CHAPTER 2

THE ENVIRONMENT: THE SETTING, PAST AND PRESENT

A TRIP TO WARM SPRINGS DAM

This mid-December journey began in fog. Driving north from San Francisco, the trip to Santa Rosa took a little over an hour. Typically, by that time the low cloud cover had “burned off”—as it is expressed locally—resulting in a brisk but clear midmorning. From here we could see three or four skinny columns of white vapor emerging from the mountaintops some miles to the northeast. In fact, this was steam from Sonoma County’s Geysers district, where subterranean steam power has been harnessed to drive huge turbine generators, providing electricity to communities as far away as San Francisco.

On both sides of the freeway there were signs of the recent changes evident in much of the county; its proximity to San Francisco has caused much development here since 1970. With the rising cost of agricultural land, some orchard crops, such as prunes, are being replaced by wine grapes, a more profitable investment. Decaying, untended orchards alongside plantings of young vines still protected in their white cardboard cylinders are common sights now between Santa Rosa and Healdsburg, where we crossed the broad Russian River.

To get to the dam, we took Canyon Road, a rolling country road that crosses the low hills between the Russian River and Dry Creek valleys. We then followed Dry Creek Road up the north side of the valley, just above the valley floor. Like the road, many older homes and ranches are on high ground, reminding us of the floods that once inundated the valley each winter, contributing to its fertility. Vineyards and orchards cover the valley floor and creep up its sides. Unlike some parts of the county where wine-grape growing is a recent phenomenon, viticulture has been practiced in the Dry Creek Valley since the 1840s, and on a large scale since the countywide grape growing boom of the 1870s. As we passed by, it was clear that some of the modest Victorian houses built by those 19th-century viticulturalists were now occupied by farmworkers, while many of the pioneers’ successors and descendants favor more modern homes.

About 12 miles out of Healdsburg, a bend in the road by a deeply cut bank brought us in sight of the dam. Where the valley had begun to narrow and its sides to steepen, it was blocked by the dam’s great bulk. It was here that we were surprised by our first sight of Dry Creek itself. Barely 15 feet wide and not more than 3 deep, it was difficult to believe that this languid stream would ever fill up the enormous basin behind the dam. Crossing the creek immediately in front of the dam, we encountered some low, official-looking buildings and trailer offices. Construction on the dam had only recently been completed, and dozens of vivid yellow pieces of heavy equipment—dozers, blades, and front-end loaders—were lined up, idle, in a fenced compound. On the opposite side of the road was the Visitors Center and fish hatchery, where, for ten cents, the visitor could buy a handful of fish food to throw to the young trout and salmon in their concrete ponds. But our interest was in seeing the dam and its environs from up high, and to do this we drove past the cluster of buildings, up steep Skaggs Springs Road, to the overlook.

Warm Springs Dam is situated at the junction of Warm Springs and Dry creeks. While Dry Creek Valley is some 2000 feet wide at this point, Warm Springs Creek flows through a narrow, V-shaped gorge. By this junction, almost 800 feet above the valley floor, is the overlook spot with its observation tower. From here we were able to look down on the dam’s great crescent. At its base, creek water had accumulated in a small, stagnant-looking pond. Fill for the dam had come mostly from the ridge on the opposite side of the valley. The area was now brown, unnaturally terraced, and striped with long, parallel gullies. In some places, new grass had grown up bright green and strangely artificial-looking in comparison with the drab grey-green of the untouched hillside. Down in the valley, the area that was to become Lake Sonoma had been denuded of trees and shrubs. The effect was a surreal ghost shoreline that switchbacked at a single elevation along the opposite slope. Over the ridge to the east, on the opposite side of Alexander Valley, the thin columns of steam we had seen from Santa Rosa were now heavy, towering
white plumes that drifted in an unbroken line of cloud above the mountaintops to Mount St. Helena.

Back on the road, we crossed Warm Springs Creek by the new bridge that carries Rockpile Road out onto the ridge that forms the southwestern side of the valley. The sight of this great span crossing the insignificant stream far below was so strange and incongruous that we stopped briefly halfway across to enjoy the novelty.

Driving along this ridge, one can begin to experience the character of the uplands that extend to the west. This country is quite different from the valley bottomland. Here, sheep and cattle ranching have been the chief pursuit for more than a century. The sloping, open pasture on the ridge’s south side is witness to the land-clearing on a massive scale undertaken by 19th-century ranchers to create grazing land. Today the dam and lake dwarf all other human imprints on the landscape; yet, even before the construction, this area was no pristine wilderness, but a region changed by human use over several thousand years. The observant can still see remnants of times past in the split stakes of sheep fencing from the days before woven wire, and in the remains of family orchards.

A prominent sign by the roadside warns the visitor that from this point on the track is flanked by private property whose owners are wary of trespassers. Recently, local ranchers have been plagued by poachers, sheep thieves, and careless visitors; some believe this problem will get worse when the lake is filled and more adventurous tourists come to the area.

Soon the paved road gave out to a potholed, dirt surface. Having been sufficiently intimidated, we stopped here and turned northeast to look across Dry Creek Valley. Directly opposite us now were the barren, rocky prominences known as Pritchett Peaks. The green slopes that skirt these outcrops suggest an easy hike; in reality, the way is steep, exhausting, and, in the winter, chillingly windswept. This particular afternoon, a strong westerly wind funneled between the ridges, turning the valley into a wind tunnel. Taking this as our signal to leave, we headed back along the ridge, across the bridge, and down past the dam into the valley.
Natural Environment

Location and Topography

The Lake Sonoma Area is composed of more than 17,000 acres of land in the North Coast Ranges of California, some 100 miles north of San Francisco and 20 miles east of the Pacific Ocean (1). The area consists of two odd-shaped swaths: one follows the narrow upper Dry Creek Valley and the ridges that flank it for about 12 miles, from the present dam site northwest along Dry Creek to about 3 miles past its intersection with Cherry Creek; and the other goes some 5 miles west up Warm Springs Creek past Rancheria Creek. The steepness of the drainages leading into the upper Dry Creek Valley bears witness to erosion on a massive scale that, in places, has created dark, gloomy canyons. In other areas, where waterborne sediments have accumulated, broad oak-studded meadows have formed.

Climate

The Lake Sonoma Area is situated in a transitional zone between two climatologically distinct regions: the damp Pacific Coast to the west and the drier Russian River Valley to the east. In temperature pattern, the upper Dry Creek Valley experiences a range in monthly averages of about 30 degrees Fahrenheit during the year; in contrast, average temperatures at Fort Bragg on the coast range only about 10 degrees. Mean summer maximums in the valley vary between about 88 and 92 degrees Fahrenheit; mean winter minimums are from 36 to 38 degrees Fahrenheit. Most precipitation occurs during the winter, from November through February; mean annual rainfall varies from about 40 inches on the valley floor to about 55 inches on western ridgetops. This heavy average, however, constitutes considerably less rainfall—as much as 20 inches less—than the mountains nearer the coast. Changes in air pressure during summer days often draw in banks of ocean fog that stay overnight and recede the next morning. This phenomenon, known locally as “natural air conditioning,” is most welcome on hot summer afternoons. During the winter, radiation or ground fogs are common.

Soil and Vegetation

The soil and vegetation types that occur in the Lake Sonoma Area are determined by several environmental factors, including topography, geology, and climate. In the northeastern part of the area, relatively high temperatures and low precipitation have encouraged the development of shallow soils and a covering of oak woodland and chaparral-associated plants. In the cooler and wetter southwest, soils are deeper, and mixed evergreen forest and oak woodland communities predominate; these are three of the five general vegetation types, each made up of several plant communities, that have been identified in the area by ecologists. The coniferous forest type, consisting of redwood, douglas fir, and other evergreens, is also well represented. Redwood and fir dominate in cooler, moister areas, whereas hardwood evergreens, such as tan oak, madrone, live oak, and bay occur on well-drained slopes. On southern exposures and the edges of the mixed forest can be seen the northern oak woodland type. Oregon and black oak and manzanita dominate here, while coniferous trees are scarce. Together the north oak woodland and evergreen forest cover as much as 75 percent of the study area. The chaparral vegetation type occupies areas having shallow, rocky, and nutrient-deficient soil. This type is characterized by few trees and a predominance of low shrubs and grasses. Much of the grassland in the study area has developed on land cleared of hardwoods and conifers for grazing. Numerous types of grasses, both exotic and native, cover these open areas. The riparian vegetation type, which is also present, includes all plants that grow along or in watercourses. Trees include cottonwood, willow, valley oak, live oak, and alder; some areas support a thick growth of buckeye, poison oak, and toyon.

Wildlife

To meet their basic requirements of sustenance and protected nesting sites, each animal species may use the vegetation zones’ resources differentially during the course of the day. Deer, for example, may drink in the riparian areas in the early morning, browse in the chaparral during the day, and spend the night in dense oak woodland. The junctions of different vegetation zones, called “ecotones,” are particularly important locales, for here the resources of many vegetation types are available within a small area.

Human intervention has acted to increase the population of some species in the area, while reducing
or eliminating others altogether. Animals such as the elk, grizzly bear, and beaver were hunted out of existence here long ago. Black-tailed deer, however, may be more populous than in the past; official estimates set the number of these animals at 20 to 100 per square mile in various sections. Several medium-sized mammal species in addition to deer inhabit the area, including the coyote, whose population has also increased of late, badger, and bobcat. Feral pigs, the descendants of domestic hogs that were raised on the open range, are not unusual; their search for roots and bulbs has given some meadows the appearance of ploughed fields. Small mammals, such as cottontails and jackrabbits, skunks, ground squirrels, and grey tree-squirrels, all abound. Common birds in the area include coots and mallards, quail, band-tailed pigeons, jays, redheaded woodpeckers, and the ubiquitous turkey vulture. Several nesting sites of the peregrine falcon, an endangered species, have been identified on rocky outcrops on Pritchett Peaks. Salmon, steelhead, and other trout all spawn in Dry Creek. Reduction in the numbers of some fish species caused the California Department of Fish and Game in 1982 to stop all fishing in Dry Creek and other Russian River tributaries.

**Environmental Change: Natural and Cultural**

**The Changing Climate**

Over the past 20,000 years, seemingly insignificant fluctuations in climate have brought about major environmental changes that have influenced—some would say determined—the pattern of human use of the earth. During the last glacial period, what is now the San Francisco Bay was dry land, a valley surrounded by low hills. In general, the area’s climate would have been somewhat cooler and wetter than it is today. Many prehistorians believe that it was during this period that humans first entered North America.

A widely held theory of the populating of the continent contends that this migration occurred between 18,000 and 40,000 years ago. At this time, a significant amount of the earth’s water was captured in massive ice sheets. It was this phenomenon that caused the sea level to be lowered, by about 300 feet. Then the Bering Strait, which now separates Alaska from Eurasia, was a plain, 1000 miles wide. This isthmus between the two continents, known as Beringia, provided an opportunity for humans to cross. Of course, the people who used this route did so inadvertently. It is likely that they were nomadic hunters who lived by following the herds of large mammals, including caribou, musk ox, and bison, that would have been attracted by Beringia’s tundra environment. The migration of some species of animals by this route has been well established: there is little doubt that the ancestors of the elephant, elk, and moose evolved in Eurasia and spread east, whereas those of the horse and camel originated in the Americas (2).

A new climatic cycle, a warming trend, began about 12,000 years ago. The mile-deep polar ice caps began to melt, glaciers receded, and the sea level began to rise. Slowly, Beringia was inundated. By about 6000 years ago, what geologists have named the Franciscan Valley became recognizable as the San Francisco Bay. Scientists have estimated that the maximum average temperature was achieved 3000 to 5000 years ago. This date range has been supported by the study of fish scales taken from Clear Lake in Lake County, California, which reflect the animals’ growth rates. Such a change is also evident in the growth patterns of ancient bristlecone pine trees in the White Mountains of eastern California.

The effect on vegetation of a higher air temperature, which is believed to have been as little as two to three degrees Fahrenheit, was profound. Areas previously dominated by species well adapted to cooler conditions were gradually stocked with a different assembly of plants and animals. As the California climate became more Mediterranean and desertlike, temperate plant communities were forced out of much of their old range, being replaced by heat- and drought-resistant species. This replacement, however, was not total. In some areas, microclimates allowed pockets of the previously dominant community to survive. The effects of microclimates on vegetation can easily be seen by comparing the communities that grow on a shaded, north-facing, or windward slope with those that grow on a southern or lee exposure; presently, in the hillier regions of northern California, cooler slopes tend to be dominated by conifers and sunnier locations by hardwoods (3).

Although little information specific to northern Sonoma County is available to reconstruct the area’s ancient environment, important work has been done in nearby Mendocino County by scientist James West. There, sediment that had accumulated over several thousands of years in a lakebed was found to contain
Harvesting acorns (drawing by Rusty Rossman)
sufficient pollen to allow researchers to reconstruct the history of regional vegetation change. Although some of the results reflect local processes, such as alterations in the lake’s immediate environment, there is evidence for the transformation of vegetative communities due to a change in climate. In the oldest sample, which dates to 7000 or 8000 years ago, pollen indicated the presence of a pine forest. For a pine forest to have dominated, cooler temperatures must have prevailed at that time. The next two samples showed increasing proportions of oak pollen, indicating a warming trend between about 6500 to 5000 years ago, which allowed the oak to extend its range into the higher elevations. In the most recent sediments, the proportion of oak decreased, while Douglas fir increased, suggesting the beginning of a cool period about 2000 to 2500 years ago that has continued to the present (4).

By comparing the results of various studies, scientists have come to some general conclusions about climatic changes over the past 10,000 or 12,000 years that would have had important effects on the distribution of plants and animals in northern California. Although there is some variation in the dates assigned by different scholars to various climatic episodes, most of these fall within an acceptably narrow range. That the climate has changed, and in certain ways, there is no disagreement; pollen, fish-scale, and tree-ring data all support the idea.

Project archaeologist Martin Baumhoff has pointed out that if these climatic changes were indeed great enough to cause this kind of environmental alteration, they would also have had a significant effect on the area’s human occupants. He noted that the hills in the Lake Sonoma Area are on the eastern edge of the coastal redwood belt; although some redwoods occur on sheltered, northern slopes, evergreens and oak woodland predominate. As acorns were a very important subsistence crop to northern California’s Indians, this area would have been an attractive place for residence. Conversely, if a cooler and wetter climate had made possible the redwood belt’s eastward expansion, the reduction in the proportion of oaks, and consequently the acorn crop, would certainly have had important effects on the ways in which people used the land. This might have involved differences from the historically documented patterns of behavior in areas such as seasonally based use of the land and the size and make-up of the groups that occupied the area. Consequently, stated Baumhoff, “reconstruction of the prehistoric environment is of the utmost importance in the analysis of archaeological remains” (5).

Accounts from the 16th and 19th Centuries

Archaeological finds and surviving natural remains, such as pollen, are our only means of reconstructing the changing environment occupied by northern California’s early inhabitants. As we move into the later period, however, written sources appear in the form of travelers’ descriptions and official government agents’ accounts. It is the occurrence of these kinds of records, or even the start of some surviving oral traditions, that scholars see as marking the beginning of a region’s “historic” period and, simultaneously, the end of its prehistoric era. Unfortunately for our purposes, the early accounts were not written with future environmental reconstruction in mind. The writers often traveled simply to scout the land, to assess its worth and the possibility of settlement. And yet their accounts are very revealing, both about the environment as they saw it and about the eras in which they were written.

In the following section, these contemporary accounts will be used to build a composite picture of the study area’s natural environment and the changes wrought there by successive peoples. Only the barest outline of the area’s history is necessary for this purpose; detail is supplied elsewhere in this volume. The nature of the historic record is such that some of the earlier accounts are not of the Lake Sonoma Area itself but of nearby locations. This absence of documentation makes an important statement about the peripheral character of the study area, for this was never a stage on which events of momentous importance were acted out. Rather, the Lake Sonoma Area is representative of California’s hill country, exemplifying some of the processes that changed the face of this developing area.

A description of changes in environmental setting cannot progress far without reference to the influences of the area’s native occupants, for Sonoma County’s pioneers did not settle in an untouched wilderness. Fortunately, through the strong tradition of oral history among the Mihilakawna (Dry Creek) and Makahmo (Cloverdale) Pomo groups, it is possible to make some general statements about Indian land-modification practices which changed parts of the natural environment. Although large-scale cultivation was not practiced, other techniques were used that encouraged certain desirable plants
Drake’s encounter with California Indians (from The Annals of San Francisco, by Frank Soulé, John H. Gihon, and James Nisbet, 1855)

and plant communities at the expense of others. The impact of these kinds of practices on the landscape would have been on a scale noticeable only to people with specialized knowledge. In contrast, the custom of seasonally burning off areas of brush would have caused easily recognized changes in local plant communities. Burning prevents the buildup of dense, woody chaparral and allows the growth of grasses, forbs, and other low-growing plants. As these plants provide better forage for deer and other wild game, the population of these animals increases. Prehistoric burning would have created large grassy slopes, thus preventing the kind of heavily destructive forest fires that are fueled by an accumulation of downed wood and chaparral growth. Some of these practices continued, although with less intensity, into the 20th century, as later chapters will show.

The first historical description of the north San Francisco Bay area was provided by a member of Sir Francis Drake’s party. In June 1579, these English seamen were making their way south along the California coastline as part of their circumnavigation of the earth. For 14 days the navigator had been unable to take sightings from the sun or stars because of the thickness of what the writer perceived as cloud cover—what today’s coastal California residents know as ocean fog. This summer weather pattern was quite beyond the experience of the English seamen. The diarist commented on this foggy period:

During all which time, notwithstanding it was in the height of summer, yet were we continually visited with like nipping colds… we could have very well have been contented to keep about us still our winter clothes (6).

The group made a landfall for repairs and to take on supplies. Exactly where their camp was established has been disputed for many years. The most widely held theory contends that it was on the Marin County coast, probably at Drakes Bay. Although it appears that representatives of Indian groups from all over the local area visited Drake’s beachhead, the Englishmen made only one recorded sortie into the countryside,
when Drake himself visited a local village. While the
description that has come down to us is rich in detail
concerning the village and its inhabitants, the writer
made only these few comments on the countryside
itself:

The land we found to be farre different from
the shoare, a goodly country and fruitful
soyle, stored with many blessings fit for the
use of man: infinate was the company of very
large and fat Deere which we saw by
thousands, as we supposed, in a heard, and
besides a multitude of strange kind of Conies
(7).

The multitude of “conies”—an old English word
for rabbits—were, in fact, colonies of ground
squirrels, which the explorer noticed lived in warrens
dug rabbitlike into the sandy soil. Perhaps the writer’s
approval of the area stemmed from his sense of
familiarity with its mild climate and rolling
appearance, which resembles southern England.

In the first years of Spanish rule in California, the
area north of San Francisco Bay held little interest for
the new settlers and was rarely entered. By the early
19th century, outside interest in the North Bay area
began to grow. Spain, and later Mexico, claimed the
region and sparsely settled it. Russian explorers sailed
up the Russian River, and agricultural colonies were
established along the Sonoma County coast by a
commercial Russian company. The best known of
these, and the headquarters of the Russians’
operation, was Fort Ross. The group’s presence began
in 1812 and lasted for nearly 30 years. During this
time, when the rural products of northern California
consisted largely of half-wild stock cattle raised on
huge, unfenced tracts, the Russians cultivated land
for numerous kinds of grains, fruits, and vegetables
that were shipped out to supply the company’s other
colonies.

At about the time the Russian settlement was
being abandoned, the Mexican government stepped
up its attempt to secure northern California from
other would-be colonial powers by distributing large
grants of land to those willing to occupy them and to
swear fidelity to Mexico. Most of these tracts were in
fertile, well-watered areas, including Dry Creek
Valley, which was granted to José German Peña in
1843. At that time, the use of land by Mexican
Californians was centered around cattle that were
raised for the hide and tallow trade. Peña raised cattle
like most other grant holders, in addition to
specializing in horses; his herds probably used the
surrounding hills for forage in season, and would
surely have grazed on the bottomlands near the
confluence of Warm Springs and Dry creeks.
Although most of Peña’s grant is situated immediately
to the southeast of the Lake Sonoma project area,
there can be little doubt that he recognized all the Dry
Creek Valley as his own and used it accordingly. Thus
Peña may have begun the land use that, later in the
century, was to develop into exploitive overgrazing
and contribute to substantial changes in the area’s
natural environment. Peña was also among the first to
make use of the valley’s fertile soil by planting seeds
and crops. The sketch-map, or diseño, that was filed
with Peña’s land-grant application shows a milpa
(cornfield) and two siembres (sown fields) adjacent
to his dwelling on Dry Creek.

U.S. government-sponsored surveys of northern
California began shortly after statehood. One such
expedition, led by Col. Redick McKee, traveled up
the Russian River Valley in 1851, passing Peña’s
little settlement, on its way to negotiate treaties with
northern California Indian groups. Although the
travelers were not naturalists, entries in the
expedition’s log give some insight into the area’s
natural environment as it was after the first waves of
Euroamerican settlement. California was at the height
of its gold-mining period, and its rural, non-miner
population was relatively small. Consequently, while
agriculture and ranching had altered the landscape in
some more accessible regions in the state, major
changes in flora and fauna were still to come. The
following entries from the McKee party’s log concern
the land lying between Santa Rosa and about
Geyserville:

We saw during the day great numbers of the
blue or crested quail; coves of from twenty
to fifty, exceedingly tame. . . Redwood was
now abundant on the mountains to the left
[west]. . . At camp we found recent signs of
deer, and two were started within it. Two
grizzly bears were also seen in the
neighborhood.

The largest single body of prairie country is
that lying between Santa Rosa and Fitch’s
Ranch [at about Healdsburg]. . . Above
Fitch’s the bottom consists of detached valleys,
of at most a few square miles in extent,
separated by wooded hills. Small basins are
also scattered around the mountains, which, however, do not add greatly to the quantity. This country generally requires irrigation for the production of green crops, but is admirably adapted to the small grains. Beyond this, its great value is for pasturage, the ranges on either side being very extensive and rich. Large herds of cattle were formerly kept there (8).

As mining declined over the next 20 years, more Californians began growing high-profit grain crops in the valley and stocking the hilly rangeland with ever-increasing numbers of cattle and sheep. For years the hill country around Dry Creek had been used for grazing by ranchers who had a legally uncertain right to the land. With growing land scarcity, these people found it advisable to establish their possession on firmer grounds by means of patents from the federal government. The first step to patenting public domain was a survey, and an invaluable record of the general characteristics of the land was created in the process. The surveyors were instructed to set up certain fixed points on the landscape, usually rock cairns or wooden posts, from which property boundaries could be established. They were also charged with providing a description of the survey area and a map showing distinctive natural landmarks, such as springs, mountains, and unusual vegetation types, as well as man-made elements, including roads, fences, and homes. These notes are particularly valuable because they contain rare information about the use and condition of the rangeland surrounding the Dry Creek Valley. An 1872 survey included part of the upper Dry Creek Valley and the hills to the southwest. Of this area, the surveyor noted:

The eastern portion of the township is very broken and rough with occasional openings of grass. The open land is No. 1 grazing. The bottom land on Dry Creek is being cultivated, but is quite limited in extent. Most of the timber is white and black oak with a little redwood and fir (9).

We shall see that a survey 20 years later gives hints that, by this time, substantial changes in local vegetation had occurred.

Conventional histories are of little use in researching the environmental changes in this somewhat obscure part of California. In the 19th

Fort Ross (from Thompson’s Historical Atlas Map of Sonoma County, 1877)
century, it was the business of writers of local history to sell their works; this was most easily achieved by accentuating the county’s fertility and level of development to inspire its proud citizens sufficiently to buy a copy of the history book. Consequently, when the 1880 tome *History of Sonoma County* gives the following glowing picture of the Dry Creek Valley, we may be a little skeptical:

[The valley] is without a peer in the production of wheat, corn, and staple products, while the hill land on its border produces all kinds of fruit, being especially adapted to grape culture (10).

Yet there is no doubt that the 1870s and early 1880s was a time of relatively rapid development and change. Grain’s high price and ease of growing made clearing land in the valley worthwhile. A newspaper correspondent traveling to Skaggs Springs resort on Warm Springs Creek in 1881 described the scene as follows:

The farms of . . . Upper Dry Creek were in good condition. We notice quite a number of young vineyards started this season and looking thrifty. This is a really beautiful little valley flanked as it is on two sides by ranges of mountains of singular formation. These are generally covered by a growth of heavy shrubbery with a variety of bright green foliage in pleasing contrast to the golden fields of grain lying at their base (11).

At this time, the heavily forested hills surrounding upper Dry Creek began to be denuded. Although redwood logging was not recorded in the Lake Sonoma Area at this time, no doubt it occurred here as elsewhere in the county. Many groves of tan oak were stripped of their bark, which was used in the hide-tanning process, and the trees left to die. But not all trees were cut for wood products; sheep raisers also played a part. According to the State Board of Forestry, “as ranges deteriorate under the influence of overstocking [of sheep], the remedy sought is to render new lands available by the burning of brush and girdling timber” (12). The Board estimated that, by 1885, 50 percent of Sonoma County’s original timber stock had been cut, much simply girdled and left to die. Not only the hardwoods—oak and madrone—were dealt with in this way. Tracts of fir, which had not yet acquired commercial value as construction lumber, were also destroyed. Entire hillsides could be seen littered with girdled trees that had been left to rot where they had fallen.

Rangeland experts have shown that increased erosion is closely associated with a reduction in plant cover. In this area, plant cover was lessened both intentionally, by the sheep ranchers, and as a result of sheep grazing itself. Soon after their introduction to the Sonoma County hills, sheep greatly reduced the amount of native plants such as wild clover, bunch grass, and sunflower, while exotic species, notably foxtail and wild oat, arrived to take over the range. These plants, however, were scarcely better suited to the new rangeland environment than those they had replaced, for in areas that were heavily grazed, sheep ate so many seed-bearing tips that these plants could not propagate. Consequently, the soil was bare when the winter rains came and the surface quickly became saturated, causing the soil to be eroded in sheets by the fast-moving water. Funneled by natural convolutions into surface streams, the water increases in power, eventually cutting sharp-edged gullies into the ground’s surface. Although there is no documentary evidence of erosion on a massive scale during the late 19th century in the Lake Sonoma Area, there can be little doubt that many of the deep gullies that are present today had their origins during that period.

Changes in the land brought about by settlers’ activities also affected wild animal populations. Although isolated grizzly bear were reported in the hills until the early 1880s, sport hunting both by ranchers and visitors eradicated this once-common breed from the area. Even the number of black bear had been severely reduced by the same means: in 1872 a party of local ranchers and “eight good bear dogs” spent three days hunting in the hills west of Healdsburg; their only prize was one small black bear (13). After this time, sighting a bear in the vicinity was something of a novelty. It is probable, based on modern experience, that human-wrought environmental changes actually benefited the area’s deer population. By improving the browse for sheep through burning and clearing, ranchers unintentionally provided more food for the deer. Although hunting would have countered part of the upward trend of the deer population, the ranchers’ war against deer’s chief predator, the coyote, must also have resulted in an increase in the number of deer.

During the 1870s and 1880s, the Lake Sonoma Area experienced something of a boom. Some parts,
especially the more rugged sections, would never again see such a large population, as growing families moved there in the hope of taking advantage of the relatively high prices that agricultural products commanded. Unlike the situation in the fertile Dry Creek Valley bottomland, where agriculture in its various forms was to continue until the present, the population boom in the uplands lasted only a single generation. Although these family operations were typically based in sheep raising, various types of crops were also grown, changing the area’s appearance. These crops included alfalfa, hay, and corn for animal fodder; orchard crops for marketing; and a variety of vegetables and berries grown for the table. When, during the last years of the 19th century, many families moved out of the area, they left behind them evidence of their presence, which survives in the form of stump-scattered hillsides, untended orchards, and patches of exotic flowers and eucalyptus groves marking the remains of their homes and barns.

Within a relatively short time, much of the hill land in and surrounding the area became the property of a few, large-scale sheep ranchers. Clearing additional land for grazing became less common because of the labor costs it involved. In fact, there is evidence that some previously cleared land was allowed to degenerate to chaparral: in 1872 and 1875, government surveyors of the township to the south and west of the upper Dry Creek Valley wrote of this region’s suitability for grazing and its covering of oak and other trees. When the area was resurveyed in 1893, the situation appears to have changed. The surveyor noted that, “A number of trees have been destroyed in clearing adjacent land. The portions of this township that I have surveyed are very rough and mountainous and it is principally covered with dense chaparral” (14). From this account, we must conclude that some sheep raisers allowed less productive portions of their range to deteriorate. Yet this would have been a peculiar response on their part, for although the sheep population had declined by half...
over the previous 10 years, a more extensive—consequently less densely grazed—range would still have been to the ranchers’ advantage; certainly the knowledge of how to sustain rangeland was present, as controlled burning was frequently practiced in the area.

Literary references to the project area before the creation of Lake Sonoma are sparse. One notable exception is the autobiography of Orville Baldwin, an upland rancher for much of the first three decades of the 20th century. Baldwin noted that bears were all but unknown in the area. Of the smaller mammals, wildcats, coyotes, and foxes were not uncommon. Coyotes were not usually a significant problem to Baldwin’s sheep; certainly, they were not perceived as such a menace as they have become in recent years. Feral pigs and bald eagles were considered pests, but of a low order. The pigs would root up meadows looking for bulbs and roots, thus destroying the grass, and an eagle would occasionally take a lamb. While noting these animals’ presence, Baldwin only took action against persistent offenders (15). Neighbors referred to him as “Rattlesnake Baldwin” because of his reputed reluctance to kill even this varmint.

**ENVIRONMENT AND THE LAW**

**Assessing Environmental Impacts**

In many ways, Orville Baldwin’s attitude reflected that of the rising conservationist movement, exemplified in the characters of John Muir and Theodore Roosevelt. The key to reconciling conservation with long-term, productive land use was planning. It was not until 1969, however, that a resurgence of environmental awareness gave birth to legislation that required a public evaluation of the effects of all federally funded projects. Under this law, the National Environmental Policy Act, an Environmental Impact Statement (EIS) was prepared in 1973 which considered the effects of the Warm Springs Dam-Lake Sonoma project on a variety of factors; these included soils and geology, wildlife habitats, air and water quality, traffic patterns, regional economic development, seismic activity, vegetation, and archaeological sites. Although these assessments are made on the basis of professional, and often highly technical, studies, the EIS review is intended to be comprehensible to any intelligent person, who should be in a position, after reading it, to critically evaluate the project’s worth.

Ideally, all measurable effects of a project should be evaluated by the EIS to determine whether there is an ultimate loss or gain. For example, by building the Warm Springs Dam and inundating the upper Dry Creek Valley, productive agricultural land was lost to the county. According to the EIS, however, creating the dam and lake would allow more previously unusable downstream land to come into production than would be lost by construction, a positive outcome in economic terms.

The process is evaluative, weighing advantages against drawbacks in relation to community goals; many of these decisions, however, are not clear cut. Few people would claim, for example, that it would be appropriate to build a sewage treatment plant in a densely populated residential neighborhood; the values are clear in this situation. Yet there would be much less agreement in the community on the value of an industrial development. Some would characterize such a plan as an opportunity for economic development, to bring jobs and a larger tax base to the region, whereas others might claim that their area would be changed by the population growth and changes in air quality and aesthetics, and that they like things as they are. Of course, both factions would be right in this case, since they have no common idea of what is desirable. Thus the environmental review process cannot provide an unequivocal signpost to the “best” alternative. The facts do not “speak for themselves”; evaluations will always be made in relation to human and community priorities.

Before an EIS is approved and the project begun, it must be shown that all of the plan’s major adverse side effects will be reduced to acceptable levels. In the case of the Warm Springs Dam-Lake Sonoma project, the extreme sensitivity of the natural setting made these efforts especially important. Three such problems that had to be solved by the Corps of Engineers planners and their consultants involved the deleterious effects of construction on soil erosion, vegetation, and wildlife.

**Soil Erosion and Vegetation**

A combination of relatively steep slopes and unstable soils make erosion an important problem in the Dry Creek watershed. To reduce the amount of erosion-induced soil loss during dam construction, settling ponds were constructed at the bottom of cleared slopes to capture waterborne sediments and prevent them from being carried downstream. As a long-range measure, a carefully formulated program
of seeding and reforestation was instituted. Special attention was paid to “Wildlife Management” areas—parcels of land set aside to make up for wildlife habitat lost because of the reservoir (16).

**Wildlife: Birds and Fish**

While the creation of Wildlife Management areas was calculated to significantly reduce adverse effects on many species of animals, construction created special problems for certain bird and fish species. During the dam’s planning stage, biologists discovered that several breeding sites of the peregrine falcon, an endangered species, were situated within and near the project boundary. To protect the birds, Corps of Engineers planners placed strict limits on the uses of land adjacent to the nesting sites and buffered them from areas of heavy public use. Wildlife biologists will continue to monitor the birds, at least through the 1980s, so that any man-made
problems that might affect their population can be quickly spotted and eliminated.

Historically, Dry Creek and its tributaries above the dam constituted more than 80 miles of spawning and nursery grounds for steelhead trout and Coho salmon. After the dam was built, however, these areas could have become inaccessible to the fish, whose numbers were expected to decline accordingly. Fortunately, this projected effect was noted early in the dam’s planning stage, and the construction of a fish hatchery was proposed as a way of sustaining the fish population, while also providing an appealing visitor attraction. At the time of writing, the results of the first years’ releases have been very encouraging, with many more fish returning to spawn at the hatchery than scientists had expected. It is hoped that in time this program will contribute to returning the Russian River to its previous status as an important sport-fishing stream.

Ethnobotany

Perhaps the most innovative resource-protection program devised to offset construction impacts was directed toward plants of great importance to the local Indian community. Studies made by anthropologists alerted officials that certain plants of traditional economic, medicinal, and ceremonial value—notably sedge, willow, and angelica—were still regularly collected from the upper Dry Creek area by local Pomoan Indians. Although many local Indians vehemently opposed the dam project, several respected community leaders agreed to help the Corps in creating new plant-collection areas downstream from the dam. Between 1979 and 1981, over 48,000 sedge plants and a much smaller number of willow and angelica were moved to the ethnobotanical relocation areas (17).

Archaeology and Archaeologists

Clearly, the pre-dam environment of the upper Dry Creek area contained more than plants and wild animals: for several thousand years it was occupied by people who left archaeological evidence of their presence.

Under the law, archaeological remains are considered as much a part of the environment as are natural elements such as wildlife, plants, and soil. All are conceived of as valuable resources, to be managed wisely. Conserving a diversity of plants and animals is beneficial to the local ecosystem, which in turn contributes to the land’s long-term productivity. The value of archaeological sites and artifacts, which are sometimes termed “cultural resources,” is more difficult to assess, as it stems from their contribution to scholarly knowledge, to public understanding of past lifeways, and to heritage values of the affected group.

The archaeologists’ attachment to the Lake Sonoma Area goes deeper than merely a relationship between scientists and their data source. For more than seven years, archaeologists studied the area, spending the three- to six-month field season of each year in makeshift camps and inevitably becoming part of the environment.

The typical archaeologists’ camp was on a terrace by a creek; the creekside setting was particularly important after a day’s work in 100-degree weather. The most permanent structure was a mobile office trailer that doubled as a lab, in which artifacts were cleaned, labeled, and cataloged. The open-air kitchen was located nearby, with its huge cast-iron skillets and restaurant-scale pots and pans. Since as many as 30 people sometimes ate at the camp, kitchen equipment included a gas stove and refrigerator, adapted for propane. Tables, benches, and sometimes old armchairs and couches could be found around the kitchen and “community center” firepit.

Years of experience under field conditions made many of the archaeologists particular about their own material comforts; roughing it was no novelty to them. Consequently, a good cook was as indispensable a part of the crew as any scientific specialist on the team. Once off-duty, archaeologists sought relief from monotony and weather that seemed to be either excessively hot or cold. For some camp dwellers, this relief came via bizarre antics and mad-dog style volleyball games. On working days, exhaustion took its toll early in the evening, leaving only a few diehards to their late-night conversations around the stone-lined firepit.

Thus organized, archaeologists were the last people to actually live in parts of the reservoir basin. It is appropriate that a chapter that began as a description of the primordial environment should end with a glance at the lifestyle of people who came to study the land for evidence of its past. For people were as integral an aspect of the area’s setting as rocks, plants, and wildlife.
Archaeologists take time out