3

WATERSHED CHARACTERISTICS AND USES

3

WATERSHED CHARACTERISTICS AND USES

CHAPTER 3
WATERSHED CHARACTERISTICS & USES

WATERSHED CHARACTERISTICS AND USES

The seven major canyons included in the Sandy City Watershed Plan area contain unique physical, hydrologic, and environmental characteristics. Along with differing physical and environmental characteristics, the canyons also differ in the types and amounts of use they receive.

It appears that use and recreation in the watershed area is increasing rapidly to coincide with population growth. In order to protect and preserve this precious resource, it is an important time to plan for resource management and future development.

Despite increased usage in watershed areas, canyon water quality is generally excellent, especially for culinary purposes. Based on the experience of other watersheds, there may be cause for concern over biological contamination. Therefore, water quality monitoring in these canyons is important.

Utilizing information from the 1982 *Salt Lake County Area-wide Water Study* and County Tax Records, this chapter describes the characteristics and associated uses of each canyon within the Sandy City watershed area. It also catalogs the land ownership patterns throughout the watershed area.

LAND OWNERSHIP IN THE SANDY CITY WATERSHED

Land ownership in the Sandy City Watershed Management Plan area is divided between private and public entities. The federal government (United States Forest Service) and local governments (Sandy City & Salt Lake City) have ownership of large portions of the land. Additionally, there is private land ownership throughout the watershed. Some of the largest land owners include irrigation companies and drinking water providers like Water Pro and Jordan Valley Water Conservancy District. A map showing watershed land ownership may be found on page 3-11. The following table approximates land ownership acreage and percentages:

SANDY CITY WATERSHED MANAGEMENT PLAN
AREA-WIDE LAND OWNERSHIP

Owner	*Acreage*	*Percentage*
Federal Government	**17,771 acres**	**79 %**
Local Government	**777 acres**	**3 %**
Private	**4,037 acres**	**18 %**
Total	**22,585 acres**	**100 %**

CANYON BY CANYON CHARACTERISTICS & USES

The identified Sandy City watershed land area included within the seven canyons east of the City is approximately 22,585 acres or 35 square miles. Water from the canyons is being treated, or proposed to be treated, by various entities including the Metropolitan Water District of Salt Lake & Sandy, Water Pro, and Jordan Valley Water Conservancy District. The canyons are generally steep, narrow drainages. With the exception of Little Cottonwood Canyon, these drainages are only accessible by trail. Impacts on the watershed from development and increased use are a concern. Increasing population has pushed more people into these canyons and usage is increasing dramatically. Federal and local governments are recognizing their responsibility to protect the canyons as a water resource and striving to attain a balance of uses. Establishing such a balance means trying to match the social and ecologically acceptable levels of development with public needs and desires. The scope of this document calls for viewing the canyons from the perspective of protecting Sandy City's water resources for the foreseeable future. A map showing watershed hydrology can be found on page 3-13.

A. Little Cottonwood Canyon

Physical and Hydrologic Conditions: Little Cottonwood Canyon includes approximately 17,536 acres (or about 78%) of the identified Sandy and Salt Lake City watersheds with elevations ranging from 5,040 to 11,489 feet. Little Cottonwood Canyon is the steepest and highest canyon in the plan area. The canyon is "U" shaped with rugged side-canyons formed by glaciation. The head waters for Little Cottonwood Creek originate in the Albion Basin, from minor drainages and Cecret Lake. Tributaries to the drainage include the streams from White Pine Reservoir, Red Pine Lake, Hogum Fork, and Coal Pit Gulch. The length of the primary stream channel is approximately 12 miles.

Little Cottonwood Creek peaks late in the spring, June 4 on the average, mainly because of the heavy snow pack in the higher elevations. Throughout the year the stream flow radically fluctuates due to the steep side slopes and impervious rock surfaces that make up much of the canyon. The average annual yield for the stream is 46,149 acre-feet, the largest yield in the plan area.

The canyon contains three reservoirs (Cecret Lake, Red Pine Lake, and White Pine Lake), water distribution and waste-water collection systems for Alta and Snowbird resorts, the Metropolitan Water District of Salt Lake City & Sandy's Little Cottonwood Water Treatment Plant, a hydroelectric power generation plant, and several irrigation ditch diversions.

There are diversion structures located along Little Cottonwood Creek at Murray Penstock, one mile up the canyon, and at the Radial Gate diversion below Wasatch Blvd. The Metropolitan Water District of Salt Lake & Sandy is the primary consumer of Little Cottonwood Creek water and operates a treatment plant at the mouth of the canyon. *(See Hydrology Map on page 3-13.)*

Canyon Uses: Uses in Little Cottonwood Canyon are characterized by heavy developed and dispersed recreational use, destination lodging, and transportation. All uses in the canyon have increased during the past decade. Downhill skiing is the most intensely developed recreation use in the canyon at Alta and Snowbird ski resorts. The most accurate measure of growth in the canyon is average daily traffic. In 1987, according to the Utah Department of Transportation and Salt Lake County Parks & Recreation, the average daily traffic was 12,865 vehicles. In 1996, the average daily traffic had increased to 16,540 vehicles, an increase of 29 percent.

Developed campsites are maintained by the Forest Service at Tanner Flat and Albion Basin. Use at these sites has varied from year to year. The two campgrounds have a combined capacity of approximately 465 persons. While weekend and holiday user numbers are high, weekly averages fall below capacity.

Land Ownership: Little Cottonwood Canyon is predominantly under Forest Service management. Private ownership, however, does exist at the canyon

mouth, Wasatch Resort, Snowbird Ski Resort, the Town of Alta, and in various mining patents. Several land exchanges involving Salt Lake City, the Forest Service, Trust for Public Lands, The Nature Conservancy, and private land owners have altered the land ownership pattern in Little Cottonwood by placing more private property in public ownership. The following tables describe current land ownership in Lower and Upper Little Cottonwood Canyon. *(See Land Ownership Map on page 3-11.)*

LAND OWNERSHIP LOWER LITTLE COTTONWOOD CANYON (Watershed Area)		
Owner	***Acreage***	***Percentage***
Federal Government	**494 acres**	**55 %**
Local Government	**48 acres**	**5 %**
Private	**361 acres**	**40 %**
Total	**903 acres**	**100 %**

LAND OWNERSHIP UPPER LITTLE COTTONWOOD CANYON (Watershed Area)		
Owner	***Acreage***	***Percentage***
Federal Government	**13,359 acres**	**81 %**
Local Government	**408 acres**	**2 %**
Private	**2,866 acres**	**17 %**
Total	**16,633 acres**	**100 %**

B. Bell Canyon

Physical and Hydrologic Conditions: Bell Canyon includes approximately 1,515 acres (or roughly 7%) of the identified Sandy City watershed with elevations ranging from 5,160 to 11,250 feet. The canyon's slopes are very steep.

Surface waters in the canyon originate in the Lone Peak Wilderness and have a 6288 acre-feet average annual yield, the highest in the plan area after Little Cottonwood. Snow melt is the origin of the creek. The average peak flow occurs on June 8. The length of the primary stream channel is approximately 5 miles.

There is one active water retention reservoir in Bell Canyon. Upper Bell Canyon Reservoir, constructed in the late 1800s, held 220 acre-feet of water and was located at the elevation of 9,400 feet. Upper Bell Canyon Reservoir dam was breached in the 1950's due to safety concerns. Lower Bell Canyon Reservoir, located directly above current development in the foothills of Sandy at approximately 5,578 feet elevation originally held 420 acre-feet of water. In the early 1990's, the capacity of the reservoir was reduced to approximately 30 acre-feet due to dam safety concerns. In addition to these reservoirs, there are two diversion structures making use of Bell Canyon water. These structures are located above and below lower Bell Canyon reservoir. *(See Hydrology Map on page 3-13.)*

Canyon Uses: This is a high-use canyon. Bell Canyon is used for a variety of recreational purposes. The lower portion of the canyon, up to the waterfalls, is a popular hiking, picnicking, and camping destination. Climbers can access the Bell Canyon Towers for day-climbing excursions and overnight climbing adventures are common in the Lone Peak cirque in the Forest Service-managed Lone Peak Wilderness Area.

Land Ownership: Sandy City and the Forest Service are the main land owners in Bell Canyon. The following table provides details about the land ownership pattern existing in Bell Canyon. *(See Land Ownership Map on page 3-11.)*

LAND OWNERSHIP BELL CANYON (Watershed Area)		
Owner	***Acreage***	***Percentage***
Federal Government	**1,306 acres**	**86 %**
Local Government	**173 acres**	**11 %**
Private	**36 acres**	**3 %**
Total	**1,515 acres**	**100 %**

C. Middle Fork & South Fork of Dry Creek Canyon

Physical and Hydrologic Conditions: Middle Fork and South Fork of Dry Creek Canyon encompass approximately 1,282 acres (or about 6%) of the identified Sandy City watershed. Both forks contain very steep terrain. Elevation ranges from 5,160 to 10,260 feet.

Headwaters of South Fork and Middle Fork Creeks originate primarily from snow melt. The area receives on average 20 to 30 inches of precipitation a year. The average annual yield is approximately 1,700 acre-feet. Peak flow dates are typically in June. The combined length of the primary stream channels is approximately 5 miles.

Water from the Canyon(s) is treated at the Water Pro Treatment Plant and the Jordan Valley Water Conservancy District's Southeast Regional Water Treatment Plant. It is then delivered to residents of Sandy and Draper. A diversion structure at the mouth of the canyon directs water to the water treatment plants. *(See Hydrology Map on page 3-13.)*

Canyon Uses: There is very little recreational activity in these canyons. Despite the current low level of use, there is potential for this canyon to receive dramatic increased use with the development of residential areas at the mouth of the canyon. There are primitive trails that access South Fork. South Fork is also the location of a Sandy City water tank site.

Land Ownership: In these canyons, the lower canyon has some private land ownership, while the upper canyons are predominantly controlled by the Forest Service. The following table shows land ownership details. *(See Land Ownership Map on page 3-11.)*

LAND OWNERSHIP
MIDDLE FORK & SOUTH FORK OF DRY CREEK CANYON
(Watershed Area)

Owner	*Acreage*	*Percentage*
Federal Government	**915 acres**	**71 %**
Local Government	**131 acres**	**11 %**
Private	**236 acres**	**18 %**
Total	**1,282 acres**	**100 %**

D. Rocky Mouth Canyon

Physical and Hydrologic Conditions: Rocky Mouth Canyon includes approximately 496 acres (or roughly 2%) of the identified Sandy City watershed. Elevations range from 5,160 feet to 10,260 feet. It is a steep canyon. Normal annual precipitation in this canyon is 20 to 30 inches. Peak flows occur in June. Annual yield estimates are approximately 650 acre-feet. The length of the primary stream channel is approximately 2.5 miles.

The Rocky Mouth stream is diverted to commingle with Big Willow Creek. Collectively, these waters are delivered to the Water Pro and Jordan Valley Water Conservancy District treatment plants. *(See Hydrology Map on page 3-13.)*

Canyon Uses: Recreation use is heavy and concentrated primarily within the falls trail corridor approximately ½ mile up the canyon. There are no existing recreational facilities except for a high-use trail to a picturesque waterfall a short way up the canyon.

Land Ownership: Land ownership in Rocky Mouth is split between private land owners (located at the lower end of the canyon) and the federal government. This relationship is detailed further in the following table. *(See Land Ownership Map on page 3-11.)*

LAND OWNERSHIP
ROCKY MOUTH CANYON (Watershed Area)

Owner	*Acreage*	*Percentage*
Federal Government	**482 acres**	**97 %**
Local Government	**0 acres**	**0 %**
Private	**14 acres**	**3 %**
Total	**496 acres**	**100 %**

E. Big Willow Canyon

Physical and Hydrologic Conditions: Big Willow Canyon encompasses approximately 943 acres (or roughly 4%) of the identified Sandy City watershed. Headwaters for Big Willow Creek begin at over 10,800 feet elevation. Half of the drainage area lies above 8,000 feet. This canyon usually receives between 20 to 40 inches of precipitation a year. Surface waters have an average peak flow in the first weeks of June. The stream has an average annual yield of just under 1,500 acre-feet. The length of the primary stream channel is approximately 4.25 miles.

There are several diversion structures in Big Willow Canyon that are operated by Water Pro. They are located at the mouth of the canyon. Water is diverted to be treated at the Water Pro and Jordan Valley Water Conservancy District treatment plants. *(See Hydrology Map on page 3-13.)*

Canyon Uses: There is little recreational usage within Big Willow Canyon. One main trail accesses the canyon. This trail begins at Hidden Valley Park and follows a relatively steep path up the canyon. A horse trail is located on the ridge between Big Willow and Little Willow Canyons.

Land Ownership: Water Pro is a significant private land owner in this canyon. Other lands are owned primarily by the federal government and managed by the Forest Service. The following table outlines this land ownership. *(See Land Ownership Map on page 3-11.)*

LAND OWNERSHIP
BIG WILLOW CANYON (Watershed Area)

Owner	*Acreage*	*Percentage*
Federal Government	**714 acres**	**76 %**
Local Government	**0 acres**	**0 %**
Private	**229 acres**	**24 %**
Total	**943 acres**	**100 %**

F. Little Willow Canyon

Physical and Hydrologic Conditions: Little Willow Canyon includes approximately 813 acres (or roughly 4%) of the identified Sandy City watershed. Canyon elevations range from 5,140 feet to over 10,700 feet. The stream channel is approximately 3.15 miles long and very steep. Little Willow Canyon has an annual water yield of approximately 1,200 acre-feet. The average peak flow occurs in the first part of June.

There are two diversion structures in Little Willow Canyon. They are operated by the Utah State Prison in Bluffdale, the Little Willow Irrigation Company, and the Hidden Valley Golf Course. Currently, the water is utilized for non-culinary purposes. In the future, this water may be treated and used for culinary purposes. *(See Hydrology Map on page 3-13.)*

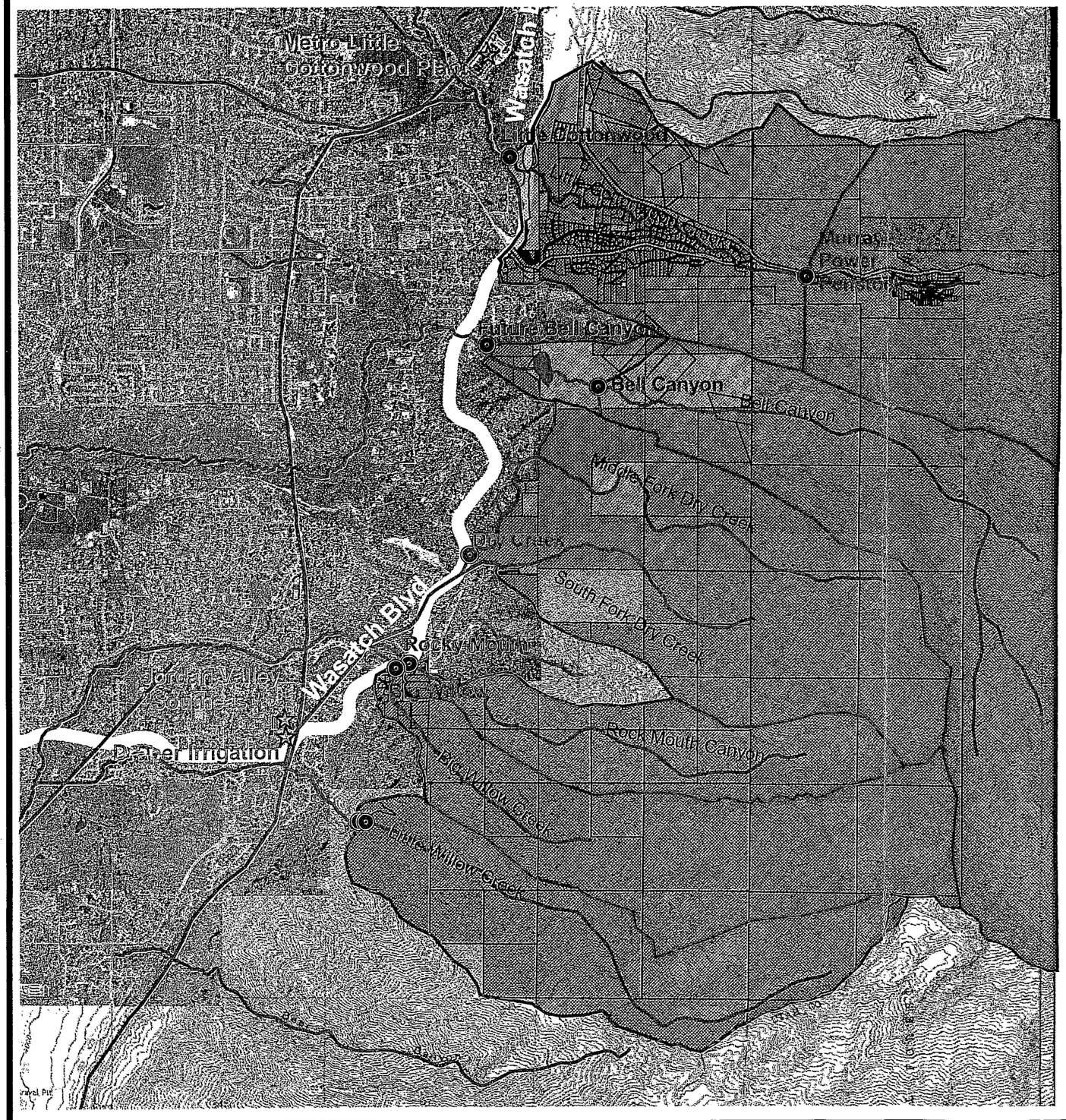
Canyon Uses: Little Willow sees moderate pressure from recreationalists due to its close proximity to Hidden Valley Park. There are observable impacts from dogs at and near the canyon mouth.

Land Ownership: Little Willow is the domain of private land owners and the federal government in the upper reaches of the canyon. The following table shows land owner acreage and percentages. *(See Land Ownership Map on page 3-11.)*

LAND OWNERSHIP
LITTLE WILLOW CANYON (Watershed Area)

Owner	*Acreage*	*Percentage*
Federal Government	**501 acres**	**62 %**
Local Government	**17 acres**	**2 %**
Private	**295 acres**	**36 %**
Total	**813 acres**	**100 %**

Sandy City Watershed Ownership



Legend

Ownership

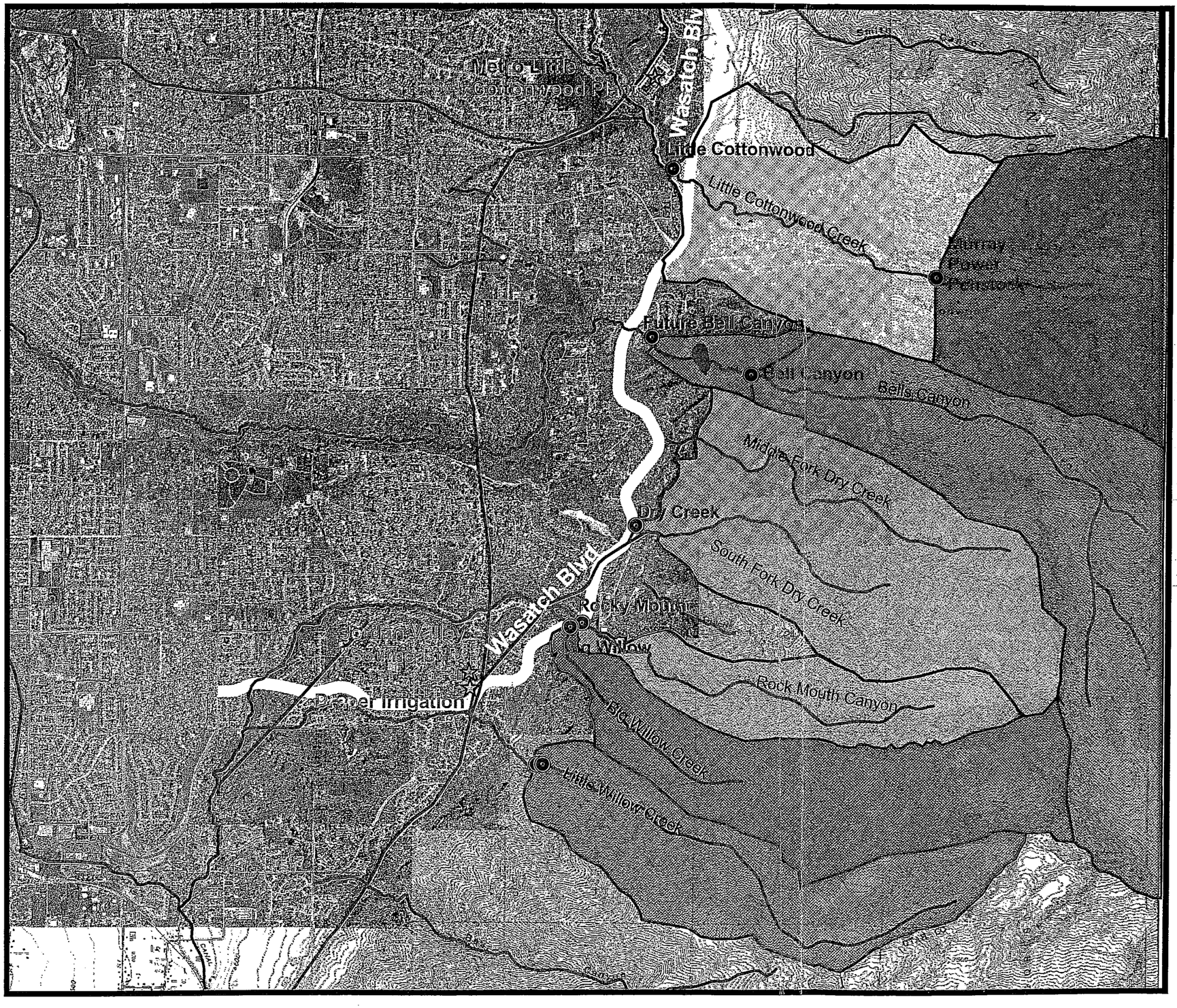
- Private
- Federal
- Local Agency
- Watershed Boundary
- Diversions
- Treatment Plants
- Waterways

N

SANDY CITY
1893
STATE OF UTAH

Date: 4/02/2001

Sandy City Watershed Hydrology Map



Legend

Watershed

- Upper Little Cottonwood
- Lower Little Cottonwood
- Upper Bell Canyon
- Lower Bell Canyon
- Dry Creek / Middle/So Fork
- Rocky Mouth
- Big Willow
- Little Willow

- Treatment Plants
- Diversions
- Waterways

Note: The following diversions are diverted to the Little Cottonwood Water Treatment Plant: Little Cottonwood, Murray Power Penstock, and the Future Bell Canyon diversion. Bell Canyon, Dry Creek, Rocky Mouth, and Big Willow are diverted to the Jordan Valley Southeast Regional Water Treatment Plant.

N

SANDY CITY
1893
STATE OF UTAH

Date: 4/02/2001