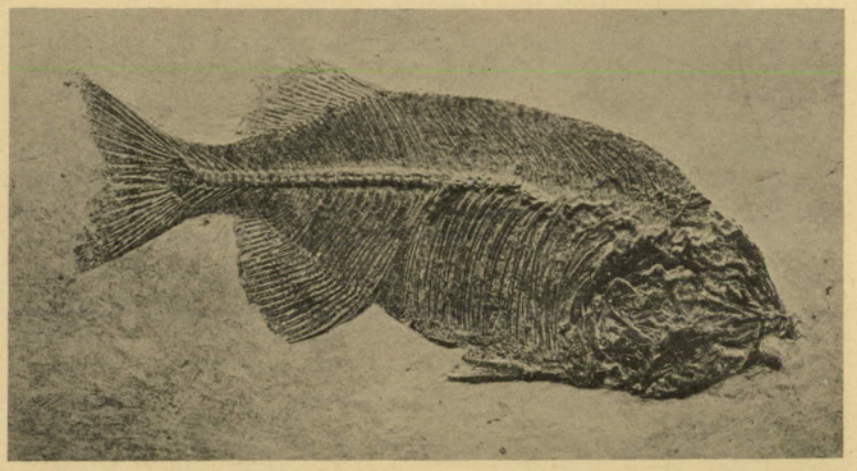
PROPOSED

FOSSIL BUTTE

NATIONAL MONUMENT



UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

SYNOPSIS OF REPORT

PROPOSED FOSSIL BUTTE NATIONAL MONUMENT

PROPOSAL: That Fossil Butte and surrounding lands and features in Wyoming be established as the Fossil Butte National Monument and be administered by the National Park Service.

LOCATION: Fossil Butte is about 10 miles west of Kemmerer, Lincoln County, Wyoming, adjacent to U. S. 30N--an all-weather, trans-continental highway.

DESCRIPTION OF AREA: The proposed monument includes Fossil Butte, a rugged topographic feature rising 1,000 feet above the valley floor to an elevation of over 7,500 feet. This butte and the associated Condick Ridge are made up of the Wasatch and Green River formations which contain numerous, well-preserved fossils of Eocene age. From vantage points on the ridge interesting features associated with the geologic history of these formations and the ancient inland lake in which the Green River formation was deposited can be observed.

SIGNIFICANCE AND NEED FOR CONSERVATION: Fossil Butte, from the scientific viewpoint, is of national significance because of its unusual concentration of aquatic vertebrate remains. Known locations of fossil fish of any age are rare, but here thousands of fish fossils are present and fossils from this locality are exhibited in museums throughout the world. These fossils represent the evolution and modernization of fresh-water fishes better than those from any other known site in the world. The fossil remains of plant and animal life in the Wasatch formation are of added value along with the outstanding geologic examples of lake, shoreline, and tributary river flood plain deposits.

SUITABILITY: This area is highly suited for preservation and development as a national monument. It has great scientific interest for the geologist, paleontologist, icthyologist and botanist as well as for the visitor who has seen fossil fishes from this locality exhibited in museums elsewhere. The area is relatively free from manmade intrusions with no developed properites included within the proposal. It is readily accessible from an all-weather road.

FEASIBILITY: Of the 8,240 acres included in the proposal, 86 percent is already in Federal ownership, 9 percent is State-owned land and 5 percent is privately owned. The area contains all undeveloped grazing land--mostly under lease to grazing allottees. There is a good possibility for exchanging the private and State-owned lands for Federal lands outside the boundary. If these exchanges could be made, no Federal funds for land acquisition would be required and no private lands would be removed from the tax rolls.

PROPOSED DEVELOPMENT AND USE: A visitor center containing administrative offices and a museum would be located near U.S. 30N as an initial information center and contact point for visitors to the national monument. Roads and trails would lead to a major interpretive facility at a location where fossil deposits are rich and easily accessible and the visitors could watch scientists expose and prepare fossils for in-place exhibits. Interpretive markers, self-guiding trails and wayside exhibits would provide additional interesting details of the scientific story. A small campground, a picnic area and scenic overlook would also be developed for the visitors. Employee housing and facilities would be needed for the proper administration, interpretation, protection and maintenance of the area.

September 1964

PROPOSED
FOSSIL BUTTE
NATIONAL MONUMENT

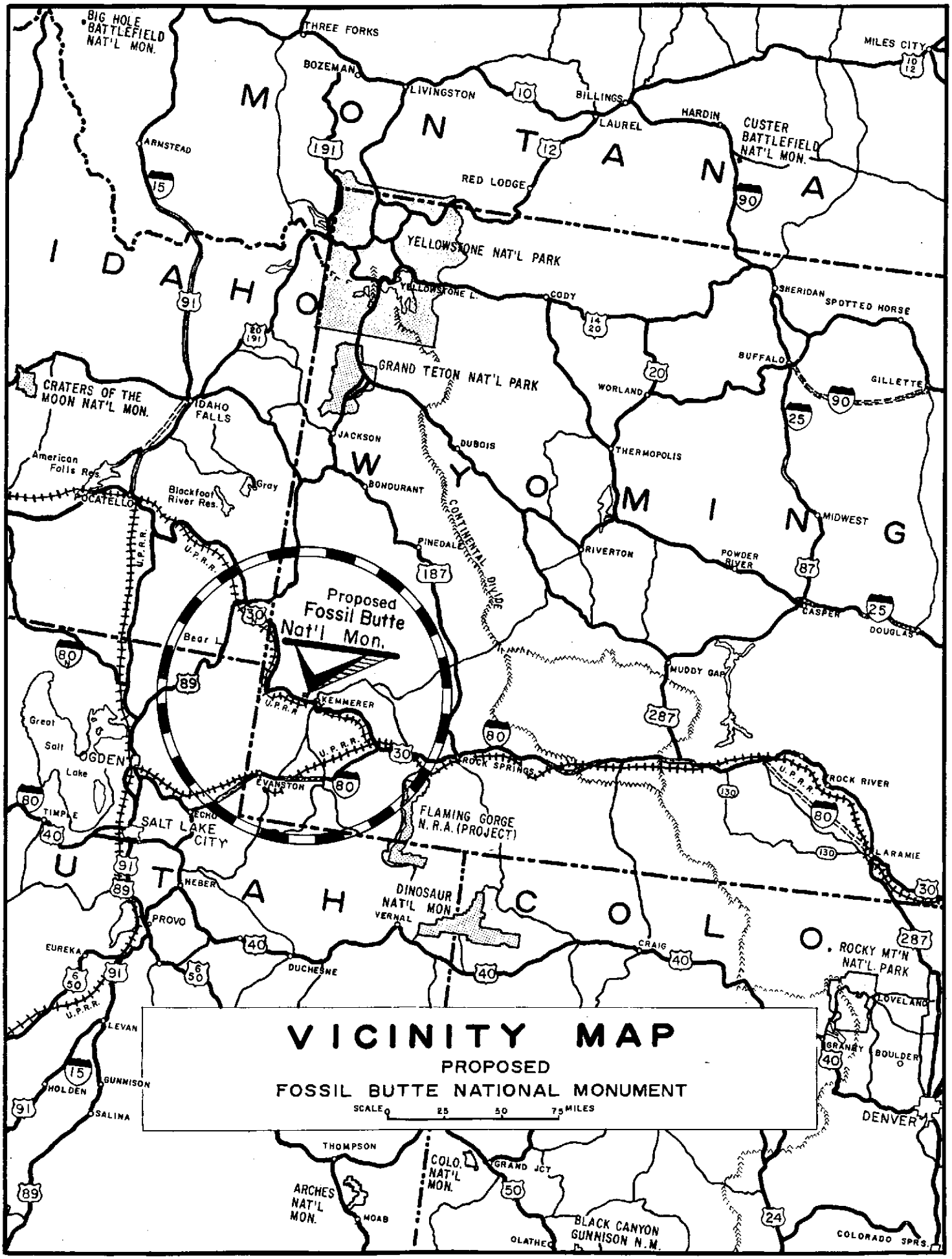
AUGUST 1964

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
MIDWEST REGION
OMAHA, NEBRASKA

Created in 1849, the Department of the Interior--America's Department of Natural Resources--is concerned with the management, conservation, and development of the Nation's water, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.

CONTENTS



VICINITY MAP

PROPOSED

FOSSIL BUTTE NATIONAL MONUMENT

SCALE 0 25 50 75 MILES

FOREWORD

Recognition of the significance of fossils in revealing the story of life in the geologic past is increasing each year. The rising educational level of our citizens has lead to a widespread interest in this, the field of paleontology. Although fossils have long been of fundamental scientific importance and traditionally displayed in public and institutional museums, their exhibition and interpretation in-place as a cultural and educational medium has only recently come to public attention. A notable example is the quarry development at Dinosaur National Monument.

The phenomenal increase in visitors at the Dinosaur Quarry since completion of the visitor center there in 1959, is a strong indication of this Nation's endorsement of the preservation and interpretation of our rich paleontological heritage. The success of the Dinosaur development and the ever-increasing threat of exploitation or destruction of other well-known fossil beds sharply point out the desirability of preserving some of them, both for scientific study and for public enjoyment.

A goal of the National Park Service is to include within the National Park System a representation of the more significant chapters of the history of life as revealed by fossil remains. Some are already represented in existing parks. For example, the earliest known form of life, exemplified by fossil algae of Precambrian age, is represented at Glacier National Park; fossil remains of many invertebrates are found in the sedimentary rocks of several parks and monuments, but especially at Grand Canyon; a form of plantlife is represented by the petrified forests of Yellowstone and Petrified Forest National Parks; and an important chapter in the Age of Reptiles is represented at Dinosaur National Monument.

Lacking representation in the National Park System is the fossil story of the modernization of fresh-water fishes. This void can be filled by the establishment of a national monument at the site described in this report. Here is an opportunity to present for the benefit of all people another chapter in the geologic history of life.

Fossil Butte

INTRODUCTION

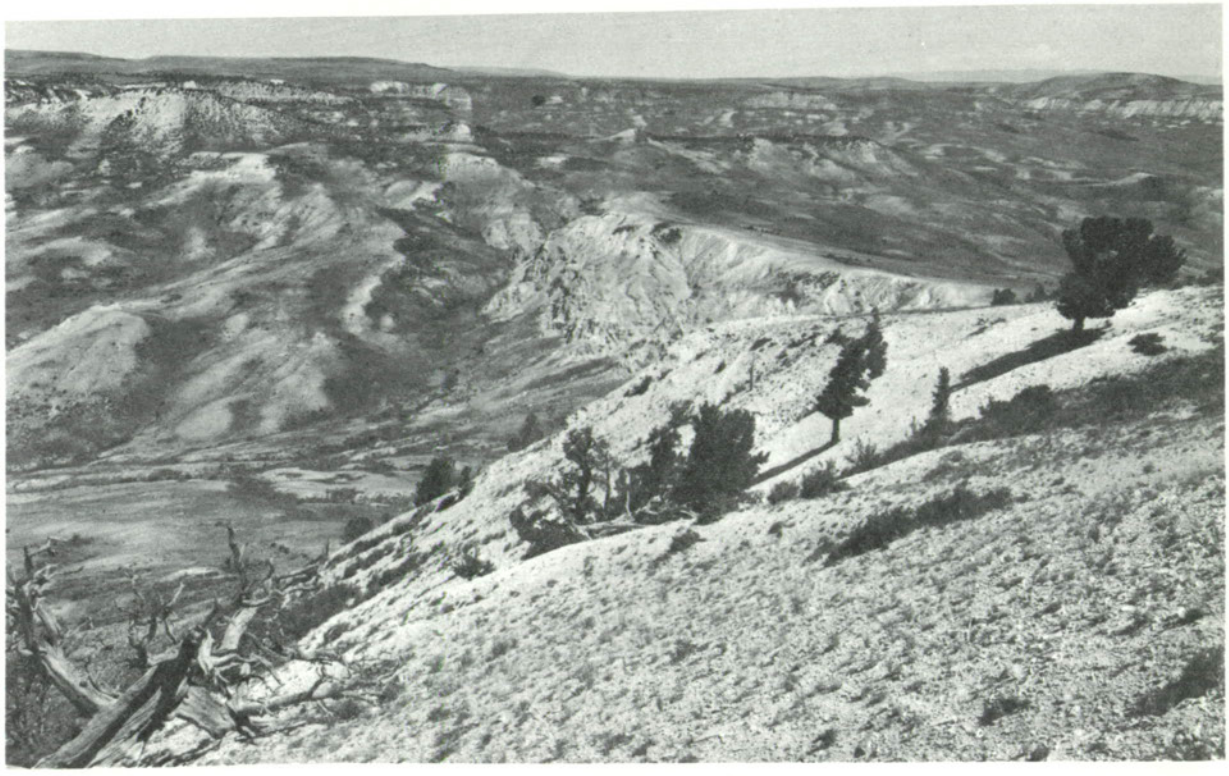
Fossil Butte, world famous for its well-preserved fossil fishes, is located about 10 miles west of Kemmerer, Lincoln County, Wyoming. Fossils have been collected at this locality for almost a century, and specimens from this site are exhibited in museums throughout the world.

A reconnaissance study of this area was made by the National Park Service early in 1959, followed by more detailed studies in subsequent years. The results of these investigations are covered in this report.

Studies such as this are part of the long-range effort of the National Park Service to identify areas of sufficient importance to be included in the National Park System. The eventual objective of these efforts is a system of national parks that will represent the most outstanding examples of America's natural and cultural heritage.

In September 1961, the Advisory Board on National Parks, Historic Sites, Buildings and Monuments recommended to the Secretary of the Interior, establishment of the Fossil Butte area as a national monument.

The purpose of this report is to present sufficient information about the Fossil Butte site so that its significance to the Nation is understood at the local, state, and national levels, and to describe what the National Park Service believes should be done to preserve and interpret it for the benefit and enjoyment of the people.



A narrow ridge of badlands connects Fossil Butte with Cundick Ridge. ABOVE: View from Fossil Butte to Cundick Ridge. BELOW: View from Cundick Ridge to Fossil Butte

Scattered stands of limber pine are prominent in this view from Prow Point.

Sagebrush and grass carpet the lower north slopes of Fossil Butte while stands of conifers grace the upper slopes.

GENERAL SETTING

Fossil Butte is a ruggedly impressive topographic feature which rises sharply 1,000 feet above Twin Creek Valley to an elevation of over 7,500 feet. The Butte is located just north of U.S. Highway 30N and the Union Pacific Railroad which traverse the valley.

The base of the Butte consists of brightly colored, red, purple, yellow, and gray beds of the Wasatch formation. The eroded portions of these horizontal beds slope gradually upward from the valley floor, and steepen abruptly. Overlying them and extending to the top of the Butte, are the much steeper buff to white beds of the Green River formation, here about 300 feet thick. These upper beds contain the fossil fish deposits.

Adjoining Fossil Butte on the north is a narrow ridge of picturesque badlands which have been sculptured out of the Wasatch formation. This ridge connects the Butte with Cundick Ridge, an upland which extends northwestward from the badlands. Cundick Ridge is similar in character to Fossil Butte except it rises to an average elevation 300 feet higher than the Butte. Actually, both are remnants of a once continuous ridge. Their separation came about years ago when the Green River formation once overlying the narrow ridge of badlands was eroded away.

A western extension of Cundick Ridge terminates in a promontory that rises to an elevation slightly over 8,000 feet. From this superb vantage point, known as Prow Point, magnificent views in all directions may be obtained.

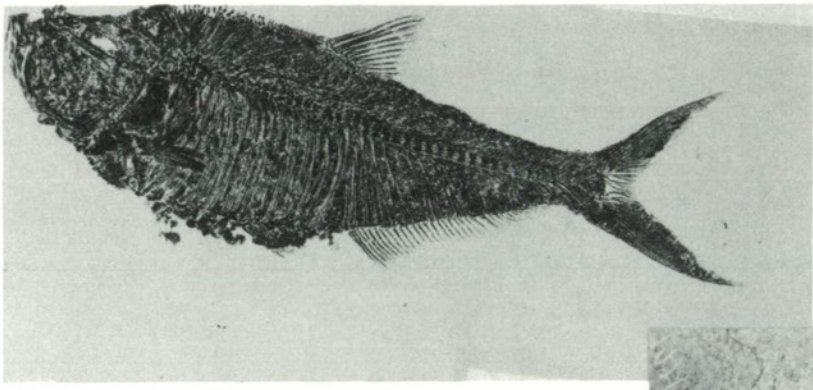
The vegetative cover is predominantly a grass-brush type which normally grows under the semiarid to arid conditions of western Wyoming.

Indian ricegrass, Junegrass, and wild rye are the more common grasses. These are interspersed with herbaceous vegetation such as big sagebrush, rabbitbrush, snowbush, greasewood, and serviceberry. The lower and upper flats are well carpeted with this grass-brush type vegetation, but the steeper slopes are sparsely covered to barren.

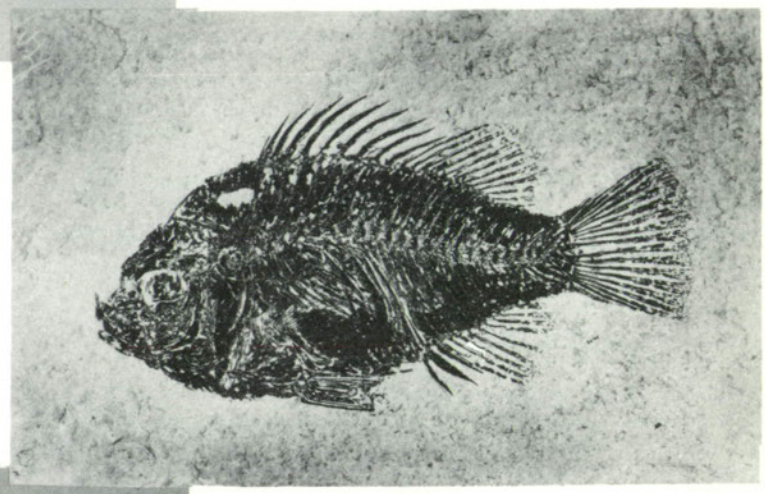
Scattered stands of limber pine grow on some of the higher north-facing slopes and on other exposures where moister subsurface conditions exist. Intermixed with these and in some instances farther downslope than the evergreens, are stands of aspen. In fall, the latter appear as splashes of gold along the ravines on the southwest face of Cundick Ridge. At lower elevations, willow thickets mark the courses of intermittent streams.

Several different species of wildlife live in or pass through this rugged area. Mule deer are common inhabitants and antelope are native to the general area. In fall, elk and occasionally moose drift into the vicinity from higher elevations. Coyotes and bobcats find ample food supply in an abundant rabbit population. On the west side of Fossil Butte is a small colony of prairie dogs. Birdlife is abundant, and a majestic golden eagle soaring overhead may often be observed.

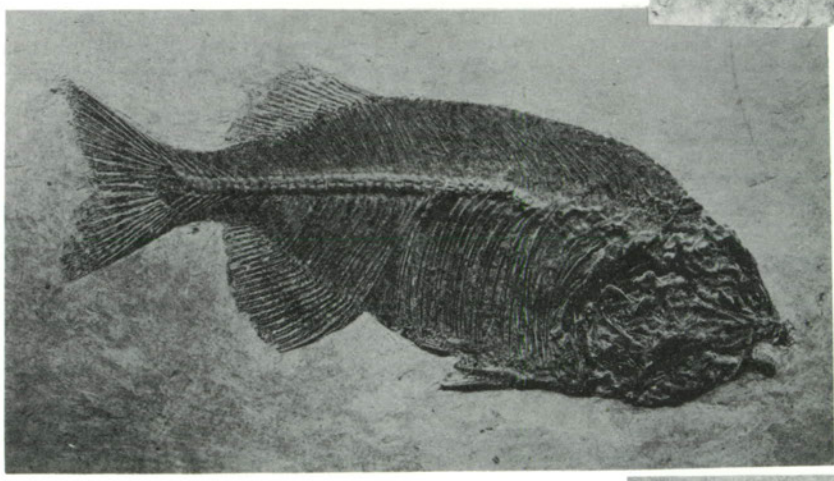
The climate is semiarid and cool-temperate. Annual precipitation, most of which falls as snow, averages about nine inches. Winters are cold, but not of the severity of those on the more exposed plains of eastern Wyoming. Summer days are warm, but nights are cool.



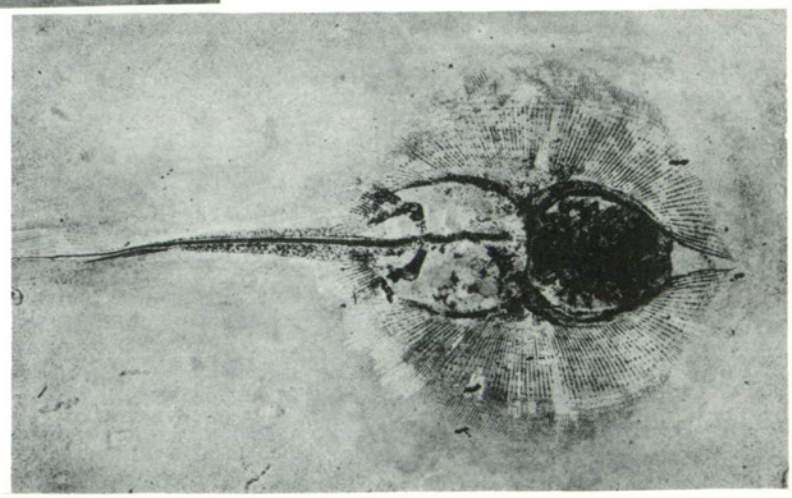
Diplomystus dentatus
Fossil herring



Priscacara peali
Fossil perch



Pharodus acutus
Fossil fish



Xiphotrygon radians
Fossil stingray

COURTESY: SMITHSONIAN INSTITUTION
CHICAGO NATURAL HISTORY MUSEUM

Fossils at the Butte

The richest fossil fish deposits are found in limestone layers about three feet thick which lie from 30 to 300 feet below the varying surfaces of the butte. Fish fragments, however, are also found in many other beds. Some layers have so many fishes that they overlap one another. The black to dark-brown organic remains contrast dramatically with the white muddy limestone in which they lie. The deposits are in the Green River formation of Eocene age.

The fossil fishes represent several varieties of perch (species of Priscacara) as well as other fresh-water genera, and several kinds of herring (Diplomystus) whose descendants now live in the sea. A deep-bodied fish with many curious plates (Pharodus), 20 inches long, is common. Such other fish types as the paddlefish, garpike, and a stingray (Xiphotrygon /Heliobatus/ radians) are also present.

The Green River formation also contains very well-preserved insect fossils in layers near the top of the butte, and about a dozen species of such other invertebrate animals as snails, clams, and ostracods, along with fragments of a few birds and bats, and many kinds of plant remains ranging from fossil palm and fern leaves to pollen.

The Green River formation consists mainly of light gray, tan, and buff muddy limestone, calcareous siltstone, very fine sandstone, and mudstone, but includes oil shale and a few thin layers of volcanic tuff. The very thin and even layering of the rock is also evident when the rock is examined microscopically, for it is composed of very thin laminae of dark-brown organic layers alternating with lighter colored and thicker

layers. Each pair of layers is believed to represent an annual deposit, as in tree rings; such layers are called varves. The number and thickness of the varves indicate that each foot of the various kinds of rock took from 250 to 8,000 years to form.

The underlying Wasatch formation also contains abundant fossilized remains of animals. Fragments of primitive horses and tortoise shells have been found at the base of Fossil Butte, and bones of ancestral monkeys, snakes, birds, crocodiles, and of the large primitive mammal Coryphodon are known from nearby places.

The Wasatch formation consists of variegated mudstone, light gray to red sandstone, and gray conglomerate. In some places lens-shaped cross sections of conglomerate reveal their origin as stream valley deposits.

Dark fossil remains contrast with the lighter limestone layers.

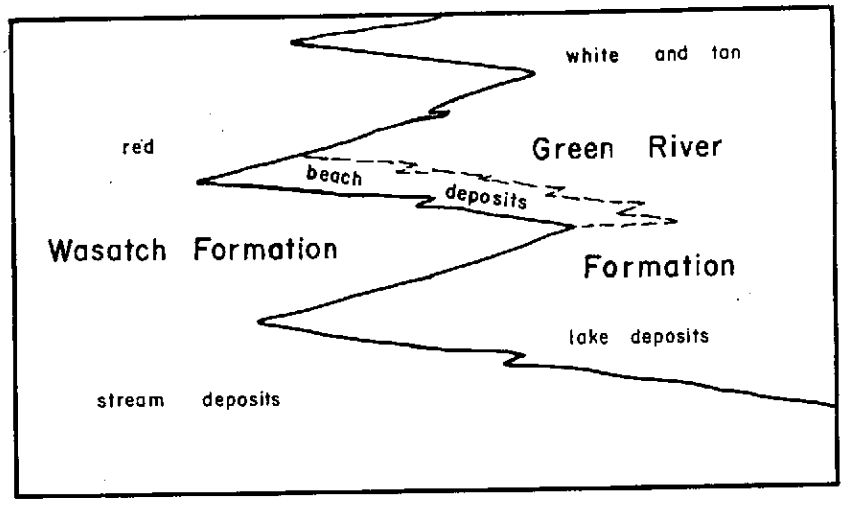
Physiography of the Vicinity

Rock exposures near Fossil Butte reveal the geologic history of the region. Visible from the top of Prow Point northwest of Fossil Butte, for example, is Commissary Ridge to the northeast and east of Dempsey Basin which is north of the Butte. Exposed in this ridge is a fault surface along which a thick slice of the earth's crust, composed of old rocks 20,000 feet thick, has been thrust tens of miles eastward over younger rocks.

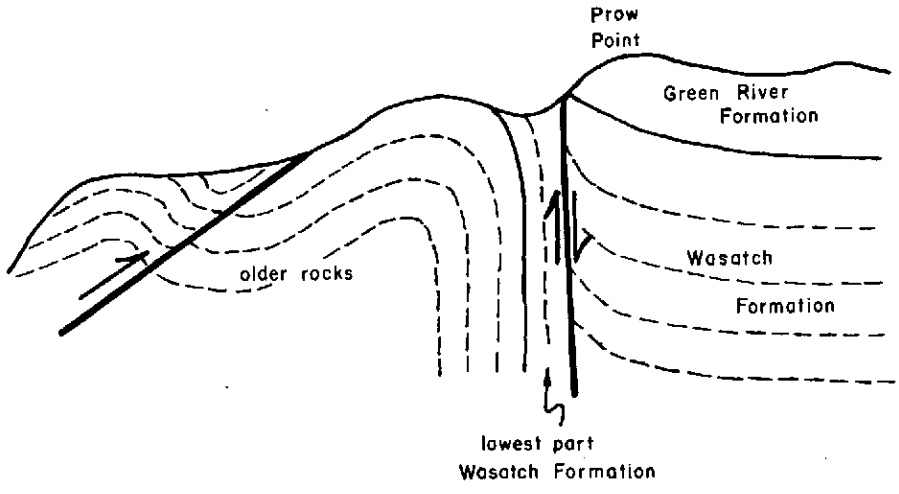
Great wedges of the Wasatch and Green River formations can be seen to lie alternately one above the other directly north of but close to Prow Point. The formations intertongue, demonstrating that parts of both formations were forming at the same time at adjacent places. (See fig. p. 10). The rocks of the Green River formation consist of materials deposited on the bottom of a lake, and those of the Wasatch formation consist of materials deposited by streams that flowed into this lake. Near the contact between the two formations are ancient fresh-water beach deposits.

West of Prow Point can be seen the older rocks of Dempsey Ridge in the Tunp Range. The rocks are bent, contorted, and broken. A steeply dipping, northerly trending fault is exposed at the west end of the Point on which the rocks of the Tunp Range have been lifted up and those to the east, including the rocks that form Fossil Butte, have dropped down.

Fossil Butte itself is a remnant of the dissected Hams Fork Plateau that extends northward to Dempsey Basin, along the Hams Fork drainage, and southward toward Evanston, Wyoming. The plateau is bounded on the east and west by long ridges of steeply dipping layers of harder and older rock. Oyster Ridge, on the east, separates the plateau from the Green River Basin in which other Green River and Wasatch strata are present, and Dempsey Ridge is on the west.



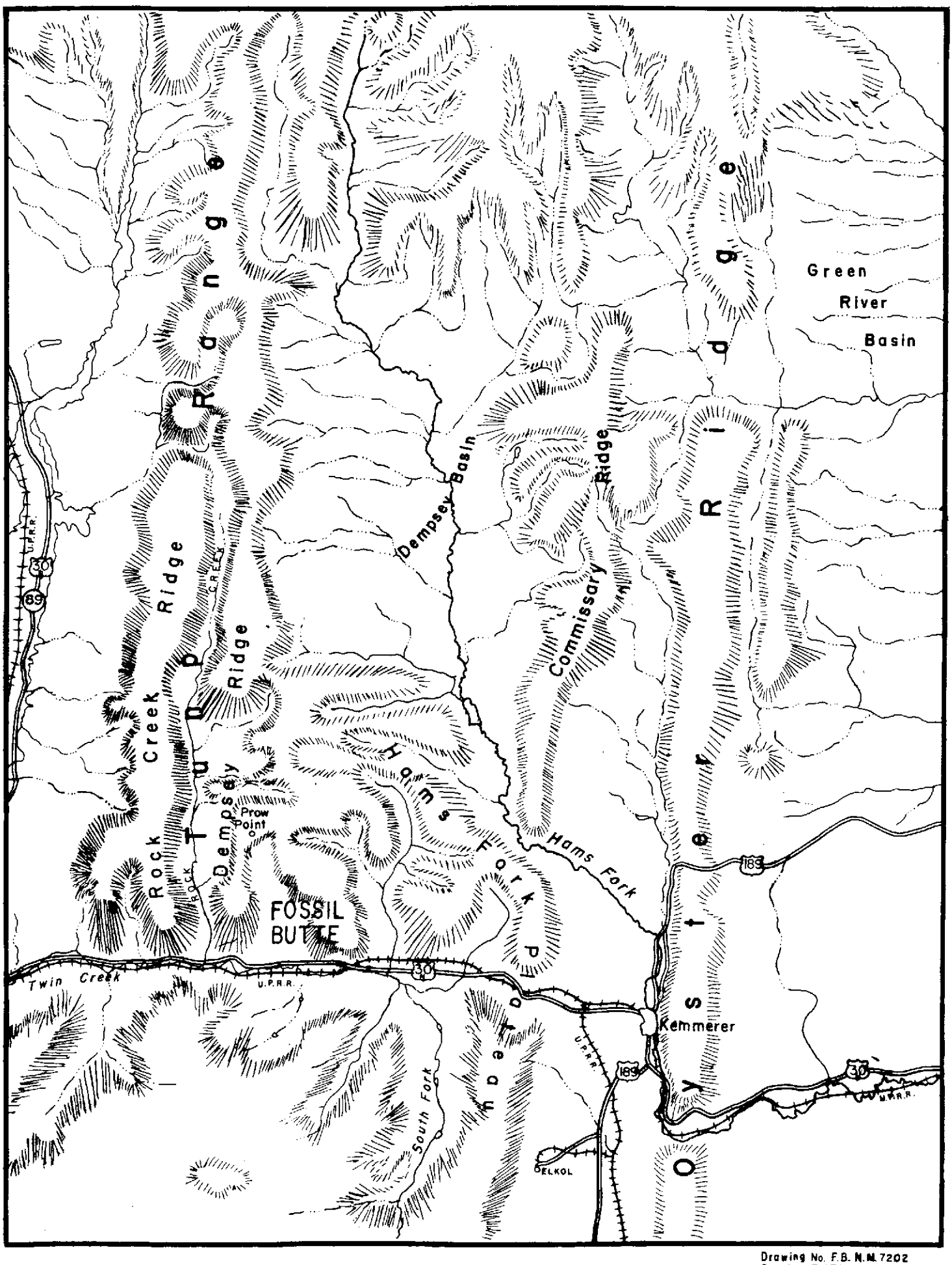
Intertonguing of Wasatch and Green River Formations



Structural relation of older rocks to Wasatch and Green River Formations

VERTICAL SECTIONS THROUGH GEOLOGIC FEATURES EXPOSED NEAR PROW POINT

FBNM 7203



Drawing No. F.B. N.M. 7202
Drawing By: Richard K. Weaver, N.I

An 8,006-foot exploratory hole was drilled on the north side of Fossil Butte by the Amerada Petroleum Corporation in 1958. In this hole, rocks drilled directly beneath the Wasatch formation are gray siltstone, sandstone, and mudstone of the Evanston formation, which is now exposed in the valley of South Fork of Twin Creek, two to three miles southeast of Fossil Butte. Here, bones of small primitive primates have been found. Beneath these strata several thrust slices were found in repeated sequences of older, broken rocks.

Origin and Geologic History

For at least half a billion years, until the Cretaceous Period 80 million years ago, most of the western United States was submerged beneath the sea. As the sea retreated and advanced, most of the diverse older rocks of the region were deposited on its floor; some, however, were deposited by streams during brief marine withdrawals. The first mountains in western Wyoming rose from the sea as broad sheets of rock and were thrust up and eastward, late in the Cretaceous Period some 80 to 70 million years ago. The front of the thrust mass and the strata directly beneath the fault buckled by frictional drag along the fault surface and formed long ridges like the present Commissary and Oyster Ridges. Basins caused by down-buckling formed on each side of the ridges, the Fossil basin on the west and the Green River basin on the east.

Uplifted rocks in the mountains became weathered and eroded. Gravel and rock debris from their slopes accumulated as vast aprons of sediment and began to fill the basins, forming the Evanston formation. By Eocene time, some 60 million years ago, the ancient mountains were rejuvenated by uplift and block faulting. Rainfall increased, resulting in deep chemical

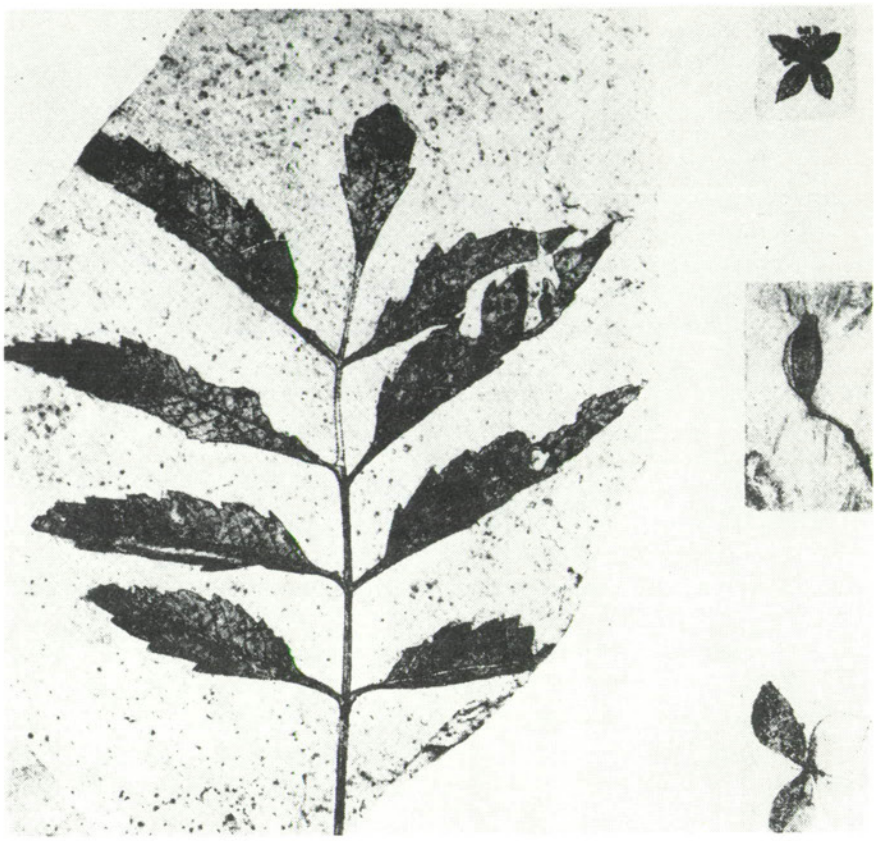
weathering of the uplands and the decay of rocks to form a deep mantle of red earth. The mantle was eroded from the uplands and deposited as red conglomerate, sandstone, and mudstone, in alluvial fan and stream deposits now called the Wasatch formation. The basins sank again and lakes formed within them. Thinly-layered, white, limy muds accumulated in these lakes to form the Green River formation.

Whether the lake in the Fossil basin was ever connected with the much larger lake in the Green River basin called Lake Gosiute, is not known. The two bodies probably were separated through much of their history by a long ridge ancestral to the present Oyster Ridge, but the lake in the Fossil basin may have formed a large bay of Lake Gosuite during brief rises in lake levels. Around the lake, streams deposited strata of the Wasatch formation.

The lakes were then less than 1,000 feet above the sea. The climate was warm and temperate and the waters of the lakes and their shores teemed with life. Conditions were very similar to those of our Gulf Coast today and hospitable to plants and animals.

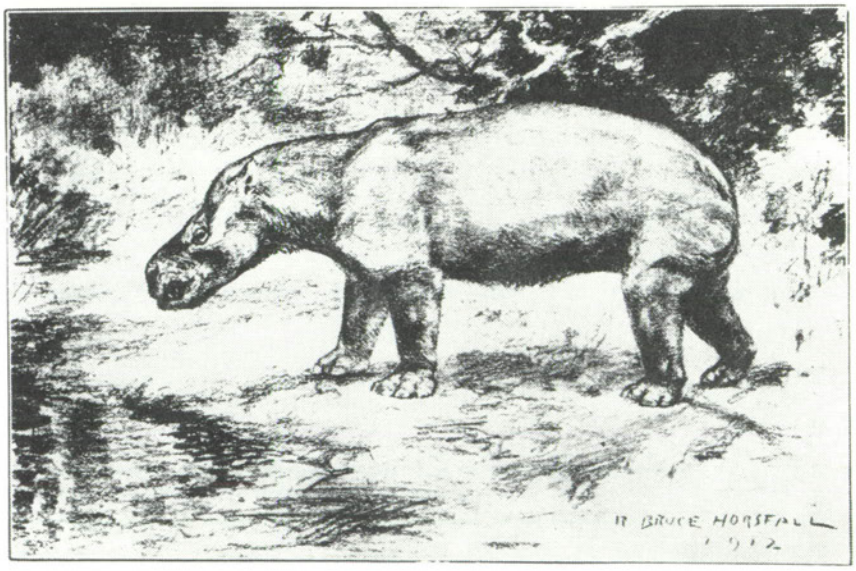
Fossil pollen indicate that the higher parts of surrounding mountains were covered with forests of pine, spruce, and fir. Lower down, the hills were covered with mimosa, oak, maple, hickory, and willow. Large palms, ferns, and reeds abounded along the shores, and in the lake itself algae and other plankton flourished.

The forests supported much animal life. Birds and insects were abundant. Primitive monkeys may have swung on tree branches. Primitive horses, no bigger than modern dogs, trotted about the open forest and fed on leaves and soft, lush, plants. Crocodiles, turtles, and snakes lived along the streams. The largest mammal then living, Coryphodon, probably lived in meadows.



COURTESY: SCIENCE

Fossil leaves, flowers, and seeds



COURTESY: W. B. SCOTT

Artist's conception of Coryphodon testis, one of the larger Eocene mammals about the size of today's small rhinoceros.

Clams and snails lived on beaches of the lakes. The warm, shallow, clear water near the beaches was ideal for algae which built many reef-like mounds of limestone. Free-swimming small shellfish called ostracods also lived in the shallow waters, for deposits of their shells are found near the algal mounds. Farther out in the lake, fish life was prolific. The lake was connected by streams with the sea, probably 700 or 800 miles away, for most herring live in the sea, although a few go up rivers to spawn and some live in rivers. The moderate distance to the sea did not preclude the migration of many marine forms; modern salmon are known to travel more than 2,000 miles up the Yukon to spawn.

How did so many fish come to be preserved in one of the world's most unusual rock deposits? Early attempts to answer this question by calling on catastrophic events to slaughter, wholesale, prodigious numbers of fish failed because they did not account for other features of the rocks in which the fish are found. A far more lucid answer has been found by W. H. Bradley in a careful comparison of these ancient lake deposits with known features of large modern lakes.

The waters of large lakes in warm temperate regions become stratified during certain times of each year and surface layers become warmer, lighter, and less viscous than the deeper, cooler waters. Winds blowing across the lake are unable to circulate the deeper waters because of the density differences, and so set up a circulation pattern in the upper, well oxygenated surface layer. This layer acts as a seal for the deeper, denser body of water which becomes foul and stagnant through the decay of organic matter, and uses up the available dissolved oxygen and produces hydrogen sulphide and carbon dioxide. The lake is said to be thermally stratified. In late

COURTESY: CHICAGO NATURAL HISTORY MUSEUM

The lakes and lakeshores teemed with life in Eocene time.

COURTESY: SMITHSONIAN INSTITUTION

fall and winter, surface temperatures decrease and the density of the surface layer increases until it approaches that of deeper waters. When this happens, the waters of the entire lake are again circulated ("overturn" occurs); hydrogen sulphide that has accumulated in the bottom waters rises and becomes oxidized. If it rises too quickly, it may result in great mortality among fish and other organisms.

A thermally stratified lake accounts for the fish preservation and sediments at Fossil Butte. The fish thrived in the warm, well oxygenated surface waters in which they swam. When they died, some sank to the lower stagnant, hydrogen sulphide-charged waters in which there was no life except anerobic bacteria. The fish thus escaped being torn apart by scavengers and bottom feeders or scattered by wave currents. Their delicate fin and tail rays, other bones, and even their scales were undisturbed. Stagnant, sulphide-rich organic mud, accumulated under these bottom conditions, account for the oil shales which were deposited in association with the fish.

The varved layers in which the fish occur may also be accounted for by the early cycle of thermal stratification. As temperatures of the surface layers rose, carbon dioxide was driven off and calcium carbonate was precipitated. But as the precipitate sank, it encountered bottom waters which were acid because of their carbon dioxide and hydrogen sulphide content; the carbonate was redissolved (which would enhance the stability of the stratification). During the period of overturn in late fall, the sulphide and carbon dioxide were dissipated, the waters became less acid, and a relatively thick lamina of calcium carbonate was precipitated. During the rest of the year, only small quantities of organic matter settled slowly to the bottom.

The great abundance of fish preserved in some layers may be explained as follows: If the entire lake were suddenly chilled, as happens in tropical lakes, waters may have overturned so rapidly that large numbers of fish of all ages and kinds were killed before the hydrogen sulphide could be oxidized.

Research work at the Ulrich Quarry in 1963

COURTESY: DR. PAUL O. MCGREW

History of Geologic Research and Fossil Collecting

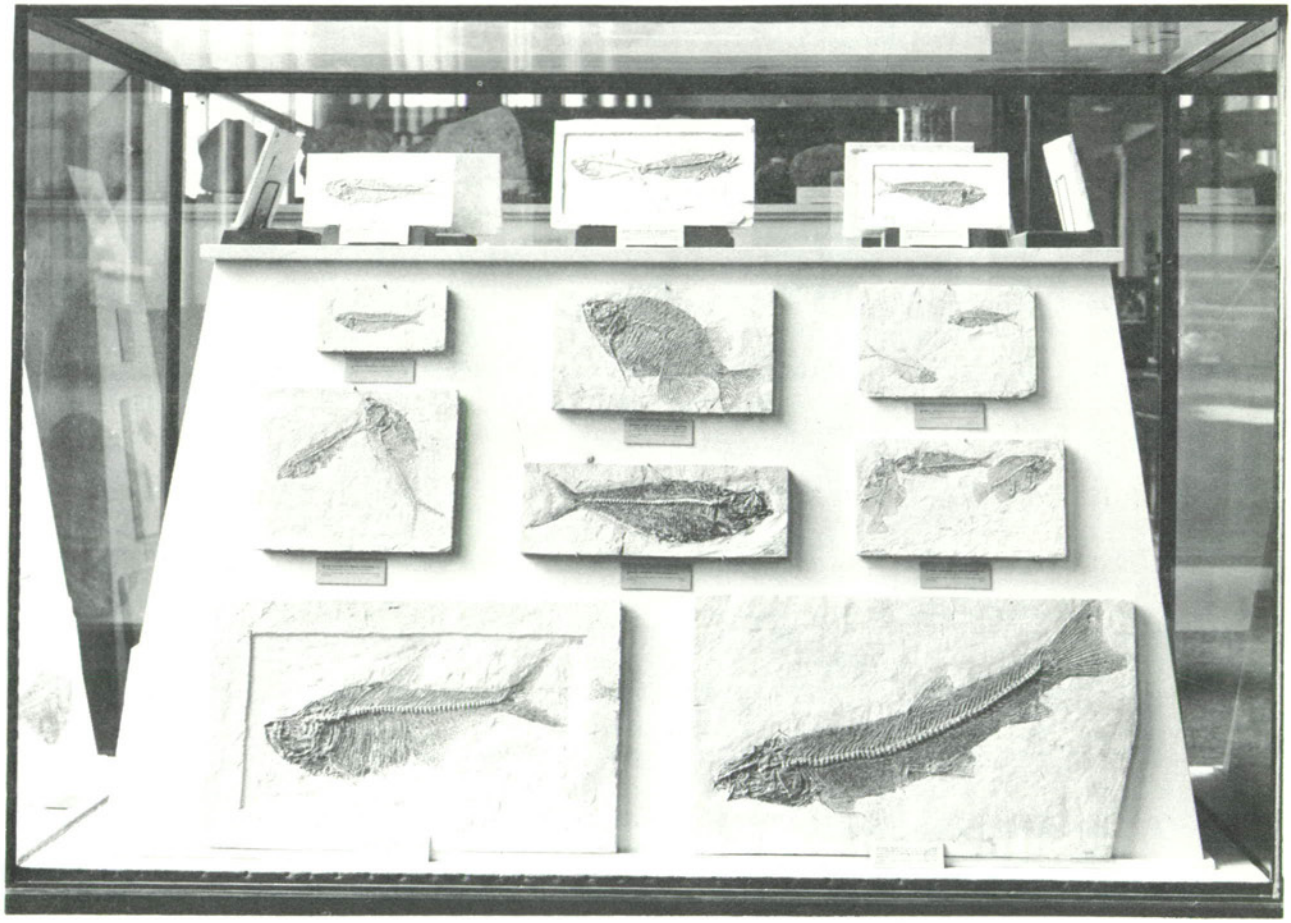
The first fishes from the Green River formation were found along the present Green River by Dr. John Evans in 1856, and were described by Joseph Leidy. Several other localities were found to yield fishes, but it was not until the early 1870's that abundant fishes were found at Fossil Butte, which was referred to as the Twin Creek locality.

A. C. Peale examined the Butte in 1877 and described it in the Hayden Survey report of that same year. Material collected by Peale included specimens subsequently described by Cope, Lesquereux, and Scudder. A more comprehensive study of the area was made in 1905 by A. C. Veatch, and described in a U.S. Geological Survey Professional Paper in 1907. Fossil Butte and nearby exposures were among many sites examined by W. H. Bradley in his regional studies of the Green River formation and described in various publications.

During the past decade, W. W. Rubey, J. I. Tracey, Jr., and S. S. Oriel have been conducting geological studies in areas that include the Butte. Reports covering these studies are being prepared. In 1963, Dr. Paul O. McGrew of the University of Wyoming was awarded a National Science Foundation grant for research on the fossil beds. He began work that summer at the Ulrich Quarry a few miles to the south of Fossil Butte and plans to continue his study through the summer of 1965.

Many other scientists also have collected in this region. A more complete listing can be found in the bibliography.

Several generations of local residents have quarried fossil fish on a small scale and supplied specimens to museums throughout the world.



"...no other fossil-bearing formation in North America has produced so many and such characteristic fossils as this great series of lake beds." - Hesse

COURTESY: SMITHSONIAN INSTITUTION

SIGNIFICANCE

Fossil Butte is unquestionably of national significance from a scientific viewpoint, according to geologists who have studied it. The site is of major importance because of its unusual concentration of aquatic vertebrate remains. This is even more significant because known locations of fossil fish of any age are relatively rare, and yet at Fossil Butte literally thousands of fish fossils are present.

A good resumé of the significance of this site was given by Hesse (1939). "Few museums in the world, certainly none of the larger ones, are without specimens of the fossil fishes from the Green River shales of southwest Wyoming. These are prize exhibition specimens and no other fossil-bearing formation in North America has produced so many and such characteristic fossils as this great series of lake beds."

The Fossil Butte site is but a small part of the vast area in which the fine-bedded layers of white Green River shale make up much of the landscape. It is strategically situated, however, since it contains not only rich fossil deposits, but also outstanding examples of lake, shoreline, and tributary river flood plain deposits.

The fish fossils are of primary significance. They represent the evolution and modernization of fresh-water fishes better than those from any other known site in America. In addition, the fossil remains of plant and animal life found mainly in the Wasatch formation are added values.

The site has great significance in being a classic location known to many scientists. It is of significance to the geologist, the paleontologist, the ichthyologist, and the botanist, as the source of numerous fossil fishes exhibited in the halls and research rooms of their institutions of learning.

SUITABILITY AND FEASIBILITY

The Fossil Butte site is highly suitable for national monument purposes. Although fossil fishes have been quarried here for almost a century, the potential has barely been touched. Past activity has taken place primarily at one small quarry on the south face of the Butte. Fossil deposits worked at this site are only a minute fraction of those remaining within the Butte. Ample opportunity for further exploration and in-place exhibition of fossils exists here.

The softness of the rock in which the fossil fish are embedded makes it relatively simple to remove or expose the fossils for in-place exhibition and interpretation. Also, the completeness of the skeletal remains makes them easily recognizable and adaptable to interpretation.

Since fossil remains of other Eocene life such as turtles and horses have previously been found in the Wasatch formation, the Wasatch beds within the proposed monument are well suited to further exploration.

Although the story of life revealed through fossil remains is the principal theme at Fossil Butte, the area possesses other important interpretive values. It provides graphic evidence of geological events accompanying and subsequent to late stages of major earth movements that formed the present Rocky Mountains. The red Wasatch formation which accumulated as great flood plains, deltas, and alluvial fans, was derived from material eroded from the freshly uplifted mountains. The light colored but laminated Green River strata, on the other hand, graphically record the presence of very large inland lakes which existed for tens of millions of years. The two formations, initially thought to be completely separate, can be seen to interleave with one another. This is a classic illustration of the geologic products of shifting adjoining environments.

The area has good accessibility, being served by U.S. Highway 30N. It is strategically located near some of the Nation's most popular attractions--Grand Teton and Yellowstone National Parks, less than 250 miles to the north; Flaming Gorge National Recreation Area, less than 150 miles to the southeast; and Dinosaur National Monument only 50 miles beyond the latter. Many vacationers on their way to or from these existing parklands could readily include a Fossil Butte National Monument on their itineraries.

The size of the area within the proposed boundary is 8,240 acres. Of this amount, 5 percent is private land, 9 percent is State land, and 86 percent is Federal Land Reserve which is administered by the Bureau of Land Management. No one resides within the proposed boundary.

There is the possibility of exchanging the private and State lands for federal lands outside the proposed national monument. If this were done, no federal funds would be required to purchase these lands. Most of the land nearby is Federal Land Reserve.

A great deal of support for the Fossil Butte National Monument proposal has been aroused in the Kemmerer area. In the fall of 1963, a petition was signed by over 90 percent of the Kemmerer businessmen indicating their interest in its establishment. Also, more recently a Fossil Butte National Monument Association has been formed to work toward the establishment of the national monument.

Some local opposition has been expressed. Most of this, naturally, comes from the livestock grazing interests, since this activity is the major land use in this region. Grazing would be incompatible with national monument purposes. However, it could be phased out over a period of years if necessary, so as not to work a hardship on anyone now grazing this area.

As a national monument, protected and made available for public use and enjoyment, Fossil Butte would receive the nationwide attention it deserves. The potential visitors to this area would need all the facilities and services required by the traveling public. Hence, the establishment, development, and management of a Fossil Butte National Monument would be economically helpful to nearby communities in southwestern Wyoming and to a certain extent to neighboring states. Its most important values, however, would unquestionably be the intangible benefits to the visitor, who would receive a ready understanding of the meaning and significance of the life of the geologic past portrayed here. Intangibles such as these cannot reasonably be measured in terms of economics.

CONCLUSIONS AND RECOMMENDATIONS

The ancient Eocene lake deposits at Fossil Butte are nationally significant because of the unusual concentration of aquatic vertebrate fossils found there. This is even more significant because known locations of fossil fishes of any age are relatively rare, and yet at this site literally thousands of fish fossils are present. This important chapter in the history of life is not presently represented in the National Park System. The Fossil Butte area is but a small part of a vast area in which the fine-bedded layers of the Green River formation make up much of the landscape. It is strategically situated, however, since located here are not only rich fish fossil deposits, but also outstanding examples of lake, shoreline, and tributary river flood plain deposits. The area also meets suitability and feasibility requirements for a national monument.

Based on these conclusions it is recommended that the area described in this report be established as the Fossil Butte National Monument, to be administered by the National Park Service.

PROPOSED DEVELOPMENT AND USE

The proposed national monument, with its wealth of impressive and easily exposed fossil remains, has unusual and interesting development opportunities to facilitate its public use, understanding and enjoyment. The important story here would be presented through various interpretive methods.

The major interpretive facility would be planned at a location where the fossil deposits are richest and most accessible. Here visitors would be able to watch scientists expose fossils and prepare them for in-place exhibition. Exploratory excavation which has great visitor interest and appeal, would be an important part of the interpretive program. To complement the in-place exhibits in telling the story of life represented here, a series of museum exhibits also would be displayed in a visitor center.

The visitor center would be the initial contact station for the public and would be located so as to be readily accessible from U.S. Highway 30N. It would consist of administrative offices and a museum. This would be the interpretive and information center of the park. Here would be told in exhibit form the varied stories of this area--its paleontology, its geology, its biology, and the significance of this site to the Nation as a whole.

The rich natural history of this area also would be interpreted by park naturalists through the media of conducted walks, museum talks, and evening lecture programs. Interpretive markers, self-guiding trails and wayside exhibits would provide interesting details of the scientific story for the benefit of those exploring on their own.

Employee housing and facilities necessary for proper administration, interpretation, protection and maintenance of the area would be provided.

Roads and trails necessary for easy access to the many points of interest would be developed. In addition to suitable access to the fossil

A visitor center would be the focal point for interpretation and information. Above: Dinosaur National Monument Visitor Center.

Conducted walks would be a part of the interpretive program.

Wayside exhibits such as the one at Badlands National Monument (above) and scenic overlooks such as the one at Dinosaur National Monument (below) would be provided.

deposits of Fossil Butte, there would be a road leading to Prow Point where parking and picnicking facilities and wayside exhibits would be provided. Looking to the north from Prow Point one may observe a location where the ancient lake deposits of the Green River formation and the stream deposited Wasatch beds intertongue as described in the Geology section of this report. In addition, very impressive views of the rugged landscape can be seen from Prow Point in all directions. Also, because of the sheltering grove of pines found here and the relative coolness of this elevated point, Prow Point appears to be well suited to the development of picnic facilities.

Camping would be an appropriate activity and the provision of small campgrounds located so as to take advantage of the cooler, higher elevations and tree cover--which luckily coincide--would enable many to stay longer at this area. Presently there are no public campgrounds nearby.

View from Prow Point

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R. 118 W. R. 117 W.

T. 22 N.
T. 21 N.

SIXTH PRINCIPAL MERIDIAN

PROW POINT

NORTH FORK RIDGE

WASATCH FORMATION BADLANDS

FOSSIL BUTTE

LARSON FISH QUARRY

TENTATIVE ALIGNMENT FOR PROPOSED RELOCATION OF U.S. HIGHWAY 30N

TWIN CREEK

UNION PACIFIC RAILROAD

WAYSIDE PICNIC AREA

SOUTH FORK TWIN CREEK

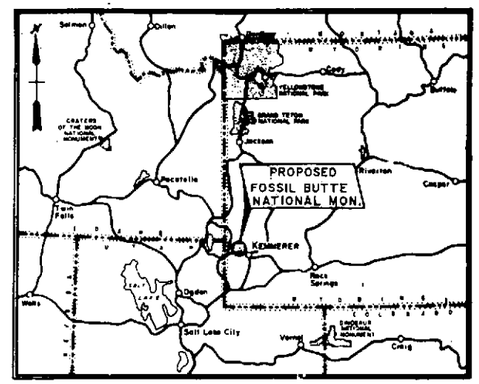
MONKEY FOSSIL

ULRICH FISH QUARRIES

FOSSIL RIDGE

CLEAR CREEK

D. E. ROGERS, 9/3/61 & REVISED 8/11/61 D.E.R REVISED 10/4/62, R.K. WEAVER



VICINITY MAP

LEGEND

- PROPOSED BOUNDARY
- TREES
- U.S. HIGHWAY
- OTHER ROADS

N

0 1/8 1/4 1/2 3/4 1 2
SCALE IN MILES

A PROPOSED

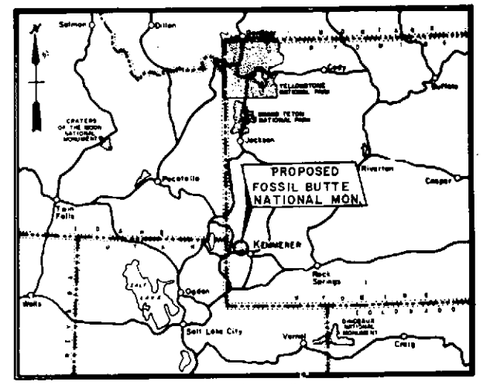
FOSSIL BUTTE NATIONAL MONUMENT

WYOMING

UNITED STATES DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE MIDWEST REGION

DRAWING NO FBNM 7200
DATE: 4/63- Revised 7/64
Prepared By: R.K. Weaver



VICINITY MAP

R. 118 W.
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SIXTH PRINCIPAL MERIDIAN
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LAND OWNERSHIP

- PRIVATE
- STATE
- FEDERAL

LEGEND

- PROPOSED BOUNDARY
- TREES
- U. S. HIGHWAY
- OTHER ROADS

N

0 1/8 1/4 1/2 3/4 1 2
SCALE IN MILES

LAND OWNERSHIP
A PROPOSED

FOSSIL BUTTE NATIONAL MONUMENT

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UNITED STATES DEPARTMENT OF THE INTERIOR
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