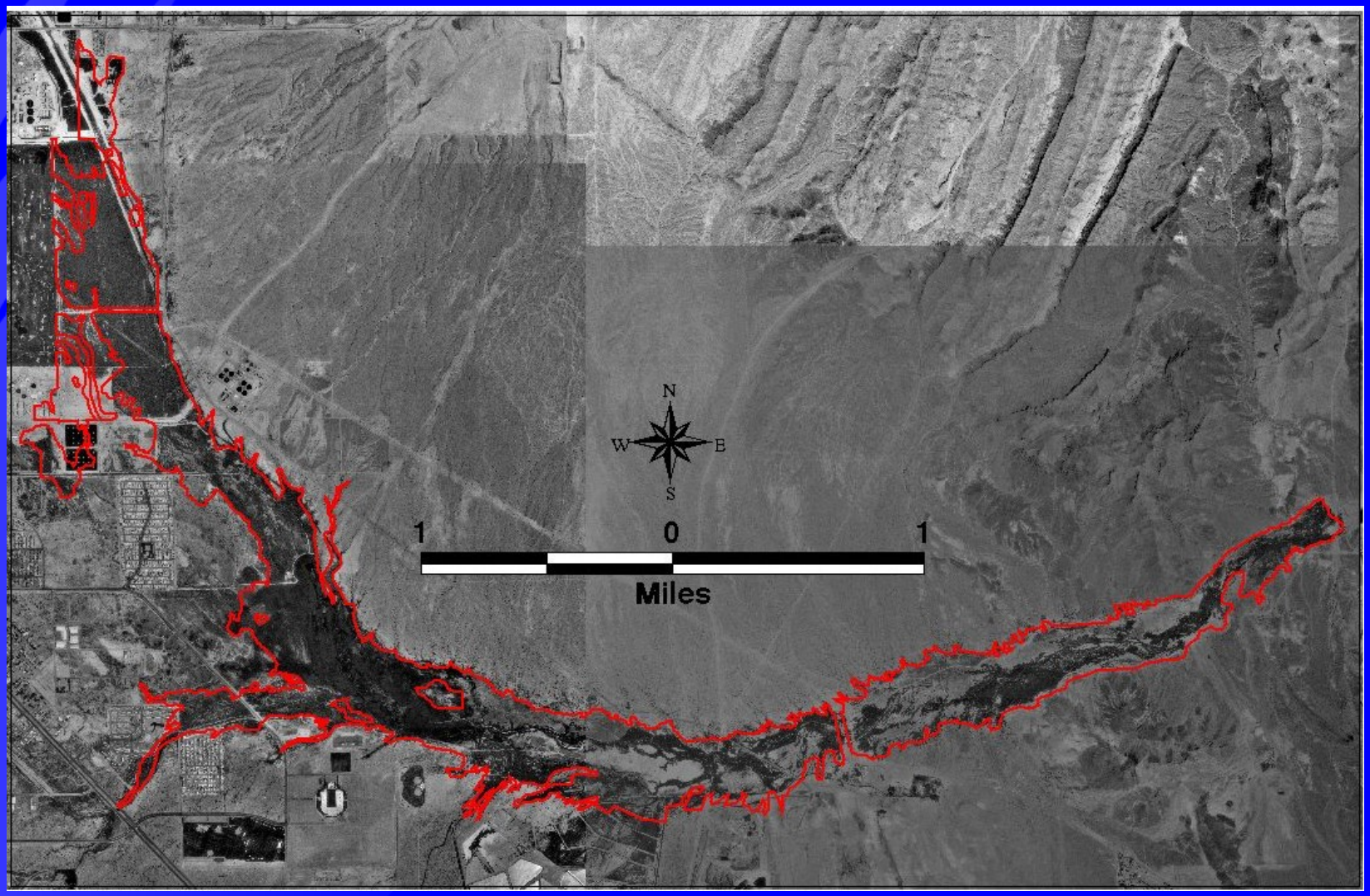
2000

Lower LV Wash - 1950

Lower LV Wash - 1973



Lower LV Wash - 1994



Lower LV Wash - 2000

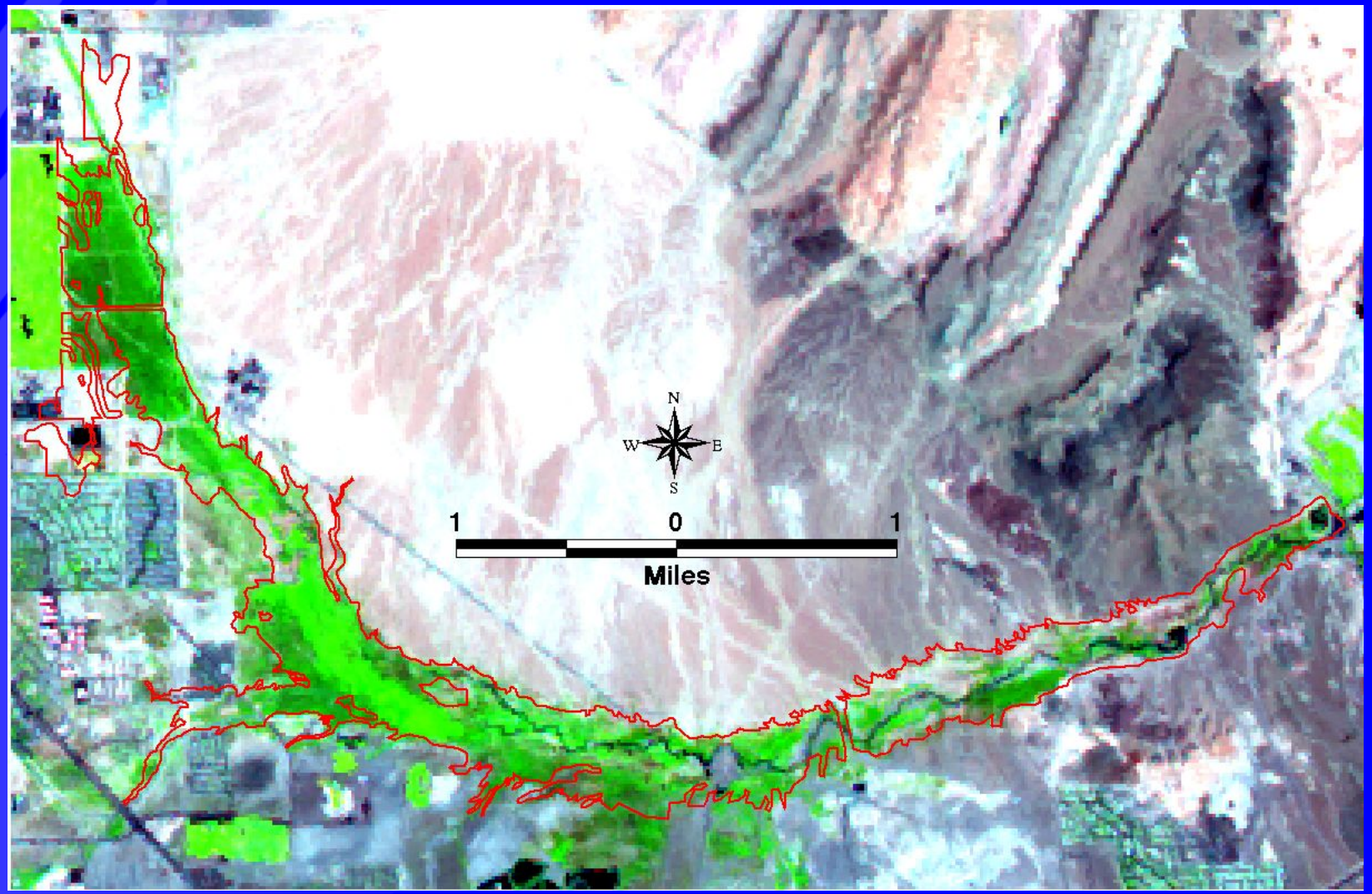


Photo comparison of LV Wash 1972 -2000

Northshore looking East 1972

Northshore looking East 1976

Northshore looking East 1983

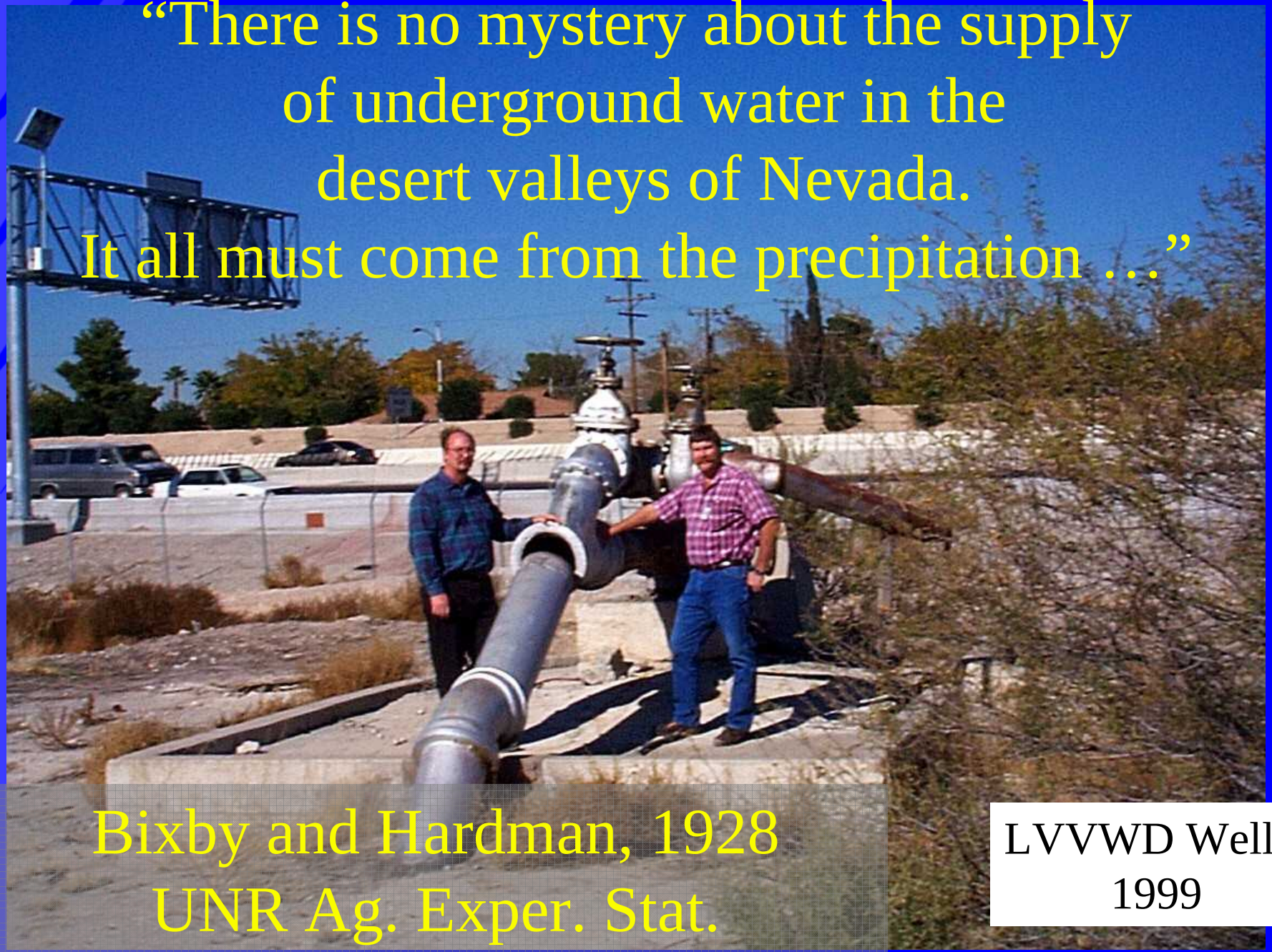
Northshore looking East 2000

Current Conditions in lower LV Wash

- Increasing community involvement with goal of improving condition
  - Annual “green up” days
  - Creation of county wetlands park
- Construction of four grade structures since 1999
  - Several more are planned
- Active planting of desirable native species

Phreatophyte Changes

- Gradual reduction due to urbanization
- Enhancement in lower LV Wash due to waste water flows (1955 – 1975)
- Reduction in lower LV Wash due to down cutting (after 1975)
- Introduction of weed species


"There is no mystery about the supply
of underground water in the
desert valleys of Nevada.
It all must come from the precipitation …"
Bixby and Hardman, 1928
UNR Ag. Exper. Stat.
LVVWD Well 3
1999

Internet Sites

- WWW.SNWA.COM
- WWW.LVVWD.COM
- WWW.LVSPRINGSPRESERVE.ORG
- WWW.LVWASH.ORG
- WWW.LASVEGASGMP.ORG
- WWW.SNWAWATERSHED.ORG