

**U.S. Army Corps of Engineers
Master Plans and Environmental Assessments
LACDA, Santa Ana River and Arizona Basins**

Preliminary Draft Resource and Ecosystem Objectives

“Environmental stewardship is not just a job to us. Like all Americans, we have a vested interest in the nation we leave for the next generation.” LTG Robert B. Flowers.

1. Background

The U.S. Army Corps of Engineers (Corps) is in the process of updating Master Plans for flood control basins (also known as reservoirs) that form integral units of the Los Angeles County Drainage Area (LACDA) and the Santa Ana River (SAR) system. The LACDA basins include Sepulveda Dam, Santa Fe Dam, Whittier Narrows Dam, and Hansen Dam in Los Angeles County, California. The four Corps’ basins that form integral units of the SAR system include Brea Dam, Carbon Canyon Dam, and Fullerton Dam in Orange County, California, and San Antonio Dam in San Bernardino County, California. Whitlow Ranch Dam in Pinal County, Arizona is a single basin.

The U.S. Army Corps of Engineers (Corps) holds some of the most valuable real estate in the country and perhaps none more so than the subject of the Master Plans. When the flood control dams were constructed as part of flood control systems, the population of the surrounding areas was far less than today. Land use was still primarily agricultural or nearly devoid of surrounding development.

The Corps’ real estate holdings can be valued in purely economic terms of dollars per acre, but more importantly, they provide scarce natural open space and recreation opportunities for a diverse population of people, and habitat for species increasingly isolated and in some cases, at risk of extinction.

The thought process of natural lands management is moving towards an integrated ecological approach. Especially in highly urbanized areas such as southern California, ecosystems and their various habitat communities have become severely restricted. With the surrounding environment so drastically altered, biodiversity (species richness) is reduced and landscape linkages are broken. Hence, conservation and restoration take on a redefined planning process. Each Master Plan and accompanying Environmental Assessment must try to reflect the most current advances in restoration ecology and wildlife management in the context of the Corps mission, regulations, and directives.

In some cases, restoration to a prior undeveloped state may no longer be practicable or feasible. The hydrology, topography, microclimates and even soil structure and composition may be significantly altered due to previous construction activities within the basins. Water tables may have lowered over time from groundwater pumping. Surrounding urban development adds unseasonal water runoff that carries high loads of

pollutants, higher water temperatures, exotic invasive plant species, and drives a plethora of animal species that thrive in human-dominated ecosystems into remaining open spaces to seek refuge.

Science now recognizes the need for habitat connectivity so that wildlife not only have the necessary space to roam, but allows for genetic diversity to ensure that an “island effect” on species is not inadvertently created on remnant habitat lands. With species increasingly endangered or of special concern, what habitat is needed for species most at risk given current conditions at this particular basin? Can we anticipate changes that may alter this scenario in the future? Effective adaptive management techniques needs to respond to current conditions as well as a changed future.

As the existing Master Plans and accompanying National Environmental Protection Act (NEPA) documents range from 15 to almost 30-years old, the public has increasingly demanded to be more involved with the planning of public spaces and for these public spaces to reflect their expressed desires and needs. These desires and needs are diverse reflecting the diversity of the surrounding general population.

The Master Plans are being developed to acknowledge and demonstrate the balance of the latest scientific knowledge and management of ecosystems with public desires for access to open space and recreation against the backdrop of changed and changing environmental conditions on site.

Program Mission:

The plans are being developed in accordance with the Corps program mission which states:

“The Army Corps of Engineers is the steward of the lands and waters at Corps water resources projects. Its Natural Resources Management Mission is to manage and conserve those natural resources, consistent with eco-system management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations.

In all aspects of natural and cultural resources management, the Corps promotes awareness of environmental values and adheres to sound environmental stewardship, protection, compliance and restoration practices.

The Corps manages for long-term public access to, and use of, the natural resources in cooperation with other Federal, State, and local agencies as well as the private sector.

The Corps integrates the management of diverse natural resource components such as fish, wildlife, forests, wetlands, grasslands, soil, air, and water with the provision of public recreation opportunities. The Corps conserves natural resources and provides public recreation opportunities that contribute to the quality of American life.”

Resource: ER 1130-2-550 15 Nov 96 2.2 a.(1)

Environmental Operating Principles

The Corps Environmental Operating Principles which further guide the development of the plans are:

- **Strive to achieve environmental sustainability.** An environment maintained in a healthy, diverse and sustainable condition is necessary to support life.
- **Recognize the interdependence of life and the physical environment.** Proactively consider environmental consequences of Corps programs and act accordingly in all appropriate circumstances.
- **Seek balance and synergy among human development activities and natural systems** by designing economic and environmental solutions that support and reinforce one another.
- **Continue to accept corporate responsibility and accountability** under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.
- **Seek ways and means to assess and mitigate cumulative impacts to the environment;** bring systems approaches to the full cycle of our processes and work.
- **Build and share an integrated scientific, economic, and social knowledge base** that supports a greater understanding of the environment and impacts of our work.
- **Respect the views of individuals and groups interested in Corps activities, listen to them actively, and learn from their perspective** in the search to find innovative win-win solutions to the nation's problems that also protect and enhance the environment.

Resource: U.S. Army Engineer Institute for Water Resources. 2008. *Value to the Nation: Environment*.

Purpose of the Plans:

- Provides comprehensive, multi-objective land management guidelines.
- Essential element in fostering efficient and cost-effective operations and natural resources management.
- Provides direction for project development and use as a vital tool for responsible stewardship of resources for current and future generations.
- Promotes the protection, conservation and restoration of natural, cultural, and human-made elements.

Resource: EP 1130-2-550 15 Nov 96 3-2(a)

In addition, an Environmental Assessment (EA) identifies significant issues that may cause potential adverse and/or beneficial impacts to resources that should be addressed when projects are proposed in the future.

Master Plan Goals:

- Identify the public's expressed desires and needs for current and future operations and resources. (ER 1130-2-100 22 Apr 2000 B-5)
- Identify recreation opportunities that best reflect the public's physical and cultural needs. (CECW-ZA U.S. Army Corps of Engineers Recreation Policy for Outgranted Corps Land Memorandum dated 6 Dec 2005)
- Assess the status of existing habitats and identify actions that would cause them to function more effectively. (EP 1130-2-540 15 Nov 96 2-4 f. (1)(a))
- Review current uses and accurately reflect them in a GIS database to increase cost-effectiveness and efficiency of land management.

Guiding Principles:

These values are based upon the Corps' policies, regulations, and Executive Orders. They document and reflect the evolving and progressive view of the Corps as it incorporates the latest scientific knowledge in ecological and water management disciplines. The Corps' guidance documents the Master Plan process that relies on input received from the public to define the guiding principles of the Master Plans. These principles also reflect the ongoing history of authorizations of uses of the basins.

- Minimize flood risk and support flood operations to ensure protection of surrounding communities, human life and property. (U.S. Army Engineer Institute for Water Resources. 2008. *Value to the Nation: Flood Risk Management*.)
- Provide a quality outdoor recreation experience which includes an accessible, safe, and healthful environment for a diverse population. (ER 1130-2-550 15 Nov 96 2-2. (2) (a).)
- As stewards of the Nation's lands, foster environmental responsibility including preservation and protection of cultural and historical resources and community partnerships and connections. (ER 1130-2-550 15 Nov 96 2.2 a.(1).)
- Protect and conserve the quality and function of existing ecosystems, and restore significant ecosystem function, structure and dynamic process that have been degraded. (ER 1165-2-501 30 Sep 99 6.)
- Integrate ecological, social, and economic sustainability into management of all Corps lands and activities. (EP 1130-2-540 15 Nov 96 2-4 f. (1))

Against this background, the following Resource and Ecosystem Objectives are defined.

2. Resource and Ecosystem Objectives

Guiding Principle: Minimize flood risk and support flood operations to ensure protection of surrounding communities, human life, and property.

Flood Risk Management

Goal

Through structural and non-structural solutions, minimize flood risk to communities thereby eliminating danger of loss of life and reduce damage to real and personal property.

Rationale

The primary goal of management of the dams is flood risk management as authorized under the 1936 Flood Control Act. Flood risk management is the process of identifying, evaluating, selecting, implementing and monitoring actions to mitigate levels of risk. Scientifically sound, cost-effective, integrated actions are taken to reduce risks while taking into account the cultural setting in which the basins reside. (U.S. Army Engineer Institute for Water Resources. 2008. *Value to the Nation: Flood Risk Management*.) Even with heavy visitor use of recreational facilities and the enjoyment of the wildlife areas, the public may not be cognizant of the importance of the role the reservoirs play in protecting their communities from flood, nor realize the danger posed by potential flooding.

Resource Use Objectives

- Maintain or improve existing infrastructure to ensure that current levels of flood risk management are maintained.
- Utilize non-structural and multi-objective solutions such as restoring the historic floodplain and natural habitats to minimize flood risk.
- Improve signage and interpretation to educate the public about the role of the basins in flood risk management.
- Develop emergency evacuation and closure protocols that respond to changed hydrology and demographics due to increased development.

Resource: Flood Control Act of 1936, Executive Order 11988 Floodplain Management, ER 1165-2-26.

Safety

Goal

Ensure that visitors are safe from physical hazards as well as ensuring personal safety while visiting the basins.

Rationale

The dams have been built to protect downstream lives and property from flooding but safety also extends to visitors using the recreational facilities within the basins. The ability to scan and understand the environment, enter and exit an area quickly, and feel safe while enjoying the basin are critical to maintain a high quality visitor experience. All of the land uses within the basins should be reinforced with safety and security measures, including dam operation and maintenance, facilities development and construction, and recreational activities.

Resource Use Objectives

- Continue to educate the public and lessees on flood risk awareness and safety issues.
- Ensure that all infrastructure is properly maintained to avoid creating a public hazard.
- Provide a means for visitors and emergency personnel to communicate quickly their specific location in Corps reservoirs.
- Ensure that safety features such as fencing, lighting, warning signs, and call boxes are installed where needed and maintained.
- Promote formation of “community watch” type programs.
- Ensure that all areas are adequately patrolled.
- Design facilities in such a way that vandalism and other “illegal activities” are discouraged.
- Provide for safe neighborhood connections.
- Continue to conduct risk assessments to identify opportunities and constraints for improving basin safety.

Guiding Principle: Provide a quality outdoor recreation experience which includes an accessible, safe, and healthful environment for a diverse population.

Recreation

Goal

Provide a quality outdoor recreation experience which includes an accessible, safe and healthful environment for a diverse population (ER 1130-2-550 2-1.(2) (a)) while sustaining our natural resources (Corps CECW-ZA Memorandum on Recreation Development Policy, dated 6 December 2005).

Rationale

There is a critical shortage of open space within the urbanized southern California region, which includes portions of San Bernardino, Riverside, Orange and Los Angeles Counties. Whitlow Ranch Dam in Arizona is a key element in defining the open space character of the Queen Valley community.

The basins are unique in terms of their rich environmental resources, natural and pastoral quality and open space character. The basins provide extremely important habitat for wildlife and provide important migratory waterfowl habitat. They contain extensive and productive wetland, riparian, desert and rare alluvial fan scrub habitat. It is essential that the development of recreation opportunities be developed in harmony with the natural resources of the basins.

Further development of recreation in the basin would help ease regional recreation demand pressures, yet this has to weighed against the protection of the environment

including wildlife habitat. The basins offer large areas of open space with the potential for additional recreation opportunities, especially in the heavily urbanized Los Angeles and Orange County areas. Due to the suitability of level sites for intensive recreation activities there is a great deal of pressure to provide increased high intensity recreation activities within the basins.

As stated in the Corps' CECW-ZA Memorandum on Recreation Development Policy, dated 6 December 2005, "Previously approved development plans for land currently outgranted for recreation are grandfathered under this policy." However, the memorandum goes on to state, "The primary rationale for any future recreation development must be dependent on the project's natural or other resources.... Examples that do not rely on the project's natural or other resources include theme parks or ride-type attractions, sports or concert stadiums, and stand alone facilities such as restaurants, bars, motels, hotels, non-transient trailers, and golf courses."

Resource Use Objectives

- Through the planning process, develop low, medium and high intensity recreation opportunities located to minimize impacts to the natural environment and minimize conflicts between activities in the basins.
- Promote self-supporting facilities and activities to serve the needs of the general public which offset operation and maintenance expenses associated with the overall operation of the basins, since revenue earned from recreation on leased land is to be kept within each basin.
- Provide recreation opportunities that are available to a broad socio-economic cross-section of the region's population without discrimination based on age, race, religion, gender preference, or physical capabilities.
- Promote local and regional planning efforts to coordinate the basin's facilities and resources with other recreation areas and facilities to optimize a diversity of recreational opportunities in the region.
- Ensure that recreational uses and facilities do not adversely impact wildlife and their habitats.

Resources: ER 1165-2-550, EP 1165-2-550, Federal Water Project Recreation Act.

Connectivity

Goal

Connect the basins to the surrounding landscape to facilitate the efficient movement of both people and wildlife in a manner that minimizes environmental degradation and maximizes ecosystem function, respectively.

Rationale

These basins, remnants of once larger ecosystems, should not function as independent landscape patches. Particular attention must be directed towards wildlife corridors and how the basins are integral to the movement of wildlife through the region.

Similarly, there should be seamless systems of linkages and trails that are connections for human access and movement and should not be cut off from the surrounding neighborhoods. The movement of people in, out, and around the basins must be considered in light of various modes of transportation and individual mobility. Multi-model transportation options must be considered for site access for a large regional constituency. Movement within the basins must be accessible, whether singly or in a group, able-bodied or physically challenged, and should include hiking and biking paths and equestrian trails in and out of the basins.

Resource Use Objectives

- Identify and connect with regional trail systems and eliminate impediments to trail connections within the basins.
- Create trails that loop back upon themselves rather than be one-directional.
- Ensure that basin-contained trail systems interconnect with trail systems outside the basins.
- Create adequate signage and wayfinding to minimize unnecessary trips within the basins.
- Provide safe and efficient circulation and access to the basins' recreation facilities in order to both control traffic and provide a linkage between the various activities within the basins.
- Protect and restore waterways such as creeks and streams to allow for safe corridors for wildlife movement.

Resources: National Trail Systems Act, Trails for America in the 21st Century Act.

Education and Interpretation

Goal

Increase awareness and understanding of the basin's significant resources through educative and interpretive programs.

Rationale

With its rich diversity of natural resources and functioning ecosystems, the basins provide unique opportunities for children and adults to learn about natural systems. With education often comes appreciation, and an understanding of the importance of these lands and the need to preserve and protect them for generations to come. The Corps' CECW-ZA Memorandum on Invasive Species Policy dated 2 June 2009 also specifically calls for education, communications and interpretation programs that convey how the public can prevent, identify, detect, and control invasive species.

Resource Use Objectives

- Provide areas for observation, research, and study of the basin's significant natural and cultural resources.
- Promote educational and interpretive facilities.
- Prioritize improvement and development of activities, projects and programs within the basins that have educative and interpretive value.

- Incorporate environmental education signage and activities that actively encourage an interest in the environment and its preservation.
- Partner, develop, and implement a public awareness program on invasive species.

Resources: EO 13112 Invasive Species, Invasive Species Act of 1996, Aquatic Plant Program § 104 of the Rivers and Harbors Act, as amended.

Guiding Principle: As stewards of the Nation's lands, foster environmental responsibility including preservation and protection of cultural and historical resources, and community partnerships and connections.

Environmental Quality and Character

Goal

Protect, conserve and improve the overall environmental quality and character of the basins, including the quality and character of the unique and important natural and cultural resources which comprise each of the basins.

Rationale

Environmental quality and character refers to the integrity and value of a number of resources which comprise an environment, including ecological, aesthetic and cultural resources. The basins contain many such specific resources which are considered important and/or significant. These resources individually and cumulatively contribute to the high overall environmental quality and character of the basin.

The preservation, restoration and enrichment of environmental quality is recognized as being of critical importance to overall human welfare and development. Through environmental legislation, Congress has indicated that protection and enrichment of environmental quality is in the public interest. Consideration of this, along with other essential considerations of natural policy, is required in Federal decision-making.

In addition, the Corps CECW-ZA Memorandum on Invasive Species Policy dated 2 June 2009 and Executive Order on Federal Leadership in Environmental Energy, and Economic Performance dated 5 October, 2009, direct the Corps towards energy efficiency, sustainability, and removal of invasive species. Carrying out these directives will lead to improved environmental quality and character.

Resource Use Objectives

- Prioritize those uses, activities and developments which conserve natural and cultural resources.
- Preserve areas containing unique, sensitive and/or significant resources so that they will not be disturbed and their inherent integrity and values will not be adversely impacted by other uses, management practices or developments within the basins.

- Require management practices for on-going uses, activities and developments that avoid significant adverse impacts to the basins' natural and cultural resources and the overall environmental quality and character of the basins.
- Design siting, and operation of facilities and activities to avoid or minimize adverse environmental effects.
- Locate those activities which would have significant adverse impacts on the basins' unique or important natural and cultural resources in areas where such impacts would be avoided or minimized to a level of insignificance.
- Conserve and protect those resources which cumulatively contribute to the basins' overall environmental quality and character.
- Mitigate adverse environmental effects to the fullest extent practicable.

Resources: North American Wetlands Protection Act, ER1130-2-540, Aesthetic and Scenic Quality § 232 of WRDA 1996, EO 13186 federal Responsibilities to Protect Migratory Bird Act, Endangered Species Act, National Historic Preservation Act as amended, Clean Air Act, Noise Control Act, Clean Water Act, Environmental and Economic Benefits of Landscape Practices on Federal Landscaped Grounds 60 Fed 408 37.

Community Involvement

Goal

Engage the community on multiple levels and in a variety of ways to become partners with the Corps and non-Federal sponsors as stewards of the lands.

Rationale

The public is the critical partner with the Corps and the non-Federal sponsors in being wise stewards of the land. If the community has a strong sense of ownership of the land, problems such as littering, tagging, and vandalism cease to occur. The community is often the best ambassador for communicating the Corps mission of environmental stewardship, identifying and protecting resources of the site, and educating the public about those resources.

Resource Use Objectives

- Promote the spirit of personal stewardship of public lands.
- Develop public appreciation for appropriate and safe use of resources.
- Promote volunteer programs for purposes of education and interpretation, clean-up and restoration activities, and safe accessibility of the basins.
- Maintain communication channels among basin users and the Corps for reporting of issues or suggestions for improvements to the basins.
- Recognize the efforts of exemplary groups and individuals in helping improve the basins to further encourage public participation.
- Outreach to the community when major changes are proposed to identify the overall level of concurrence with such changes.

Resources: National Environmental Policy Act, EP 1130-2-550, 3-6.

Water

Goal

Prevent further degradation of and improve water quality within the basins and identify the basins' potential role for increasing the efficiency of regional water use.

Rationale

Water is increasingly scarce throughout the west, and the basins provide opportunities for water conservation and/or re-use. There must be opportunities to incorporate Best Management Practices (BMPs) for improved water quality, retention, and treatment of runoff. BMPs can also provide critical habitat such as wetlands.

Resource Use Objectives

- Prohibit activities in the basins which serve to reduce the surface or groundwater quality within the basins.
- Identify and promote potential methods of maximizing regional water conservation and encourage implementation of water conservation improvement measures.
- Identify methods of improving regional water quality and encourage implementation of regional water quality improvement measures.
- When required, utilize reclaimed water for irrigation of recreational amenities.
- Maximize regional water conservation and promote implementation of water conservation improvement measures.

Resources: U.S. Army Engineer Institute for Water Resources. 2008. *Value to the Nation: Lands and Waters*.

Soil, Sediment Conservation, and Gravel Mining

Goal

Protect and conserve soil resources within the basins while allowing gravel mining if it does not degrade the overall environmental quality of the basin, and when beneficial to flood risk management.

Rationale

The basins serve the function of holding back floodwaters but with these flood waters come a large amount of soil and debris. Preventing erosion and the sedimentation that comes with it is important for maintaining the flood risk management capability of the basins as well as maintaining high quality habitat. In order to maintain the flood capacity of the basins, dredging or removal of materials may be necessary. Recognizing that soils (and sand and gravels) are valuable resources, gravel mining and sediment removal can be an economic way of achieving the goal of maintaining flood capacity as long as it does not degrade the overall environmental quality of the basin or is mitigated to an insignificant impact.

Resource Use Objectives

- Decrease soil erosion associated with existing conditions in the basins.
- Minimize soil erosion within the basins for new conditions in both the construction and post construction project phases.
- Manage land use activities in a manner that optimizes vegetative cover in order to minimize soil loss in the basins.
- Promote BMPs in land development, agriculture and grazing activities.
- Create soil conservation management plans for areas that experience significant non-natural soil erosion and subsidence.
- Institute BMPs for managing soil deposition from the watershed to protect recreational facilities and habitat.
- Minimize conflicts associated with existing land uses and activities through buffering, screening and other measures.
- Manage real estate leases in the basins in coordination with other Federal agencies, in a manner that will minimize surface resource use conflicts.
- Minimize to the greatest extent practicable traffic conflicts in the basin by separating heavy equipment and truck transportation associated with commercial, industrial and mining operations, other activities, and transportation functions.

Air Quality

Goal

Manage the resources, activities and land uses within the basins in a manner that would not further degrade and may improve the air quality both within the basins and the surrounding region.

Rationale

The basins can provide the “lungs” of an area by minimizing vehicular traffic and maximizing the cleansing function of vegetation. For example, for children in Los Angeles County with reduced lung capacity from the effects of air pollution, the basins can provide recreational opportunities with improved local air quality. Trees especially remove particulates as well as cool the air and mitigate the urban heat island effect.

Resource Use Objectives

- Preserve existing vegetation and promote new planting of native vegetation to improve air quality in the basins and surrounding environs.
- Prohibit new land uses and activities in the basins that serve to deteriorate air quality unless impacts of those activities can be at least equally offset through implementation of measures to improve air quality.
- Decrease air quality degradation from existing land uses and activities in the basins.
- Identify and promote traffic patterns that would minimize generating pollution within the basins.

Resources: Clean Air Act, Pollution Prevention Act, EO 12088 Federal Compliance with Pollution Control Standards.

Cultural Resources

Goal

Conserve cultural resources within the basin through preserving appropriate sites, providing interpretive opportunities, and improving knowledge of these resources.

Rationale

Cultural resources need to be protected but must be balanced against the educational goals of interpretation of sites. Education and interpretation must be implemented in such a way that an appreciation of the resources is experienced without actually exposing the resources to theft or vandalism. Nature centers and interpretative panels can provide this function by safely displaying important artifacts of the site and interpreting the history of the site. Actual sites are not to be publicly disclosed as this may lead to theft or vandalism.

Resource Use Objectives

- Preserve and protect cultural sites within the basins.
- Maximize education and interpretation aspects of cultural sites while maintaining the condition of the sites.
- Maximize study and research opportunities for appropriate cultural sites within the basins.

Resources: National Historic Preservation Act, Archeological Resources Preservation Act as amended.

Visual and Auditory Quality

Goal

Preserve the open space and natural aesthetic quality and character of the basins and surrounding viewsheds.

Rationale

The visual and auditory quality of the basins provide a much-needed respite from city life as most are sited in the middle of highly urbanized areas. The ability to see, hear, and interact with nature is increasingly recognized as an important contributor to human health. When the basins are near or bisected by freeways and roads, it is important to minimize and or mitigate the adverse impacts from these elements. Likewise, there may be important views to consider when looking at new development within a basin. Views from the basin of nearby mountains or important landscape features, either within or outside the basin lead to an overall high quality visitor experience and should be preserved or highlighted.

Resource Use Objectives

- Minimize adverse visual and noise impacts of new development activities within the basins.
- Minimize existing visual and noise impacts within the basins.

- Maintain aesthetic surroundings at historic sites.
- Preserve or highlight existing viewsheds.
- Locate and design facilities and activities to avoid or minimize adverse environmental effects and in areas near vehicular access points to minimize overall impact.
- Preserve areas of unique, sensitive, or significant resources from damage by other uses, activities or developments.

Resources: Aesthetic and Scenic Quality § 232 of WRDA 1996, Environmental and Economic Benefits of Landscape Practices on Federal Landscaped Grounds 60 Fed 408 37.

Guiding Principle: Protect and conserve the quality and function of existing ecosystems, and restore significant ecosystem function, structure and dynamic process that have been degraded.

Wildlife Habitat and Native Plant Communities

Goal

Protect, preserve, and restore wildlife habitat and native plant communities within the basins.

Rationale

With increased urbanization throughout areas such as southern California, wildlife habitats have decreased and are increasingly cut off from each other. The basins provide large open areas for habitat and with their connections to waterways provide important corridors for wildlife movement and subsequent genetic diversity. Many large predator species require wide expanses of connected habitat in order to survive and thrive. At the same time, within these basins important remnant habitats provide some of the best sites for endangered species and species of special concern. Where practicable, these habitats should be managed or restored to provide these species with the high quality habitat and connections that are needed for them to thrive.

Genetic diversity and abundance is equally important to vegetation as it is to wildlife. Having the genetic stock that is indigenous to an area is critical for successful restoration as these plants have adapted to the particular nuances of the microclimate in which they have evolved. Because the basins were created before many of the areas were as developed as they are today, the basins often contain some of the few remaining examples of native vegetation in situ. For this reason the native vegetation of the basins must be preserved, expanded, and restored wherever practicable.

The Corps CECW-ZA Memorandum on Invasive Species Policy dated 2 June 2009 specifically states the objective, "Promote the exclusive use of native species in plantings associated with construction/restoration activities for real estate outgrants."

Resource Use Objectives

- Protect, preserve, and restore wildlife habitat and native plant communities within the basins to increase the diversity and abundance of existing taxa within the basins.
- Protect and restore wildlife habitat and native plant communities for rare, threatened and endangered wildlife and vegetation within the basins.
- Preserve significant and sensitive transition zones and edges between vegetative communities.
- Manage resources within the basins in a manner that would maintain or preserve the quality of wildlife habitat.
- Always use appropriate native plant palettes in new landscaping or when rehabilitating older established landscaped areas.
- Replace non-native vegetation with native species when existing non-native vegetation dies.
- Utilize native vegetation to maximize biodiversity, reduce soil erosion and subsidence, and improve air quality.

Resources: CECW-ZA Memorandum on Invasive Species Policy dated 2 June 2009.

Wetlands

Goal

Protect, conserve, maintain and restore wetlands whether seasonal or permanent, to achieve the national goal of no net loss of wetlands.

Rationale

Lying on the border between water and land, wetlands have often been called the nurseries of life because they provide a rich mix of nutrients, insects, and plants that make them ideal nesting, resting, feeding and breeding grounds for many different types of creatures. Over a third of all federally listed rare and endangered species live in or depend upon wetlands. Wetlands also help control flooding, improve water quality and serve as rest stops for migratory birds. According to EP 1130-3-540 2-4 f.(1) (e), "On hydric soils (indicating previous wetland conditions) consideration and management emphasis should be given to returning operating, and/or maintaining wetlands for wetland plant communities. Consideration should be given to buffering the wetland within an adequate amount of land to prevent abuse or loss from adjacent land uses."

Resource Use Objectives

- Protect, and maintain existing wetlands and wetland plant communities within the basins.
- Restore degraded wetlands to sustainable ecosystem function.
- Where practicable, create new wetlands.
- Buffer wetlands with appropriate land uses to protect the integrity and ecosystem function of the wetland.

Resources: North American Wetlands Protection Act, Endangered Species Act, EO 11990 Protection of Wetlands, North American Waterfowl Management Plan, EP 1130-3-540 2-4 f.(1) (e).

Guiding Principle: Integrate ecological, social, and economic sustainability into management of all Corps lands and activities.

Global Climate Change

Goal

To develop, implement, and assess adjustments or changes in operations and decision environments to enhance resilience or reduce vulnerability of basin projects, systems, and programs to observed or expected changes in climate.

Rationale

Climate change impacts affect water availability, water demand, water quality, stormwater and wastewater infrastructure, flood and storm infrastructure, wildland fires, ecosystem functioning, and energy production and demand. All of these factors affect the water resources projects operated by the Corps and its non-Federal sponsors. Many of these were designed and constructed before climate change was recognized as a potential influence.

The entire basins' water resources infrastructure and programs, existing and proposed, could be affected by climate change and adaptation to climate change. This affects design and operational assumptions about resource supplies, system demands or performance requirements, and operational constraints. Both droughts and floods can affect the operations of these basins.

The Corps' Institute for Water Resources (IWR) has taken the lead in defining the Corps' response to Global Climate Change. For further information, see:

[Http://www.iwr.usace.army.mil/inside/products/climatechange/index.cfm](http://www.iwr.usace.army.mil/inside/products/climatechange/index.cfm)

Resource Use Objectives

- Prioritize land uses and activities that do not contribute to global climate change.
- Support Corps regulators on dealing with climate change in permitting decisions.
- Use adaptive management to respond to changing conditions on site that may result from global climate change.
- Use the development of methods and policies to deal with hydrologic frequency analysis under changing conditions.
- Evaluate the impacts of climate change on the basin ecosystems and the potential effects on Corps infrastructure and ecosystem restoration projects.
- Change native landscaping as needed to adapt to changed on-site conditions resulting from global climate change.
- Where in harmony with the native landscape, maintain or expand the existing tree canopy.

- Build on the baseline carbon budget for Corps projects to guide subsequent policy and project operation and maintenance (O&M).
- Prioritize and promote the use of zero-emission transportation such as walking or bicycling within the basins.
- Locate activities and developments that have an adverse impact on the environment in similar areas near vehicular access points to minimize overall impact.
- Create circulation and traffic plans that encourage the use of public transportation to and within the basins.
- Promote the use or generation of renewable energy within the basins.
- Require all new buildings achieve a LEED® Silver or higher rating

Resources: EO on Federal Leadership in Environmental, Energy and Economic Performance dated 5 Oct 2009, ER 1130-2-540 15 Nov 96.

Energy

Goal

Increase regional energy self-sufficiency and energy efficiency within the basins.

Rationale

Wise use of energy is a key component of sustainability and in reducing the carbon footprint of activities within the basins. Energy saving measures must be installed and new development constructed in accordance with green building principles.

Resource Use Objectives

- Maximize energy conservation and apply/promote renewable energy alternatives.
- Minimize the use of non-renewable energy through energy efficient land use planning and construction techniques.
- Provide for the development of energy resources that promote national economic development.
- Require that all new development be consistent with green building principles.

Resources: EO on Federal Leadership in Environmental, Energy and Economic Performance dated 5 Oct 2009

Economic

Goal

Contribute to national economic development consistent with protecting the Nation's environment.

Rationale

The primary function of the dams is to minimize flood risk and the attendant loss of life and damage to property that goes with flooding. The economic value of each dam and basin is the cost of property damage that has been avoided since their operation.

The basins play an even larger economic role. The recreation amenities at the basins often generate user fees (such as golf fees) that help pay for and defray recreation operating costs. Recreation activities also contribute to the larger local economy through purchases of food, gas, and lodging, and specialized recreational equipment by outside visitors.

Resource Use Objectives

- Encourage activities on site including various forms of recreation that contribute to the local economy while not impacting the ecosystem.
- Allow activities on Corps lands that help defray recreation amenities operation and maintenance costs.
- Minimize economic impacts to life and property by responding quickly to flood conditions.

Resources: ER 1130-2-550

Natural Lands and Open Space

Goal

Before approving new development on natural lands and open space i.e., those areas of the basins that are neither designated as wildlife habitat nor recreation, carefully analyze the suitability of such lands for the proposed use since once approved, opportunities for more optimal uses may be permanently lost.

Rationale

Natural lands and open space are defined here to be those areas of the basins that are neither designated as wildlife habitat nor recreation. To the public they may seem abandoned, yet they may be providing other functions such as providing buffers from conflicting uses, upland habitat, protection of cultural resources or maintaining viewsheds. Before approving any new development, the suitability of such development on these lands must be carefully analyzed and weighed against alternative uses of the land.

Resource Use Objectives

- Prohibit further expansion of land uses into natural lands or open space that deteriorate environmental quality, phase out existing land uses that are no longer viable, and provide environmental compensation for land uses that adversely affect the natural resources in the area that cannot be phased out or prevented.
- Designate natural areas for the protection of rare and endangered species of flora or fauna, scientific, historical, archeological or visual values.
- Minimize conflicts between land uses, activities, and developments through buffering, screening, and other measures.
- Conserve resources that cumulatively contribute to the basin's environmental health.

- Preserve areas of unique, sensitive, or significant resources from adverse impacts by other uses, activities or developments.
- Determine suitability of natural areas for either wildlife habitat or recreation before changing land use classifications.

Sustainable and Local Agricultural Uses

Goal

Allow continuing interim use of sustainably practiced agriculture when it is consistent with preserving open space, rural and pastoral character, environmental quality of the basin and the needs of the local community.

Rationale

Agricultural use is deemed to be an interim use of Corps lands. However, agriculture in the basins represents an historic use of the land and could provide education in connection with local history. Agriculture maintains open space, provides a pastoral quality to the landscape, and can instruct about our food supply. With the increased emphasis on eating healthy and locally-grown food, these agricultural lands can provide a local food supply that minimizes transportation and the associated carbon footprint.

Minimizing intensive agro-business, which has many costs associated with it would benefit the sustainability of the Federal lands.. Prominent agro-business costs are topsoil depletion, groundwater contamination, the decline of family farms, continued neglect of the living and working conditions for farm laborers, increasing costs of production, and the disintegration of economic and social conditions in rural communities. A move towards sustainable agriculture increases stewardship of the land. Promoting sustainable agriculture addresses many environmental and social concerns and offers innovative and economically viable opportunities for growers, laborers, consumers, policymakers and many others in the entire food chain system. (UC Sustainable Agriculture Research and Education Program.)

Resource Use Objectives

- Discourage further expansion of intensive agricultural land uses within the basin.
- Encourage interim organic agricultural practices utilizing native taxa which provide habitat, feed, and/or forage for wildlife in the basin.
- Promote agricultural crops that optimize water conservation and rejuvenation of soil nutrients.
- When agricultural lands are to be transitioned to other purposes, limit land uses that would maintain the existing open space character, such as wildlife habitat or low-impact recreation.
- Discourage practices that harm air quality. Options to improve air quality include incorporating crop residue into the soil, using appropriate levels of tillage, and planting wind breaks, cover crops or strips of native perennial grasses to reduce dust.

- Protect and maintain natural habitat and wildlife around the agricultural land uses. The diversity would enhance natural ecosystems and could aid in agricultural pest management.
- Limit water use by developing drought-resistant farming systems, such as improving water conservation and storage measures, providing incentives for selection of drought-tolerant crop species, using reduced-volume irrigation systems, and managing crops to reduce water loss.
- Conserve water quality by addressing issues such as salinization and contamination of ground and surface waters by pesticides, nitrates and selenium.

Resources: UC Sustainable Agriculture Research and Education Program

Conclusion

LTG Robert B. Flowers, the Army's 47th Chief of Engineers has stated, "The mission of the Corps has evolved from 'builder' to encompass 'developer/manager' and 'protector.' In the past, our science was not adequate to fully understand the impacts of our actions on the environment. That is now changing as science improves. From the Everglades of South Florida to the Pacific Northwest, America is reevaluating those past decisions." (Source: U.S. Army Engineer Institute for Water Resources. 2008. *Value to the Nation: Environment.*)

The goal in developing these Resource and Ecosystem Objectives is to recognize the long time horizon in planning for, managing and sustaining these critical resources. In 1936, the Corps of Engineers was empowered to protect the nation from catastrophic flooding and it continues to fulfill this mandate. With the advances in science and engineering that have taken place since enactment of the Flood Control Act, there is no doubt that these basins can be managed to provide flood protection, wildlife habitat, and recreational opportunities, while fostering a nurturing environment for all inhabitants in a climate of economic prosperity.