

Network Link Planning Process



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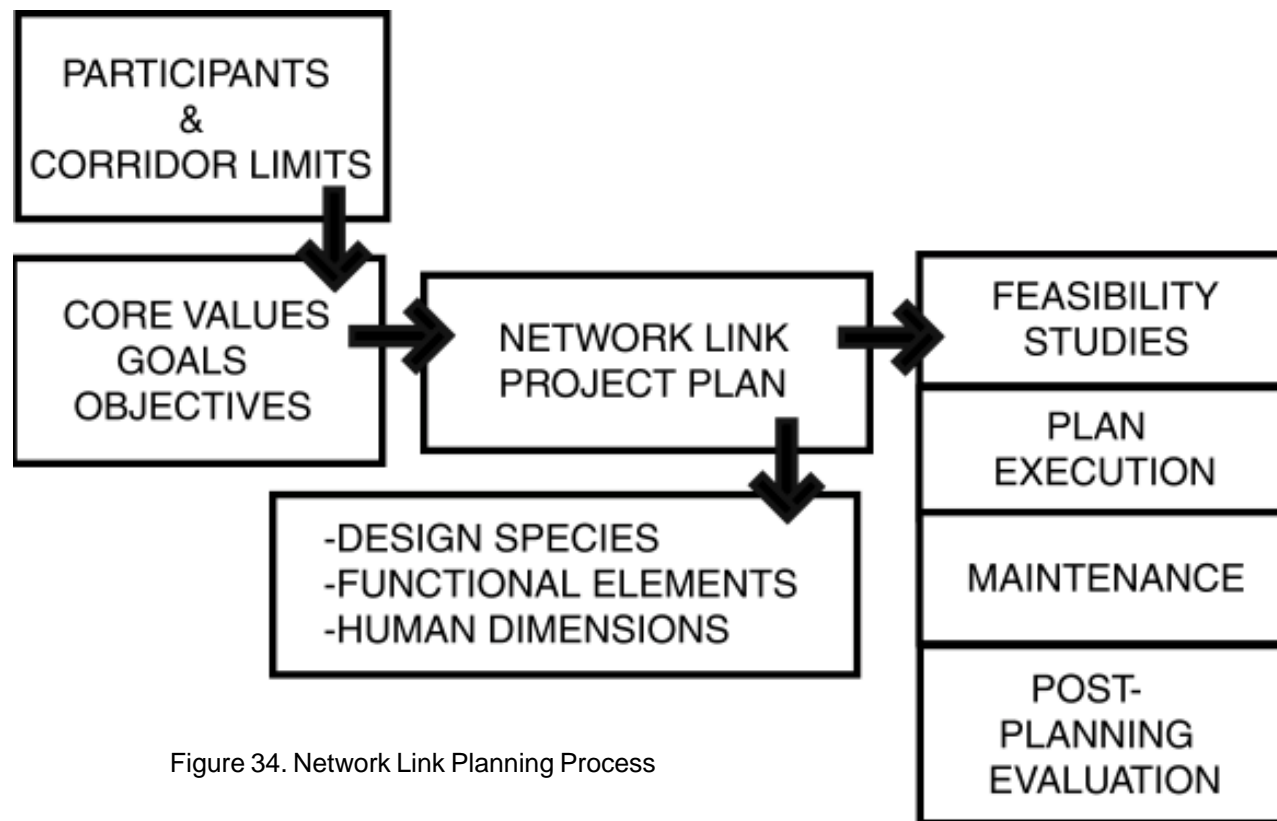


Figure 34. Network Link Planning Process

Network Link Planning Process

Once the Regional Network Planning Process has prioritized the greenway network links, a project scale planning process must begin that can systematically develop each of these links into a viable wildlife movement corridor. (See Fig. 34) As mentioned earlier, the Network Link Planning Process considers some of the same information as the Regional Planning Process does, but the information at this smaller, more site-specific scale is more definitive in character as it relates to the specific needs of the design species. To the extent that information used at the regional level is specific enough also to be used at the network link scale, every effort should be made to preserve and reuse that information. The end product of this Network Link Planning Process is a plan, that when implemented, will enable the movement of the design species.

Participants

As in the Regional Planning Process, the first step is to identify participants who will develop the network link plan. Because of

the size of the San Gabriel Valley region, many of the participants in the Regional Planning Process might not be interested in participating in particular links located in areas of the Valley that do not impact their lives. Similarly, some individuals might not be interested in regional planning, but might care very much how lands adjacent to their homes are developed and managed. In many cases, there will be significant overlap between regional planning participants and network link planning participants, but the process used to notify residents of this more localized planning process can be even more tightly tailored to the residents living in the vicinity of these localized planning efforts.

Core Values, Goals and Objectives

Again, as in the Regional Planning Process, participants in the Link Planning Process need to iterate, as a group, the core values, which will drive the planning process. The participants can then develop goals and objectives.

Network Link Plan

Although the initial steps in the regional and network link planning processes described here are similar, the products of these two processes are different. Whereas the Regional Network Planning Process produces a prioritized list of future network link planning projects, the Network Link Planning Process produces corridor specific plans. These plans will include a thorough inventory and analysis of the corridor site, design concepts to guide the appearance of amenities constructed for the human experience in the corridor, and selection of one or more design species. The corridor plan will then address, with respect to the design species, the five plan elements pertaining to wildlife corridor function, which are patches, corridors, water resources, vegetation and wildlife. These plan elements are not to be confused with the environmental assessment, performed at the regional scale that was used to compare the ecological value of different potential corridors. In this site and species-specific design process, these plan elements address the survival needs of the design species.

In addition to these function elements, the plan should also address opportunities for human experiences in the corridor, such as education and recreation. A final section, depending upon the scope of work of the planning body, might consider broader planning goals as they relate to the wildlife corridor. Though the heart of the network would still be a system of wildlife movement corridors, the network might also become the skeleton of regional redevelopment. And, the wildlife corridor will in fact function better if it is surrounded by a buffer area containing low impact land uses, such as organic agriculture, botanical gardens, nurseries, or parks. Dilapidated residential areas already prioritized for redevelopment and adjacent to buffer zones might be replaced with higher density, sustainable housing that would have less impact on the wildlife corridor nearby. Transit hubs and small-scale commercial amenities might be built into these communities, which already have many residents who do not drive, in order to facilitate pedestrian communities and use of mass transportation.

Design Species

The selection of design species will drive the design of each link in the regional network. A wildlife biologist, or perhaps a biology department at a local university, could provide valuable

input regarding appropriate design species for a particular network link, plus provide information about the specific habitat needs of that species. When selecting design species, planners should consider known occurrences of protected animal species, animal species that have experienced significant declines, and top predator species. Preservation of protected species is mandated by law, but sound wildlife management also dictates preservation of protected species, as well as species that have experienced significant declines in their populations. Biodiversity is an excellent measure of ecological health and is best achieved by preservation of all species that would naturally occupy a particular habitat. Top predator species, as a category, have declined in virtually all urbanized areas, due to habitat fragmentation. Most corridor designs should be based upon at least one top predator species. As discussed earlier, top predator species perform a crucial role in the natural wildlife trophic structure. Based upon the potential size of the corridor, the most sensitive top predator species that might possibly use a corridor should be named a design species for that corridor (Noss 1993; Haas 2000). From the perspective of genetic exchange, just one dispersing individual—a young animal leaving its parents' home range—must move across a corridor each generation in order to sustain the genetic health of the species in the two patches connected by the corridor (Noss 1993). It is possible that the design species will never actually use the corridor, but by selecting the most sensitive species that *might possibly* use the corridor, planners can, with a single species insure inclusion of a broad band of other sensitive species. When the corridor is designed in this way, the design species acts as an “umbrella” species. Design species must not be species likely to use the corridor regardless of the ecological health of the corridor, since many sensitive species that might potentially use the corridor will never become established in such degraded habitats.

Plan Design Elements

In order to effectively design for the design species, each network link plan needs to address the first five functional design elements. (See Table 4) Together, these elements describe the survival needs of those species. The sixth and seventh plan elements should also be addressed in each link plan, as all corridors in the greenway network should provide some educational and recreational amenities to the surrounding communities. The final plan element may be included, depending upon the scope of the plan.

	PLAN ELEMENTS
FUNCTIONAL ELEMENTS	<ol style="list-style-type: none"> 1. Patches 2. Corridors 3. Water Resources 4. Vegetation 5. Wildlife
HUMAN EXPERIENCE ELEMENTS	<ol style="list-style-type: none"> 6. Education 7. Recreation
BROADER PLANNING ELEMENTS	<ol style="list-style-type: none"> 8. Community Redevelopment

Table 4.

Patches

In the Network Link Planning Process, new patches must be designed and existing patches must be restored in order to meet the survival needs of the design species. Different design species will require different patch sizes. Planners should compare the desired patch size with the sizes of patches that exist or could potentially be created along a network link. Frequently, land acquisition becomes a key component in the final plan in order to create patches that are large enough to accommodate area-sensitive design species. Planners must also evaluate the degree of fragmentation and overall disturbance to determine whether or not the design species will tolerate these conditions. If the patches are too fragmented or disturbed, planners must attempt to restore these patches to make them suitable for the design species. Planners must also consider the number and configuration of patches as they relate to the design species. Some species require large home ranges and may need several patches of a particular size throughout their life cycle; and these patches must be configured in a way that is accessible by that species (Noss 1993; Haas 2000).

Corridors

As with patches, different design species will have different corridor requirements. As a whole, length of corridor, plus, length between nodes are key considerations that will determine the length of time necessary for the species to move through the corridor. The more time it takes for a species to move through a corridor, the more of that species' survival requirements must be met within the corridor (Noss 1993). Some species might move through a corridor in an afternoon and require only that the corridor provide some vegetative cover. Small invertebrate species, however, may require several generations to pass through a corridor, and thus, all of that species' life cycle requirements must be available throughout the corridor (Noss 1993).

Usually the most limiting factor for wildlife movement corridors in urban areas will be the width of the corridor. Many large carnivore species will not move through a corridor much narrower than a quarter mile wide (Haas 2000), which can be a prohibitive amount of space in most urban situations. Planners may need to consider land acquisition as part of the plan in order to create a sufficiently wide corridor.

Finally, planners must consider the connectivity and circuitry of the corridor with regard to the design species. If several populations of the design species are known, the corridor network will ideally link to all of the known populations. Barriers and choke points along the corridor must also be considered with regard to the design species. A barrier to one species, a body of water, for instance, might actually facilitate movement of another species. In a similar fashion, a narrowing of a corridor might create a choke point for species requiring wide corridors, but might be completely unnoticeable to species comfortable in narrow edge habitats. All of these potential impediments to movement of the design species along a corridor must be addressed in the design of the corridor. Unfortunately, scant research exists for most species and for most types of impediments to movement. Planners must, therefore, regularly consult with wildlife biologists and other specialists who are current on the most recent research into these emerging areas of study (Noss 1993; Haas 2000).

Water Resources

Different species require very different water resources. Some species endure locations with no water available at all for months at a time, while others, such as fish, spend their entire lives submerged in it. Different species are also highly variable in their tolerance to degraded water quality. The vegetation that a species requires is very closely related to the water resources available at a particular location. Several of the region's protected bird species, for example, require riparian vegetation, which in turn requires a constant water source, at least to the root zone of the riparian plants. Water resources also relate to the mobility of the design species. Where large mobile animals are concerned, water might only need to be available at certain intervals along the corridor, while aquatic and certain other species require the presence of water along all portions of the corridor (Noss 1993).

Vegetation

Along with patch and corridor size, vegetation is one of the best indicators of the wildlife species that will likely inhabit an area (Forman and Godron 1986). Virtually all wildlife species are associated with particular types of vegetation. Some wildlife species thrive in many vegetation types, while others require very specific vegetation--possibly even a single plant species, for their survival. Planners must determine the vegetation types required throughout the life cycles of the design species. Certain raptor species nest in high, rocky cliff areas, but hunt in open grassland areas (U.S. Fish and Wildlife 1982). Planners must insure that both of these habitat types are available if these species are selected as design species. Beyond general plant community types, many animal species are sensitive to a variety of other parameters of the vegetation they inhabit. Even within a particular plant community type, animal species may require several different plant species. Some riparian bird species, for example, will nest in willows, but feed on the seeds of other riparian plants (Stephenson and Calcarone 1999). When considering vegetation, planners must also determine the pervasiveness of invasive, exotic species and the impact they might have on the design species. Riparian birds have been very negatively impacted by the proliferation of giant reed or *Arundo donax*, which displaces large areas of native riparian vegetation (Stephenson and Calcarone 1999). Total vegetation cover is yet another key consideration for many interior dwelling species that

will only move through a corridor with significant cover. Other species prefer habitats that are more open and sparse.

Aside from the opportunity for a corridor to provide vegetation for wildlife, corridors also offer the opportunity to preserve rare and protected plant species and plant communities. Most often, plant communities or species become imperiled because the places where they historically grew have been displaced by urban development or by invasive exotic plant species. Other causes of their decline include fire suppression, trampling by visitors to recreational areas and altered water regimes. Obviously, preservation is far more cost-effective than restoration. Thus preservation of known occurrences of rare or protected plant communities and species must be a top priority. All that is often required from a planning perspective is protecting the land where these plants and plant communities exist apart from development. Sometimes, however, planners must develop active management plans to control the ongoing menace of invasive exotic species (Riley 1996). On a site design scale, planners have many opportunities to direct circulation of visitors away from sensitive areas, to make sensitive areas less attractive to visitors or to provide other amenities that will draw visitors away from the sensitive areas. Although regional hydrologic regimes are unlikely to be restored in the foreseeable future, opportunities on a site-scale might exist to restore the water regimes required by certain plant species. Small wetlands, for example, might be constructed to provide an opportunity for the re-introduction of wetland plant species, many of which have experienced considerable decline with the urbanization of the San Gabriel Valley. Fire suppression in the region will remain a difficult issue in the foreseeable future. Many homes have been built in landscapes that require fire cycles in order to maintain their health and productivity. Planners should make every effort to limit additional construction in these flammable landscapes and should also discourage reconstruction in them when structures are burned in the brush fires that inevitably occur there. Small scale controlled burns are practiced in the Angeles National Forest, but due to air quality management standards, it is unlikely that the region can ever return significant portions of the native vegetation to a natural fire cycle.

Wildlife

Many wildlife species require the presence of other wildlife species. This is obviously true of carnivores, which require suitable prey species for their survival. Less obviously, many

small prey species require the presence of top predator species to control mesopredators. Without top predator species, mesopredators experience a release, meaning that their numbers significantly increase. An enlarged population of mesopredators can obliterate smaller prey species (Haas 2000). Planners must also consider the effects of non-native animal species on wildlife populations. Bobcats are negatively associated with domesticated dogs; feral cats predate heavily on native songbirds; and parasitism by brown-headed cowbirds has pushed some riparian bird species to the brink of extinction (Haas 2000; Stephenson and Calcarone 1999). Effective corridor design must insure that a reasonably healthy, sustainable trophic structure is achieved within the corridor. Prey species required by the design species must be present, and top predator species must be present in sufficient numbers to control populations of mesopredator species. Planners must also control exotic and domestic animal species that pose a threat to the corridor's design species.

Design of the habitat components will always involve preservation and restoration issues and will frequently involve land acquisition as well. The Network Link Plan should identify the areas that are to be preserved and restored, plus detail how these measures are to be carried out. The plan should also identify the specific lands that need to be acquired and outline how the acquisition is to be accomplished.

Education

Virtually all corridors will offer educational opportunities and the success of the wildlife corridor will depend significantly upon the ability to educate residents of the region and persuade them to protect their natural resources. Information kiosks and interpretive trails are popular educational vehicles. Outdoor classrooms can also be incorporated into designs and educational programs offered through local schools and community groups can lead discussions, or workshops in them. Placement of educational features should correspond to the locations of interesting and unique natural features in the region, and be designed and sited so as to avoid destruction of the feature visitors will be gathering to learn about.

Recreation

One of the best selling points for a regional greenway network with the surrounding communities will be the creation of recreational amenities. Each Network Link Plan should explore

suitable recreational opportunities, as well as sensitive design and suitable placement. A network of wildlife movement corridors cannot function if the greenway network consists of a series of soccer fields, but even the most sensitive areas can incorporate certain types of passive recreation, while less sensitive areas might well accommodate soccer fields and other types of active recreation. Sensitive areas might incorporate low impact activities such as nature walks, bird watching, or possibly even picnicking. Planners of these amenities should take care to site these features towards an outer edge of the sensitive area, rather than through the center of it in order to minimize disturbance. This may involve rerouting the bicycle trail and creating spur trails to provide access to less sensitive areas of the corridor. Dogs must be kept on leashes in these areas to encourage a wider array of wildlife species. Recreation in sensitive areas must be accompanied with educational signage in all the relevant languages to help visitors understand their personal responsibility in wildlife preservation.

Community Redevelopment

Clearly not all environmental planning efforts will be broad enough in scope to consider community redevelopment issues, but all participants in environmental planning efforts should be aware that this opportunity exists. Even planning bodies whose scope of work is not this broad might coordinate and partner with redevelopment efforts carried out by other planning entities, such as city planning and redevelopment departments. The implications of this sort of integrated planning are significant. From the threads of a greenway network, this process could lead to the greening of the entire region with vastly improved utilization of scarce resources, less air and water pollution and improved quality of life.

Plan Implementation Elements

Although less substantive in nature, the plan must also contain provisions to guide implementation.

Feasibility Studies

Long before any construction of the network link facilities, the Network Link Plan and the designs in it must undergo feasibility studies. Engineers must determine whether the plans as developed can function, and if not, how they can be made functional. Planners must also determine whether or not their

plans are economically feasible, and where alternatives of comparable ecological value exist, which alternative is the most cost-effective. Based upon these feasibility studies, some of the plans and designs might require modification and others might have to be completely reformulated. Still other plans might have to be completely eliminated based upon feasibility considerations.

Plan Execution

Construction of the plan will likely proceed like most other construction projects, except that a wildlife biologist or other qualified individual should be available as a consultant.

Maintenance

The plan must address maintenance. Obviously a self-sustaining ecosystem requiring no maintenance would be optimal, but such successful restoration will rarely be possible. Any plan that includes recreational amenities will require someone to clean up after the visitors and repair damage to the corridor and its amenities. Some of impacts of human presence are indirect, such as spread of exotic species. Control of invasive species will likely be an ongoing battle. The plan should identify who will be providing maintenance, how the maintenance is to be performed and how the maintenance is to be financed.

Post--Planning Evaluation, Monitoring and Information Management

One of the most significant impediments to environmental planning efforts in the San Gabriel Valley today is the lack of information management. Because it is an important urban region, nearly every parameter of the Valley has been studied, usually more than once and very often the studies are recent. The problem is that no major regional effort appears to have succeeded in assembling all of this information. Every step in the Regional Planning Process presented herein will generate information that can be distilled and maintained in a database (See Appendix X). To the greatest extent possible, these databases should be made available at no, or at minimal charge to participants in regional planning efforts. Some crucial information has been produced at considerable expense by different agencies or organizations, which understandably have a proprietary interest in the information they have produced or

assembled. It might be possible for a central planning agency, however, to act as a clearinghouse for information produced, for example, by the California Department of Fish and Game. Through such an arrangement, the originating agency or organization could realize a financial return on the information it is providing, but the clearinghouse, perhaps an agency of Los Angeles County, could make the information available, perhaps at a cost, to participants in regional planning efforts. Stakeholder contact information, hydrologic data, mappings of known occurrences of protected species, region-wide parcel information, current aerial photographs are all important tools in effective planning, but presently this information is scattered all over the state. Every time any planning effort gets under way, the planners must assemble the same array of information that has been assembled during previous planning efforts.

The other component of this data management effort is to study rigorously and monitor the different links in the network as they are completed and to record this badly needed information into a database format. Even well-regarded wildlife biologists do not know how big an undercrossing is needed for the movement of most animal species, nor the minimum width of a corridor a dispersing animal will utilize. Researchers must also monitor use of the network links by wildlife species to ensure that these wildlife corridors do not attract wildlife that is unable to move through the link causing the corridor to exceed its carrying capacity, or possibly becoming a mortality sink—attracting animals that are unable to survive once they have arrived.

Rigorously studied, this urban greenway network can become a significant laboratory, potentially filling a major void in the existing research concerning wildlife movement and the creation of urban wildlife movement corridors. A concerted effort should be made to integrate as many biology, environmental science, and landscape architecture departments, at as many universities as possible, into this effort. Even using the most current information available, some of the initial designs will fail because the information is incomplete. But, the planning effort as a whole only fails if the results of these initial designs are not monitored and the initial design defects are not discovered and remedied. The information from these post-planning evaluations and monitoring efforts must be distilled into a digestible database format and disseminated to the planners of the future network links and to those who will be charged with redesigning the initial network links.