**Chapter Four  
Natural Resources and Environment**

[4.1: Liquefaction Hazards Map](http://www.codepublishing.com/UT/Provo/html/pdfs/map_9-1.pdf) (PDF)

[4.2: Geologic Hazards Map](http://www.codepublishing.com/UT/Provo/html/pdfs/map_9-2.pdf) (PDF)

# 4.1 Introduction

The natural features and resources in and around Provo contribute to the City’s visually spectacular setting. They provide habitat for a diverse range of plant and animal life, affect the year-round climate, and provide abundant opportunities for recreation. These features and resources attract and support industry and thriving residential, business and academic communities.

Provo City is rich in natural resources such as the Provo River, Utah Lake, high quality potable water, canyons, foothills, and mountains. Conservation efforts that make wise use of resources and protect them from loss or depletion are needed to ensure future viability of these resources. Preservation efforts that protect undisturbed resources, restore the damaged environment, or mitigate damage in one area by enhancing the natural environment in other areas are important elements of this Plan.

Natural resource usage should be tempered with wisdom and governed by a vision of future needs and desires for the natural and physical environment. Development of land and infrastructure is often shaped by the natural environment. Land development and associated activities can also impact the natural environment in harmful ways. General Plan policies for future development should consider potential negative externalities resulting between the natural environment and the built environment. The City should focus on identifying negative impacts and establishing goals and policies that will preserve natural features and conserve natural resources.

# 4.2 Background

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| **SECTION HEADINGS** | |
| 4.2.1 Provo’s Natural Resources | 4.2.3 Developmentally Sensitive Lands |
| 4.2.2 Environmental Hazards | 4.2.4 Land Use Regulations for Developmentally Sensitive Lands |

Environmental issues are interrelated with many aspects of the General Plan. Decisions affecting the environment affect everyone who lives in that environment and warrant careful consideration. The natural environment may also significantly impact planning and processes associated with the built environment and influence development patterns within the city. The use of sound community planning, urban design and engineering principles, combined with a respect for natural values that contribute to the quality of life within and around Provo, can help us to wisely use the resources available to us and ensure their long-term survival for the good of future generations. This section describes Provo’s natural resources and some of the considerations the City should keep in mind when interacting with those resources.

### **4.2.1 Provo’s Natural Resources**

This section describes seven natural resources in Provo—air, forests, soils, rivers, watersheds, and storm drainage—and highlights relevant information and potential issues pertaining to these resources.

## Air

The Clean Air Act Amendments of 1990 were passed in an effort to reemphasize the air quality standards. Congress established deadlines for progress to be achieved in non-attainment areas with accompanying federal funding and penalties for noncompliance. Federally funded highway and transit projects are required to come from a Transportation Plan and Transportation Improvement Program (TIP)(See Chapter 2 Transportation and Mobility for more information).

“Non-attainment areas” are those areas that were found to repeatedly violate the National Ambient Air Quality Standards (NAAQS). As of 2017, Utah County is designated as non-attainment for moderate particulate matter (PM-10) and Provo specifically is designated as non-attainment for serious particulate matter (PM-2.5).[1](http://www.codepublishing.com/UT/Provo/html/ProvoGP/ProvoGP09.html#266)

Inversions that trap air in the valley increase levels of particulates and could exceed the national standard. The primary manmade components of PM10 include nitrogen oxides (NOx), fugitive dust from road sanding, motor vehicles, combustion of solid fuels, agricultural activities, and construction services. A considerable portion of PM10 emissions in Utah County are attributed to motor vehicles; the rest come from industrial and area-wide sources.

Not meeting the air quality standards developed by the federal government can result in the loss of federal funding for transportation projects (see Transportation Master Plan).

## Forests

Provo City owns many forested acres in the South Fork and Squaw Peak, adjacent to United States Forest Service lands. While these forests are to be enjoyed, they are also important watershed areas. Strict enforcement of watershed policies is needed to maintain the water supply quality. Forested lands are designated in the General Plan as Developmentally Sensitive (DS)(see Chapter 1 Land Use).

Provo City has an urban forestry program that manages the public tree resources within Provo City. Trees are valuable to the City in terms of the appearance and microclimate of neighborhoods. Efforts should be continued in the management of a sustainable urban forest.

## Soils

In order to provide the best mix of future land uses, the capability of the land to support a specific use and the compatibility of the current land use with the proposed future use must be considered.

Soils vary in terms of their suitability for agricultural, residential, public facility, commercial, and industrial uses. Knowledge of soil types is very important when determining land uses. Areas with shallow water tables have limited use for foundations and septic tanks. Steep slopes with rocky soils place severe limitations on foundations and other underground building features. When placing a foundation, the potential for settling, cracking, and flooding of basements needs to be considered. The weight capacity of the soil is important in such considerations.

## Rivers

The Storm Water Division of the Public Works Department monitors and maintains the levees and any other storm drainage structure within the City boundaries. The 1983 floods made clear the need to develop a storm drain system that would help protect property, decrease soil erosion, and prevent toxic materials from entering the natural stream system that runs through the heart of Provo City. Several million dollars have been spent to upgrade the system. Improving the storm drain system is a primary function of the Storm Water Division of the Public Works Department. (For more details, please refer to the Storm Water Facilities subsection of the City Facilities Section in Chapter Five of this General Plan. For more information concerning flooding, see the Flood Hazard and Control heading, below.)

The Provo River is a prized natural resource for the City. However, over the years, neglect of the river and its surroundings has left areas that need special attention and effort to restore and enhance this treasure. The Provo River should attract residents and visitors like never before through cleaning efforts and design standards for surrounding developments.

## Watersheds

Watersheds critical to Provo City’s spring collection areas exist in several areas of Provo Canyon as well as South Fork of Provo Canyon. Watershed areas for surface waters tributary to the Provo River are much more extensive and extend all the way to the Upper Provo River drainageways. Provo City has adopted a Watershed Protection Ordinance designed primarily to protect the City’s pristine spring collection areas from potential contamination. This ordinance is based upon State law, which allows a municipality to exercise extraterritorial jurisdiction in watershed areas. While the ordinance is not intended to prohibit any or all development in watershed areas, it does allow the City to regulate development in such a way as to protect the integrity of the City’s sources of water supply.

## Wetlands and Wildlife

Wetlands play an important role in the ecological system. They are recharge zones for natural aquifers and ground water reservoirs. Wetlands provide a habitat for many varieties of aquatic, land, and waterfowl wildlife. Natural beauty is sustained by wetlands. Wetlands can be created and incorporated into the landscape of industrial parks, subdivisions, and shopping centers. This is being done already in areas of the City (for example, East Bay Business Park and the East Bay Golf Course).

In the process of identifying, preserving, and mitigating wetlands (creating new wetlands to offset the loss of wetlands that are eliminated or compromised during the course of land development), the City has effectively protected habitats and created new wildlife habitats for waterfowl and other aquatic life. The land west and south of Provo along Utah Lake and the land south of East Bay are prime locations for wildlife preserves and are to remain wetlands.

Parts of west Provo are being considered as additional wildlife preserves. The creation of a wetland bank will be valuable to Provo’s future development potential. The designation of Developmentally Sensitive (DS) protects natural habitats and local deer trails.

## Storm Drainage

As wetlands are natural recharge zones, which are necessary for continued replenishment of groundwater, concerns, arise with respect to development. Rainwater run-off is ordinarily absorbed into the ground. However, as open lands are replaced with impervious surfaces such as buildings, streets, and parking lots, this natural recharge process is disrupted.

On impervious surfaces, oil, antifreeze, and other toxic substances (including those deposited on streets by the exhaust systems or leaking transmissions of automobiles) are concentrated and redirected into the storm drainage system, which drains directly into the rivers and lakes. In short, these substances are never broken down biologically, as they should be, because toxins are not filtered through the soil, as occurs with natural recharge, or treated at the wastewater treatment plant, as with discharges to the sanitary sewer system. As a result, these pollutants threaten to contaminate surface waters. Significant amounts of common pollutants, or even smaller amounts of regulated pollutants, may also be discharged into soils with the resulting contamination of ground water. As these types of pollutants are not typically identified with a specific “point source,” such as an industrial plant with regulated discharges, these are categorized as “nonpoint source” pollutants.

Increasing levels of pollutants in water sources may lead to additional regulation of municipalities under federal and State pollution control laws, resulting in additional costs to municipalities for treating and controlling storm water discharges to waterways.

### **4.2.2 Environmental Hazards**

Provo faces various flood and geological hazards. This section exposes those hazards

## Flood Hazard and Control

#### Soil Drainage and Overflow Hazard

Flood hazards must be recognized when developing land. The federal government has issued specific regulations to cities where extensive flood areas are located. Thus, knowing which soils are susceptible to flooding and the overall drainage capabilities of soils in Provo is important. Generally, floods have occurred near Utah Lake in poorly drained, lower lying areas that are susceptible to rising water levels. Serious flash flooding has occurred along the Provo River and in the mouths of both Slate and Rock Canyons. The last major floods of this nature were in 1983 and 1984. With the addition of the Jordanelle Dam upstream of the Deer Creek Dam, greater capacity is available to store runoff and to manage potential flooding through control of these two dams as a system.

#### Flood Insurance Study

A flood insurance study for the city has been developed by the Federal Emergency Management Agency (FEMA). The study includes flood insurance rate maps that identify areas of the city subject to flooding during 100 year flood episodes. Land use policies should discourage dense development in flood hazard areas. Zoning ordinance provisions can be utilized to ensure that development in flood hazard areas occurs in accordance with FEMA regulations. Administration of flood zone regulations consistent with federal law enables Provo citizens to be eligible for participation in the national flood insurance program. As of 2017, updated studies are being done and are a few years away of when they would be ready for adoption by the City.

Upstream of Provo, the Deer Creek Dam on the Provo River is managed by the Provo River Water Users Association. This facility helps provide for the water needs of the community. Although there is no cause for concern at this time, extraordinary events could lead to the failure of this dam. In 2002, the U. S. Department of the Interior, Bureau of Reclamation, re-mapped the approximate areas that would be affected by such an event in order to provide information for public and emergency service providers who must prepare response plans in anticipation of this unlikely event.

## Geological Hazards

#### Rock Fall

Frost wedging can cause boulders to fall from the mountains of the Wasatch Range. Homes located in the foothills are at risk to potential rock fall. As boulders fall and roll through the gullies and ravines of the hillside, it is possible that a multi-ton boulder will find its resting place in a residential area. While it is too late to protect existing homes from this danger, caution must be taken to prevent new homes from being built in the path of potential rock falls, avoiding possible damage to persons and property. In past years, two major boulders have broken off from the cliffs above Provo and fallen during the spring thaw period, causing significant damage to two homes bordering the Y Mountain area. Future planning for development along the mountainside should consider this issue and explore measures to balance development needs with the potential for future damage to structures and lives.

#### Faults, Earthquakes and Liquefaction

There is great potential for earthquake damage along the Wasatch Front. Areas with high risk of earthquake damage due to liquefaction (soil liquefaction as a result of ground movement) are found throughout the city (see Map # [4.1](http://www.codepublishing.com/UT/Provo/html/pdfs/map_9-1.pdf) Liquefaction Hazards Map). The river bottoms and the west side, especially near Utah Lake, are areas in danger of damage caused by liquefaction. Special engineering standards and additional code requirements must be met to build in these areas.

Earthquake hazards in Provo are important considerations for planning. Map #[4.2](http://www.codepublishing.com/UT/Provo/html/pdfs/map_9-2.pdf) Geologic Hazards Map shows two major faults exposed in the mountains east of Provo and two inferred faults, one in the mountains and one in the valley. The term “inferred fault” means that somewhere between the mountains and Utah Lake there is probably an additional fault. An exact location of this fault would be difficult to pinpoint.

#### Land Slides

Along the Wasatch Front, alluvium or unconsolidated strata is deposited at the canyon mouths. This land can move in what is called a landslide or slump. When the water table rises, soils become saturated. Water adds weight to the soil, causing movement down the slope. This movement is very rapid at times and can cause major property damage and, occasionally, loss of life.

#### Strata Expansion

The Manning Canyon Shale Formation and its related problems for development are common along the Wasatch Front. This formation is characterized by soils and strata that expand and shift when saturated. Many building foundations have been displaced and cracked in areas associated with this formation, in particular along the higher benches, due to strata expansion.

Extensive areas affected by strata expansion and rock fall have been identified through geologic research. The public needs to be made aware of incentives and funds available to landowners who want their lands designated as permanent open spaces, or who will record conservation easements on their lands, or who will grant public access across their lands for nature trails or parks.

### **4.2.3 Developmentally Sensitive Lands**

## Hillsides

Areas generally located above the approximate 5,200-foot level of the east bench are designated in the General Plan as Developmentally Sensitive (DS). Proximity to the Wasatch Fault Line contributes to the unstable nature of the land. The existing and future Bonneville Shoreline Trail is just below the actual shoreline and follows the Questar Gas easement, which acts as a buffer and provides transition between the higher slopes and development existing or planned at lower elevations. Land at this altitude along the east bench of Provo has been determined to have a greater incidence of poor stability for construction due to soils, slopes, and faulting. The east-bench DS designation was mapped in general correlation with the 5,200-foot elevation or by concentration of slopes 25 percent or greater, with some adjustment to reflect existing development. Capabilities for providing fire control, water, and other services above the 5,200-foot level are also development impediments. Access to these areas is very limited, and new roads are difficult to construct due to grade limitations and poor soil stability.

For these reasons, any new development or construction to be considered for these areas will require geologic and soils testing and slope analysis by a qualified professional to determine suitability for development. As in other areas of the city with steep slopes or other natural limitations, development within these lands is generally subject to the Sensitive Lands ordinance of Title [15](http://www.codepublishing.com/UT/Provo/html/Provo15/Provo15.html#15), Land Use and Development. Disturbance of hillsides with slopes greater than 30 percent is prohibited in that ordinance. Other community interests in preserving hillside views from the valley, protecting significant geologic features that give character to the land, and preserving open space may not be related to geologic stability or feasibility of engineering solutions to development. They are, however, considerations that are relevant to the long-term planning of Provo City and may be factors in restricting or limiting development on the hillsides.

## Wetlands Areas

Other lands designated Developmentally Sensitive (DS) are west of I-15, incorporating significant land areas along the shoreline of Utah Lake. This designation reflects wetlands that provide valuable environmental benefits; these areas must be given special consideration in development in accordance with federal, state and local laws. Lands designated as DS also include areas of potential flooding and high water tables, both of which figure into the determination of the types of development suitable for these lands and any special construction limitations for uses in these areas.

### 4.2.4 Land Use Regulations for Developmentally Sensitive Lands

Title [15](http://www.codepublishing.com/UT/Provo/html/Provo15/Provo15.html#15) Land Use and Development, of the Provo Municipal Code, was amended in 1999 to adopt Chapter [15.05](http://www.codepublishing.com/UT/Provo/html/Provo15/Provo1505.html#15.05), Sensitive Lands, regulating the development of land with particular geologic, hydrologic, and topographic features and limitations. This chapter addresses:

1.    High-risk development;

2.    Uses and actions prohibited due to geologic or topographic features, soil conditions, or presence of surface or groundwater;

3.    Procedures to minimize risk to the project and to the environment;

4.    Special engineering or geologic evaluation and reporting requirements;

5.    Standards for hillside development where slopes exceed thirty percent;

6.    Development in high water table and wetland areas; and

7.    Professional qualifications required for environmental studies and related reporting.

Other chapters of the Zoning (Title [14](http://www.codepublishing.com/UT/Provo/html/Provo14/Provo14.html#14)) and Land Use and Development (Title [15](http://www.codepublishing.com/UT/Provo/html/Provo15/Provo15.html#15)) ordinances have been adopted to modify development standards where opportunities may be realized to preserve open lands, reduce impacts to land features and vegetation, establish conservation easements, or eliminate mass grading where topography is a desirable natural feature within the built environment. These include the Subdivision ordinance in Title [15](http://www.codepublishing.com/UT/Provo/html/Provo15/Provo15.html#15) and elements of the Planned Development, Research and Business Park, and Planned Industrial Commercial zones.

# 4.3 Vision

Vision 2030 states:

The best elements of Provo’s natural resources, including Provo River, Utah Lake, high quality potable water, clean air and beautiful canyons, foothills, and mountains are preserved and protected from the adverse impacts of increased population and potential environmental pollution. Impairments to these natural resources have been remedied by a plan of action adopted by the leadership of Provo City.

In an effort to protect its natural resources, Provo responsibly provides electrical energy to its citizens. Provo enjoys very low energy rates and profits in many ways from its municipal power company. Provo also benefits from its association with the Utah Municipal Power Association (UMPA) where Provo is the largest consumer of energy among UMPA participants. Provo provides residents, businesses, educational institutions, and industries with reliable, low-cost electrical energy with attractive or non-intrusive delivery systems and seeks the same qualities in heating, transportation and other energy needs.

# 4.4 Goals and Implementation

The following subsections will outline goals and objectives related to the general environment, energy, specific natural resources (air, forests, soils, rivers, watersheds, wetlands, and wildlife), and natural hazards. These goals and objectives should serve as a guide for the protection, conservation, development, and use of natural resources in Provo.

## General Environmental Goals

**4.4.1 Recognize and support volunteer efforts to keep Provo City clean.**

**4.4.2 Study a sliding scale solid waste collection fee, based on container size that encourages recycling and reduces the amount of waste that is landfilled.**

**4.4.3 Work effectively as a city and with other governmental agencies and private organizations to protect, preserve, and restore its natural resources in the surrounding mountains, canyons, foothills, wetlands, shorelines, riverbanks and associated wildlife corridor; agricultural lands; and in all city parks; and develop a citywide culture of proactive stewardship to preserve the ecological integrity of these resources.**

4.4.3.1 Regularly assess the current ecological health of Provo City;

4.4.3.2Increase public education and awareness of the city’s natural resources and environmental challenges;

4.4.3.3Reduce the adverse impacts of growth, development, and environmental pollution;

and

4.4.3.4 Encourage resource preservation through greater participation in recycling and energy conservation efforts.

**4.4.4 Encourage clean business and industry**

4.4.4.1Develop a plan that encourages non-polluting business and industry to locate in Provo; and

4.4.4.2 Provide regulations and incentives to encourage established businesses to improve air quality.

## Energy

**4.4.5 Improve energy efficiency in Provo and reduce our dependency of fossil fuels.**

4.4.5.1 Implement new advances in electrical energy delivery and control systems (i.e., smart grid, smart houses) as they become practical and economically feasible;

4.4.5.2 Work with residential, commercial, educational, and industrial customers to identify and implement energy savings through increases in consumption efficiency and reduction in use of energy in a cost-effective manner;

4.4.5.3 Consider private and public generation of renewable energy resources (i.e., wind, solar); and

4.4.5.4 Promote alternative vehicle fueling sources such as compressed natural gas and electrical vehicle stations.

**4.4.6 Work with UMPA to continue to seek long-term electrical energy resources that are stable, affordable, and renewable.**

4.4.6.1 Seek opportunities to diversify energy resources in a cost-effective manner, including increasing energy percentages from renewable and alternative sources; and

4.4.6.2 Seek opportunities for consumer alternatives to purchase energy from renewable resources.

## Air

**4.4.7 Work with the Utah County Bureau of Air Quality and with the Air Quality Division of the Utah Department of Environmental Quality to develop and implement programs to improve ambient air quality in Provo during all seasons of the year.**

* **public health education efforts,**
* **voluntary winter wood burning curtailment programs,**
* **financial incentives for the installation of clean-burning heating appliances,**
* **encouragement of alternative modes of transportation to reduce reliance on the automobile and thereby reducing automobile-related emissions,**
* **continued efforts to improve traffic signal timing,**
* **installation of additional bus turnout areas for more efficient transit operation and related reductions in traffic congestion with its increased emissions.**

**4.4.8 Improve air quality to meet or exceed all national and state standards for PM2.5, PM10, ozone and carbon dioxide because clean air will improve the health of our residents, aid in recruiting new businesses, increase tourism, and reduce dependence on fossil fuels.**

4.4.8.1Clean our air with a sustained, energetic, multi-faceted approach as outlined in the Provo Clean Air Toolkit;

4.4.8.2 Improve our air quality through better monitoring of automobile emissions, fire place and industrial pollution, and enforce standards not to exceed those set by the Environmental Protection Agency (EPA);

4.4.8.3 Encourage synchronization of semaphores at intersections to reduce the stopping, starting, and idle time of vehicles;

4.4.8.4 Encourage high energy-efficiency in new construction and remodels to reduce pollution;

4.4.8.5 Encourage combustion of natural gas rather than coal during winter at major industrial sources; and

4.4.8.6 Encourage alternative transit modes.

Forests

**4.4.9 Increase emphasis and efforts to enforce the Watershed Protection Ordinance to ensure the protection of forests in City watershed areas.**

**4.4.10 Identify and evaluate the urban forest and habitat areas with the city and develop policies and ordinances that would protect plant life, encourage planting, maintain a green belt and preserve habitats for wildlife.**

**4.4.11 Plant new trees on a systematic basis to replace trees that decline in health due to urban impacts, old age, or insects/disease.**

**4.4.12 ~~Continue to~~ Provide guidance to citizens regarding the selection, planting, and proper maintenance of trees citywide, including the avoidance of “topping,” which creates an unnatural appearance for deciduous trees and eventual decline in the health of individual trees and the urban forest.**

## Soils

**4.4.13 Work with the Natural Resource Conservation Service (NRCS) to develop educational materials informing the public about the soil properties in the area and the consequences or limitations for development thereon.**

**4.4.14 Require appropriate engineering expertise in development projects on poorly drained and low bearing strength soils to properly design projects in relation to soil conditions.**

## Rivers

**4.4.15 Ensure that Provo River is a year-round stream with protected flows that provide both spawning and rearing habitat for native fish species and seasonal sport species; support and sustain general fishing use; and develop trail access to the river, which will be free flowing from Provo Canyon to an ecologically restored delta area that enters Utah Lake.**

4.4.15.1 Support minimum flows in Provo River based on ecological and user needs through cooperation with all user groups;

4.4.15.2 Continue to support the Utah Lake Commission in accomplishing its goals that align with the goals of Provo City;

4.4.15.3 Ensure and communicate the needs of all parties, including adjacent homeowners, water users, and the fishing and recreating public to maintain aquatic and riparian ecosystems;

4.4.15.4 Improve public access to and use of the Provo River;

4.4.15.5 Protect and enhance lands adjacent to Provo River. Enhance upkeep and the removal of litter and debris; and

4.4.15.6 Evaluate runoff and drainage into the Provo River and Utah Lake to protect the quality of those water bodies.

**4.4.16 Restore areas of the Provo River that have been neglected and negatively impacted by development and misuse. Enhance and provide elements that will attract residents and visitors to better enjoy this amenity in a way is sustainable economically, environmentally and socially.**

**4.4.17 Develop design standards that will generate development that contributes to rather than detracts from the beauty of the River.**

**4.4.18 Establish program amenities along the River that will attract residents and visitors to explore and enjoy the river corridor in both developed and undeveloped areas of the City.**

## Watersheds

**4.4.19 Maintain lot coverage/open space ratios for new development that will ensure adequate lands are preserved for water absorption and percolation for groundwater recharge.**

**4.4.20 Maintain the current high quality of Provo's groundwater resources, both springs and aquifers, and protect them from contamination and reduction in quantity. Watersheds contributing to water sources will also be managed to protect both surface water quality and recharge of groundwater resources.**

4.4.20.1 Protect both current and future drinking water sources;

4.4.20.2Manage watersheds and distributions systems for the protection of drinking water sources. Protect the quality of surface waters;

4.4.20.3Maintain and improve the quality of our water through constantly updating and modernizing our treatment plants and protecting our water supply;

4.4.20.4 Improve water conservation;

4.4.20.5 Conserve water through educating citizens about water conservation; and

4.4.20.6Acquire additional water resources.

## Wetlands and Wildlife

**4.4.21 Work with applicable state and federal agencies to identify and preserve significant wetlands.**

**4.4.22 Consider establishment of a “wetland bank” or other means to mitigate the loss of wetlands with future urbanization.**

**4.4.23 Coordinate with state and federal fish and wildlife officials and adopt land use regulations as necessary to protect land areas frequented by wildlife.**

**4.4.24 Recognize that Utah Lake is a focal point of local natural resources systems that contribute to the environmental health, economic prosperity, and quality of life of area residents and visitors. Through collaborative restoration, protection, and sustainable-use efforts, the lake and its multiple-use amenities are fully recognized, enjoyed, and protected for current and future generations.**

4.4.24.1Support the protection and restoration of the lakefront and wetland areas in a natural state. Identify and protect wildlife corridors, and encourage less impactful uses (trail use, hiking, birding, and photography) focused on ecological attributes and experiences;

4.4.24.2 Provide a range of educational opportunities that complement the recreational experience and showcase the lake’s physical characteristics, biological uniqueness, and cultural resources, as well as its socio-economic significance;

4.4.24.3Control and effectively manage existing invasive species (e.g., carp and phragmites) to minimize their negative effects on Utah Lake natural resources. Implement programs to prevent additional invasions;

4.4.24.4Pursue site-specific enhancements and engineering solutions (e.g., re-created deltas, urban and riparian forests, mixed-use storm water detention areas, selective dredging and diking, re-vegetation) consistent with the Utah Lake Master Plan; and

4.4.24.5Attain high-quality lake water (chemically, biologically, and visually) free from deleterious contaminants and suitable for its beneficial uses.

## Storm Drainage

**4.4.25 Acquire, develop, and publicize the availability of educational materials reminding the public of the importance of proper disposal of chemicals.**

**4.4.26 Encourage participation in Household Hazardous Waste disposal programs offered by governmental or environmental agencies.**

**4.4.27 Design parking lots to provide for filtration of storm water before discharge**.

## Flood Hazard and Control

**4.4.28 Continue maintaining the levee system and floodway areas free of encroachments to facilitate the discharge of flood flows.**

**4.4.29 Minimize development in flood hazard areas to preserve storage space for flood waters and protect persons and property.**

**4.4.30 Continue participation in the National Flood Insurance Program, in coordination with the Federal Emergency Management Agency (FEMA). Maintain a library of FEMA publications for public use.**

## Geological Hazards

**4.4.31 Enforce building codes that will protect new construction from seismic hazards.**

**4.4.32 Explore incentives and funding sources for the seismic retrofitting of existing buildings.**

## **4.4.33 Enact land use regulations that will limit development in areas subject to rock fall, landslides, and strata expansion.**

[1](http://www.codepublishing.com/UT/Provo/html/ProvoGP/ProvoGP09.html" \l "wwfootnote_inline_266) Environmental Protection Agency, **Nonattainment/Maintenance Status**

. Retrieved online Nov. 30, 2017 at (https://www3.epa.gov/airquality/greenbook/anayo\_ut.html).