IX

A Potential Riparian Protected Area: The Trinational Kumiai Corridor

Katherine Comer[1]

Abstract

The Kumiai Corridor concept is a blueprint for a trinational riparian protected area that aims to enhance the hydrological, ecological, and cultural resources of the Campo Indian Reservation in San Diego County, Calif., the County of San Diego, and the Municipality of Tecate, B.C. On one end of the Campo Creek-Tecate River corridor, the Campo Indian Reservation already boasts community-led riparian protection programs. Thirty-five kilometers downstream, at the other end, an ecological easement was recently created on sacred Kumiai lands at Rancho Cuchumá. Those Mexican lands were joined with public Bureau of Land Management lands in the United States to form a transborder protected zone called Servidumbre Cuchumá. Plans for an urban river park in Tecate have been developed. These existing projects would serve as anchors for an approximately 100-meter wide biodiverse riparian ribbon through urban Tecate and through rural lands in San Diego County.

The Kumiai Corridor blueprint uses two phases. In phase one, lands could be protected within national boundaries through a variety of land protection instruments. Phase two would "weld" the protected areas across national boundaries. A seamless corridor might

help bring greater attention, protection, and funding for the area. Long-term goals for the region include the incorporation of lands adjacent to the corridor and the incorporation of lands beyond the anchors. Stakeholders hope the riparian protected area will one day stretch from the Laguna Mountains to the Tijuana Estuary on the Pacific Ocean.

Un Zona Ribereña Potencialmente Protegida: El Corredor Kumiai Trinacional

Katherine Comer[1]

Resumen

El concepto del Corredor Kumiai es un plan de un corredor ribereño trinacional protegido con el propósito de enriquecer los recursos hidrológicos, ecológicos y culturales de la Reserva India de Campo dentro del condado de San Diego, California, el Condado de San Diego y el Municipio de Tecate, Baja California. Por un extremo del corredor del Arroyo Campo-Río Tecate, la Reserva India de Campo ya cuenta con programas de protección ribereña dirigidos por la comunidad; y, por el otro extremo, a 35 kilómetros río abajo, en fecha reciente se estableció una servidumbre ecológica en las tierras sagradas de los Kumiai en el Rancho Cuchumá. En este proyecto se juntaron las tierras mexicanas con tierras públicas del Bureau of Land Management de los Estados Unidos para formar una zona protegida transfronteriza llamada Servidumbre Cuchumá. Ya se trazaron proyectos para el establecimiento de un parque ribereño en la zona urbana de Tecate. Los proyectos existentes actuarán como puntos de

anclaje de una franja de unos 100 metros de ancho de biodiversidad ribereña a través de la zona urbana de Tecate y de tierras rurales del Condado de San Diego.

El proyecto del Corredor Kumiai consiste en dos fases. En la primera, las tierras se podrían proteger dentro de los límites nacionales mediante una serie de instrumentos de protección de las tierras. En la segunda fase, se "fusionarían" las zonas protegidas de ambos lados de los límites nacionales. Un corredor continuo podría ayudar a generar más atención, protección y recursos financieros a esta zona. Las metas a largo plazo de la región incluyen la incorporación de tierras adyacentes al corredor y las tierras más allá de los puntos de anclaje. Las partes interesadas esperan que algún día la zona ribereña protegida abarque desde las Montañas Laguna hasta el Estuario de Tijuana en el Océano Pacífico.

Introduction

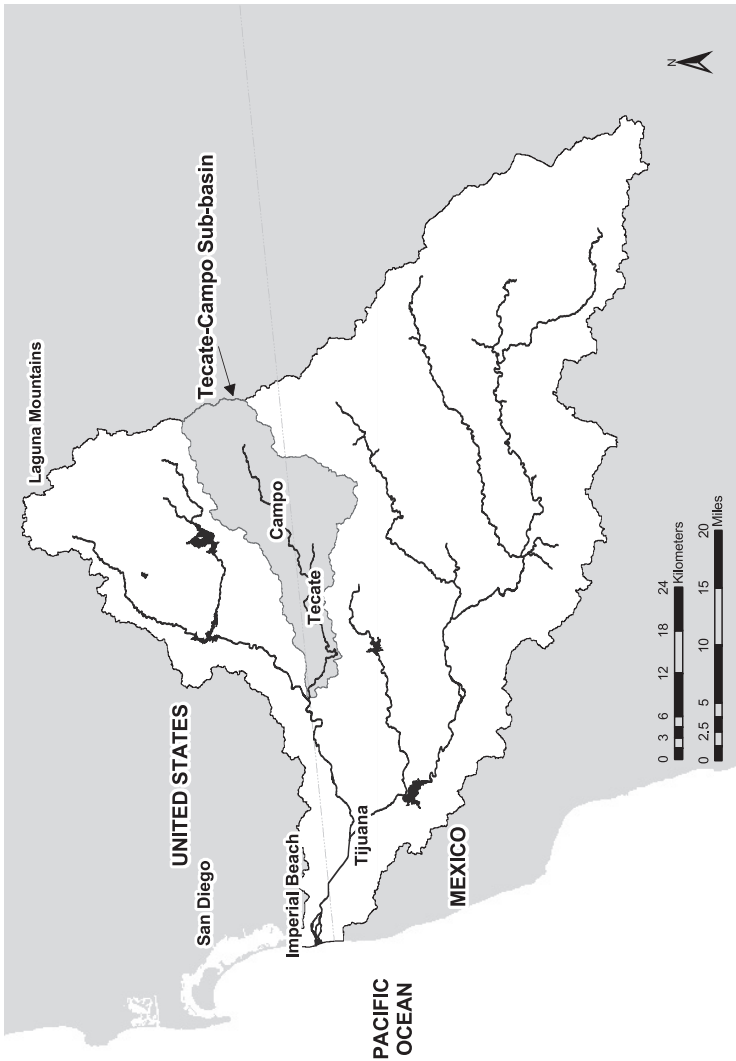
In contrast to site-based approaches, regional planning tools are some of the most effective conservation tools for maintaining ecosystems (Noss and Harris 1986). Ecosystems that operate within geographic boundaries such as biomes, watersheds, and migratory routes do not generally coincide with political boundaries, such as the boundaries of counties and countries (Zbicz 1999; CEC 2000). The coordination of all actors, laws, administrations, and cultures is challenging for conservationists. However, such challenges must be overcome to manage regional-scale ecosystems properly. This chapter focuses on regional land conservation techniques and tools.

Land conservation involves the use of legal mechanisms and economic incentives to encourage sustainable use or the recovery of the ecosystem services in an area (Terra Peninsular 2001; Gutiérrez Lacayo, et al. 2002). This chapter discusses current attempts at land conservation along the California-Baja California border that may serve as models for other areas along the U.S.-Mexican border. It also suggests mechanisms for protecting a trinational riparian Kumiai Corridor that stretches from the Campo Indian Reservation in the United States, through San Diego County, Calif., to Tecate, B.C., in Mexico.

The Kumiai Corridor blueprint is a conceptual plan for protecting an ecologically, hydrologically, economically, and culturally important area along the U.S.-Mexican border. The trinational riparian protected area would start at Campo Creek on the Campo Indian Reservation in the United States, continue through San Diego County lands to the U.S.-Mexican border where it turns into the Tecate River, include parts of Joe Bill Canyon in Mexico, the proposed Tecate Urban River Park through the City of Tecate,[2] and end at the binational ecological easement at Rancho Cuchumá, which is property of Rancho La Puerta, A.C.[3] (Figure 1). The Kumiai Corridor would encompass approximately 35 kilometers (km) of the river's length with a 50-meter (m) buffer on both sides of the river channel. Width would vary depending on hydrology and land ownership. Ideally, the corridor would provide the following services:

- U.S., Mexican, and indigenous cultural preservation
- Links between protected areas in southern San Diego County and critical ecological areas in northern Baja California
- Wildlife movement corridors and contiguous aquatic habitat
- Recovery of riparian vegetation to help recharge the aquifers, protect surface waters, trap sediments, and provide flood control
- Associated economic benefits of a clean environment and natural flood control
- Enhancement of cooperation between nations, governmental agencies, and non-governmental organizations (NGOs)
- Restoration and enhancement of the ecological and hydrological function of the larger Tecate-Campo sub-basin and the Tijuana River Watershed
- Recreational, educational, and research opportunities

Figure 1. The Tijuana River Watershed



Source: Author; data from SDSU and COLEF 1994

Background

United States and Mexican Land Acquisition Mechanisms

The United States has more land designated for conservation than Mexico does, mainly due to historic public land allotments and economic incentives, such as tax breaks that encourage individuals and companies to designate protected areas. At the same time, Mexico has developed innovative approaches for creating and managing protected areas that incorporate human needs and activities. Table 1 provides a partial list of the tools that are available to entities that want to acquire additional land for conservation in Mexico and the United States. The table also provides a short description of some of the incentives associated with each tool.

A Regional Context

Watersheds are appropriate geographic units for analyzing the regional natural and human processes that affect the Kumiai Corridor (Dunn and Leopold 1978; Montgomery, et al. 1995; GNEB 2000). The Tecate-Campo sub-basin is situated within the Tijuana River Watershed (Figure 1). This binational sub-basin straddles the U.S.-Mexican border, encompasses 430 km^2, and is characterized by steep, hilly terrain and a Mediterranean climate. It is dominated by chaparral and coastal sage scrub, wetlands (including vernal pools), and riparian zones with oaks, cottonwoods, and willows (Delgadillo 2000). The sub-basin is predominantly rural and, in 1994, was 88% non-developed. Protection of the riparian corridor would serve as an international model for other transboundary watersheds.

Challenges in the Tecate-Campo Sub-Basin

The Kumiai Corridor plan addresses many concerns in the Tecate-Campo sub-basin, including the increasing population pressure, human economic needs, diminishing groundwater, contaminated surface water, poor air quality, threatened ecosystems, and threat-

Table 1. Land Acquisition Mechanisms

Tool	United States	Mexico
Land donation	Can be stipulated in wills, land gifts by corporations, and living proprietors. The government offers estate tax breaks and charitable tax deductions.	Not common due to lack of incentives; the donor pays for the transfer of title and development rights, and the receiver pays property taxes.
Land purchase	Land trusts or governments buy or transfer lands.	Has recently been exercised by U.S. and Mexican NGO teams (in Coahuila, for example). Costs of property taxes and management of the donated land are high for land trusts. There are limits on how much land can be owned.
Easement donation	Landowners can donate conservation easements that for a stipulated time period (usually perpetuity) restrict some specific uses but maintain title to the land. Charitable deductions and estate tax breaks apply.	Must be signed between two plots of land (dominant and servient). The dominant can determine the NGO that receives a gift of land (1 ha) as a gift from the landowner. For an "easement in gross" there is only one landowner. In general, there are insignificant tax incentives. An NGO can be a third party overseer with legal power to defend the land, a more economic option.
Easement purchase	Same as above, with monetary compensation for the development rights.	Most highly recommended by Pronatura. Economic compensation or other assistance is the immediate incentive, but management and title of the land stay in the hands of locals (Bahia de los Angeles is a good example).

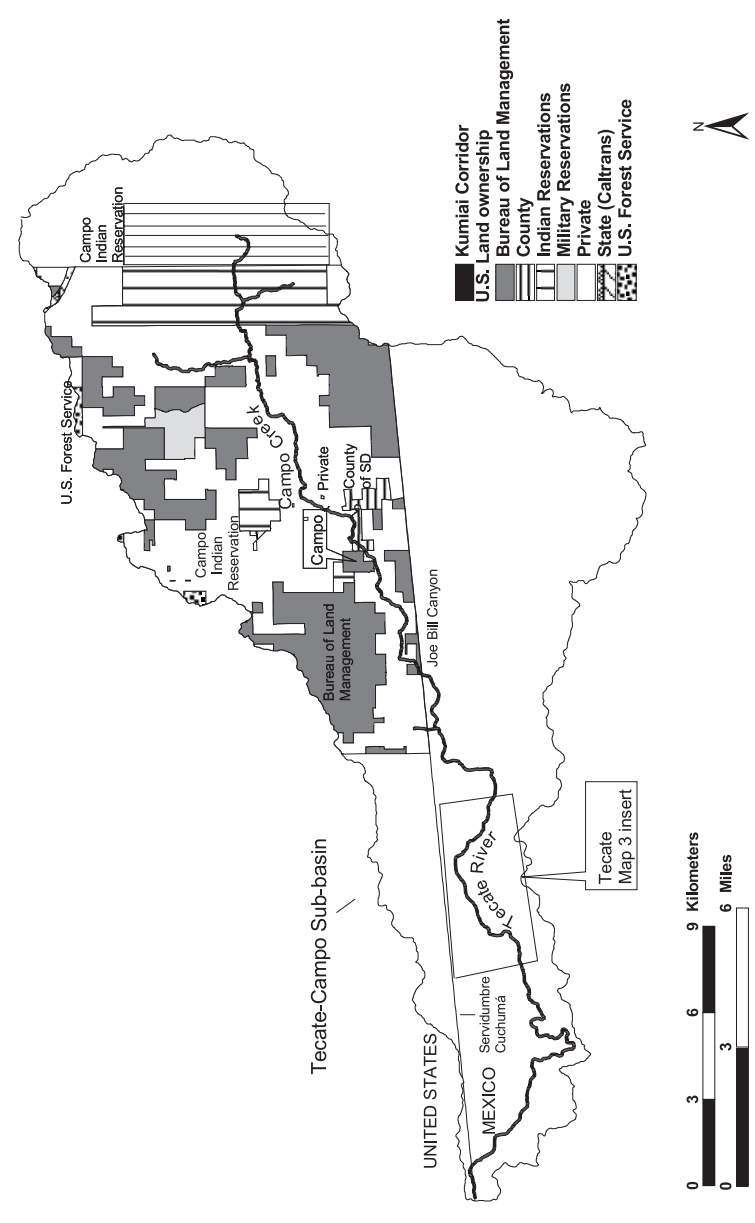
Sources: U.C. Davis 1998; Corcuera, et al. 2000; Gutiérrez Lacayo, et al. 2002; Ochoa 2004; Vargas Téllez 2004

Table 1. continued

Tool	United States	Mexico
Land transfers	Land trusts are intermediaries for the government organizations while they work on acquiring the land. Incentives are that trusts avoid monitoring and enforcement costs, and free up monies to purchase other land, and it is a faster process in emergency situations."	Land could be incorporated by the Instituto Nacional de Ecología (INE), Comisión Nacional de Áreas Protegias (CONAP), or similar government institutions. Political swings cause this to be risky. Also, laws allow "compatible development" in biosphere reserves. Attempts are being made to incorporate private lands into reserves. Generate transfer fees and taxes for the holder.
Transferable development rights, *derechos transferibles de desarrollo*	Owner sells the development rights in a sensitive area in exchange for development rights in a more biologically appropriate site, termed a "receiving area."	A government agency offers land owners a parcel of equal monetary value in a more appropriate site. Zoning laws are weak and therefore there are few incentives. Has been used in Mexico City for historic preservation.
Usufructo	Not applicable in the United States.	"Life estate," which includes the rights to use and enjoy land or resources, are sold to an NGO. The previous owners are given a parcel on which to live and work, and the contract expires with the landowner's death.
Fideicomiso	Similar to a conservancy's ability to manage funds and land.	A contract on rights of use is drawn and land/money can be donated and sold via a financial institution (usually a bank). The terms of the contract are monitored.
Bequest	Donation after death. Avoids estate taxes.	Donation after death.

Sources: U.C. Davis 1998; Corcuera, et al. 2000; Gutiérrez Lacayo, et al. 2002; Ochoa 2004; Vargas Téllez 2004

Figure 2. Land Ownership in the Campo Section of the Kumiai Corridor, 2004



Source: Author; data from SANDAG 2003

ened cultural resources. Tecate's population is expected to double by 2025 (Ganster, et al. 2002) and the demand for potable water has steadily increased. Well water now serves only 30% of Tecate, down from 100% in the early 1990s (Ramírez 2004). Well water is used less today because of low precipitation, well overdraft, and diminished water quality. Low water tables have caused the sediments, salts, and contaminants in some wells to become so concentrated that humans can no longer drink the water. Imported Colorado River water supplements well water in Tecate, but it is expensive to purchase and treat, and the construction of dams and diversions upstream have made the flow inconsistent. If managed properly, restored riparian areas of the region could help recharge the aquifer.

Hydrology, stream geomorphology, biological systems, and recreational activities in riparian areas have suffered from urbanization and sprawl (Pronatura 2002). Loss of riparian habitat in the region has led to loss of connectivity for migratory animals, erosion of the banks, scouring of the streambed, increased flooding, and sedimentation in downstream areas, such as the Tijuana Estuary. In addition, recovery of riparian vegetation could reduce evaporation of surface water, the invasion of exotic species, the loss of biodiversity, and it could increase the river's aquatic health (Michel and Graizbord 2002; Ponce 2003). Physically, the loss of riparian habitat in Tecate has given illegal sand miners, vehicular traffic, and squatters access to streambeds. The Tecate River rarely flows. However, where there is surface flow, the high levels of contamination from industrial and non-point source urban runoff make recreation unsafe (Gersberg, et al. 2000). Criminal activity also makes the riverbed unsafe for recreation in some areas. Increased impervious areas (such as roads and buildings) have slowed rain-fed recharge of the groundwater systems that underlie the channel and feed the river.

Indigenous Kumiai communities in the area that could benefit from cultural links across national boundaries include the Campo Band of Kumeyaay (spelled Kumiai in Spanish) Indians in the United States, and the Mexican communities of San José de la Zorra, San José Tecate, Juntas de Nejí, and San Antonio Necua. Land use changes and globalizing economies threaten traditional indigenous ways of life and valuable indigenous knowledge bases

such as language, ecological management, arts, and medicinal practices (Wilken-Robertson 2002). Archeological sites near the Kumiai Corridor, such as Cuchumá, Bosque de los Encinos, Rancho Pérez, Casa Orendain, and San José Tecate (Pronatura 2002) could become part of the Kumiai Corridor.

Previous Research

Previous work in the region called for the protection of this riparian corridor. Researchers identified the riparian zone of the Campo Creek and the Tecate River as important biological corridors and potential transboundary protected areas (Ganster, et al. 2002; Michel and Graizbord 2002). Recent studies have classified the U.S. section of the Kumiai Corridor as conservation category "Gap 4," which is unprotected under the law (CBI 2003). On the Mexican side of the corridor, the Servidumbre Cuchumá is the only legally protected area. Researchers have identified Joe Bill Canyon as a Conservation Priority I (a high priority) and as an established recreational area (Pronatura 2002).

The Kumiai Corridor concept fits in well with stakeholder recommendations. In 2003, five stakeholder workshops were held for the Binational Vision for the Tijuana River Watershed Project.[4] Stakeholders' desired actions and activities were documented through small group activities and prioritized through an individual voting process. At a meeting in Campo, Calif., many of the participants voted for the construction of wildlife corridors, specifically in rural San Diego County lands, the La Posta Corridor (see CBI 2003), La Gloria Canyon, Smith Canyon, Joe Bill Canyon, and from La Rumorosa to the Cuyamaca Mountains. At the Tecate stakeholder meeting, two of the most suggested actions were watershed-wide recognition and respect for the Kumiai people. Participants also suggested that deforested areas, sand mines, and areas with hydrological problems be identified.

The Kumiai Corridor plan follows general conservation recommendations from the Las Californias Binational Conservation Initiative (CBI, et al. 2004). The objectives of the project are to:

- Protect the border region's unique biogeography
- Link existing protected areas

- Identify gaps in protected areas and targets for conservation
- Promote a binational park system

Landowners and Stakeholders

The owners of the land traversed by the corridor are, from east to west: Campo Indian Reservation, U.S. private landowners, Bureau of Land Management (BLM), the County of San Diego (Figure 2), private ranchers in Mexico, Comisión Nacional del Agua (CNA), and Rancho La Puerta, A.C. (Figure 1). Some of the potential stakeholders are listed in Appendix I.

Phase One of the Kumiai Corridor Plan: Small Steps

The Campo Reservation Section

The Campo Indian Reservation is the northernmost section of the Kumiai Corridor blueprint. The Campo Band is one of 12 U.S. bands of Kumeyaay and five *ejidos* of Kumiai in Mexico totaling nearly 5,000 people (Connolly 2004). The Campo Indian Reservation, approximately 100 km east of the City of San Diego, measures approximately 65 km^2 and contains two disconnected sections with a combined population of approximately 350 residents. The area is threatened by cattle grazing outside the reservation, which causes erosion and downstream sedimentation; groundwater contamination from septic systems; illegal dumping; hazardous waste from drug labs; and invasion by salt cedar (or Tamarisk) and other exotic species (Green 2003a).

The Campo section of the corridor is already protected and under restoration by tribal authorities. A no-grazing program has been implemented and community-based riparian restoration projects are under way at a number of locations on the reservation. The restoration projects use weirs, or "rock drops," which slow water flow, control erosion and undercutting of banks during storm events, recharge groundwater, and help create wetlands (Green 2004b). Sediments are trapped in the standing water and behind the weirs,

thus protecting downstream areas from scoured banks, infill, and the pollutants mixed into the sediments. The projects can serve as models for downstream communities in the Kumiai Corridor.

The tribal government communally owns and oversees all the land on the reservation. Therefore, there is no need to create a conservation easement. However, the establishment of a long-term management program would continue to set a good example for upstream and downstream neighbors, and it could lead to many real benefits for the reservation. For example, the Tribal Council could pass a protected area ordinance or program, which would allow sustainable use of the riparian area while protecting Campo Creek from waste dumping, over-harvesting of riparian vegetation, over-development, channelization, and so forth. Activities such as sustainable reed harvesting, traditional basket making and sales, a native plant nursery, medicinal plant harvesting, food harvesting, and ecotourism present the potential to generate income and foster cultural values for the residents (Green 2004a). By participating in the trinational Kumiai Corridor, the reservation would maintain control of their lands and open up a dialogue on the best ways to promote sustainable development and foster riparian and cultural enhancement in the subbasin. The Campo Reservation could serve as a cultural hub, or anchor, for the Kumiai Corridor.

The Cuchumá Ecological Easement Section

Tecate Peak, or Cuchumá, sits at the other extreme of the Kumiai Corridor, (see Figure 1), and it is a place of significant cultural, historical, and ecological value, and could symbolically serve as one anchor for the Kumiai Corridor. Cuchumá is a sacred mountain for the Kumiai people. "The young played at its feet as their elders hunted the slopes for wild game…it was the mystic mountain where their spirits joined the spirits of their ancestors when they died" (Summers 1972). In addition, the area is biologically rich, containing endangered flora and fauna. In 2003, Pronatura helped negotiate an easement of Rancho La Puerta Mexican lands with BLM lands on the U.S. side of the border. Pronatura acts as a third party for the easement contract and monitors and defends the terms of the easement (which include no development or activities harmful to the

environment). Interestingly, BLM was the "dominant" party receiving the ecological benefits (see Table 1 for further explanation), and was an important, although not a required, player in the contract (Ochoa 2004; Vargas Téllez 2004). This type of transborder agreement could serve as a model for other areas along the border.

The San Diego County Section

The northern middle section, mostly San Diego County lands, could be protected in two phases, starting with immediate legal protection of the riparian lands and continuing with the development of a river conservancy that would acquire additional land and manage the land (see, for example, the San Diego Conservancy Law 2002). In the first phase, the San Diego County section could create a conservation easement approximately 15 km in length, starting at the southern border of the larger Campo Reservation parcel and extending to the international border at Joe Bill Canyon (see Figure 2). It would be necessary to develop separate easement contracts between each landowner and a local and willing land trust that has the necessary staff and resources to monitor and protect the easement terms (perhaps TNC, Backcountry Land Trust, the San Diego Land Conservancy, or BLM). In addition to the 50 m riparian buffer zone, other activities are possible and suggested. For example, in some cases entire parcels could be incorporated through an easement donation (such as from San Diego County and BLM) or with compensation (such as from private landowners, see Table 2). Each easement contract may stipulate conditions of use that, for example, may allow low-impact grazing and agriculture where appropriate, but prohibit channelization, high-density development, or sand extraction.

Table 2. Suggested Organizations and Actions for the County of San Diego Section

Bureau of Land Management	BLM could contribute to conservation by easing its properties along Campo Creek. The BLM lands along the border are part of the Border Mountains area, which is administered as a Special Recreation Management Area (SRMA). Changes to the permissible activities might involve prohibiting off-highway vehicles in the easement (BLM 1994). BLM also has the ability to ease adjacent lands into its own and become the holder of eased lands (CBI 2003).
County of San Diego	The county could ease its land into the Kumiai corridor along the riparian corridor by SR-94. The County could contribute to regional conservation of the easement by zoning the areas outside the easement for low densities in the General Plan 2020 and any insuring that any wetland activities require state and federal permits. Community groups and indigenous groups should work with the County Department of Planning and Land Use on these issues (CBI 2003).
Private Ranchers and Owners	Low impact grazing and agriculture can be compatible with conservation objectives, and some citizens may donate or ease land within and beyond the 50 meter riparian buffer.
Border Patrol	A written memorandum of understanding between the easement holder and the Border Patrol may help reduce vehicular impacts from Border Patrol activities. Remote sensing techniques have been studied at SDSU for the purpose of protecting sensitive habitats (Lina Masters 2002). Training for agents on where sensitive habitats are is essential.

Sources: Author and CBI 2003

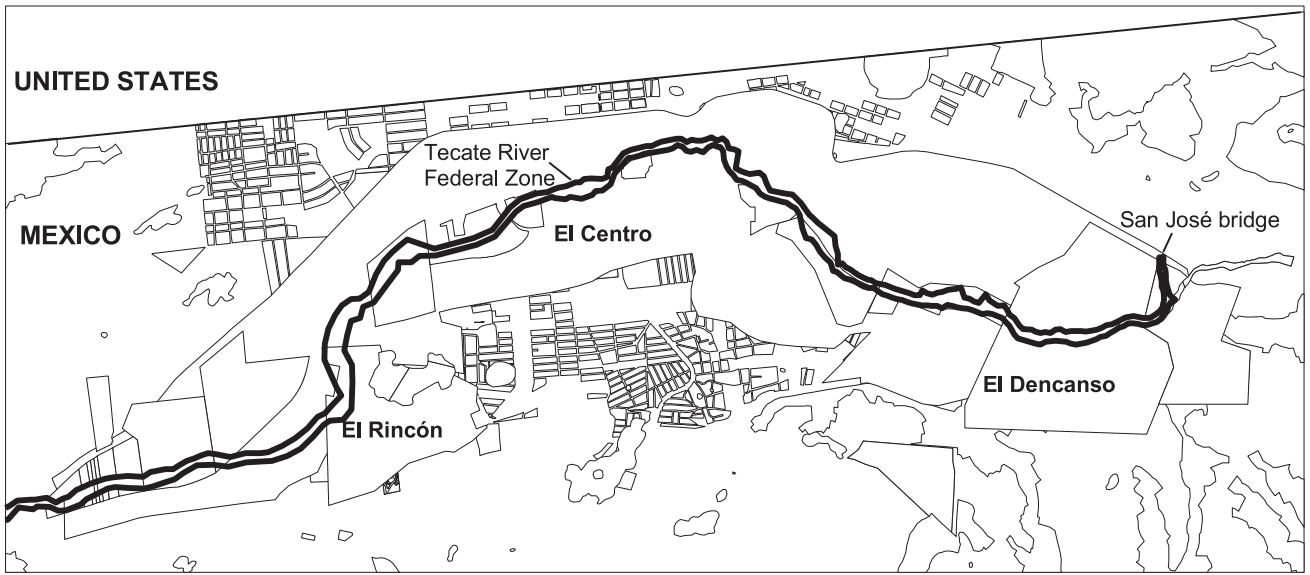
The Tecate Section

The southern middle section, the city of Tecate, is in the advanced stages of planning for an urban river park. The Kumiai Corridor would include the 10-km stretch of the Tecate River (Figure 3) that is proposed for the park and would eventually incorporate less-developed areas upstream and downstream, with the goal of creating a contiguous protected riparian zone. This is consistent with long-term goals of stakeholders, which include a series of connected river parks from Tijuana to Tecate, and even over the international border into the Laguna Mountains (United States) and into the Pacific Ocean at Imperial Beach (United States).

The idea of a Tecate river park has existed for several years and has prompted research at several universities.[5] The Centro de Estudios Urbanos developed the *programa parcial* (master plan)[6] for the Tecate Urban River Park in 2004. The proposed park extends from the San José bridge in east Tecate to the Rincón district in the west (see Figure 3). The master plan for the river park includes the concession of administrative rights to the riverbed from CNA to the municipality of Tecate (Ayuntamiento de Tecate 2004). Under the master plan, the 10-year flood zone would have a "no use" zoning while the 1,000-year flood zone would have mixed use zoning with recreational areas and permeable surfaces. The regular settlements (with services) and irregular settlements (squatters) that have been built in the CNA owned federal zone (approximately 50 m on either side of the river channel) would pose major obstacles to this proposed zoning.

The master plan also calls for the use of "ecotechnology," such as sediment traps to slow erosion, reduce water velocity, and build up the riverbanks. Permeable "geoscreens" on the banks would be used instead of concrete flood control structures because they allow groundwater recharge and can host riparian native vegetation (Espinoza 2004). Studies that have investigated the feasibility of pumping treated water from the Wastewater Treatment Plant to the San Jose bridge in the Descanso district show that the wastewater may be useful for irrigating the river park and partially recharging nearby wells (Ponce 2004).

Figure 3. Land Ownership in the Tecate Section of the Kumiai Corridor, 2004



Source: Author; data from Ayuntamiento de Tecate 2004

At a meeting at Rancho La Puerta in 2004 on the institutional concerns for the proposed Tecate Urban River Park, stakeholders and Pronatura representatives recommended a "road map" to creating the park, some of which had already been completed (indicated with *):

- Convene stakeholders, landowners, and government officials*
- Agree on the objectives for the river park*
- Organize a media campaign to involve the public
- Establish the functions of the different actors
- Create a realistic timeline and budget*
- Map out the legal issues
- Gain concession of the administrative title of the federal zone from CNA to the municipality of Tecate
- Transfer administrative control of the federal zone to a *paramunicipal* (see definition in Table 3)

The *paramunicipal* would develop plans, zoning laws, and issue development permits, among other administrative duties. Some river park stakeholders have developed a working draft of a Río Parque Tecate Paramunicipal, called the Comisión Municipal para la Administración del Río Tecate (Municipal Commission for the Administration of the Tecate River, in Spanish COMART).[7]
In addition to the above steps, two additional steps should be taken to ensure the long-term conservation of the river:

1. Create a *servidumbre pública*, or easement, between the CNA-owned federal zone and another parcel, with third-party NGO oversight. An ecological easement (see Table 1 for further explanation) would ensure the perpetual protection of the riverbed. It would be protected from potential political swings, and overseen by a third-party NGO with the legal mechanisms to uphold the easement contract. An easement contract between CNA and another landowner (such as Rancho La Puerta) could be created with terms of use that follow the stakeholder-defined objectives of the river park (e.g., prohibiting concrete channelization). The landowner would be the dominant party (receivers of environmental benefits), while CNA land would be subservient (provider of environmental benefits).

2. Create additional easements between CNA and adjacent landowners beyond the 50-meter wide CNA-owned river channel. To expand the park, a "public mixed easement" would be created between the CNA federal zone and each plot that shares a boundary with the federal zone. If the owners of the parcels are willing, the Tecate Urban River Park fideicomiso (see Table 3) could accept land donations or purchase land. In this case, the CNA-owned federal zone would be the dominant parcel, while the private parcels would be subservient. Separate contracts for each owner would lay out land use terms, which could include low-impact land use such as recreation, agriculture, or low-impact grazing. Again, a third-party NGO would monitor the terms of the easement contracts and defend the lands against violations.

In Mexico, there is currently no legal mechanism that combines all the duties and powers of a "river park conservancy" as in the United States (see San Diego River Conservancy Law 2002). What the Tecate Urban River Park stakeholders need to accomplish their goals is a combination of actions, or a "conservation cocktail" (Guitiérrez Lacayo 2004) (Table 3).

Definitions of terms in Table 3 are as follows: A *fideicomiso* operates under the *Ley de Operaciones de Crédito* (Law of Operations and Credit). A contract on rights of use is drawn and land and/or money is given to a *fiduciaria* (usually a bank). The fideicomitente is the person giving the land or money to the fiduciaria. *Fideicomisarios* are responsible for receiving the money and executing the objectives set forth in the internal rules of the *fideicomiso*. The *comité técnic*o (technical committee) is the decision-making organization that oversees the process (Pronatura 2002). A *paramunicipal* is a decentralized public entity that operates within the municipal government (or state or federal government) with a specific purpose (for example, the gas company Pemex is a *paraestatal* of the Mexican federal government). The Secretaría de Infraestructura y Desarrollos Urbano del Estado (State Secretary of Infrastructure and Urban Development, in Spanish SIDUE) would serve on the *paramunicipal* and would continue to oversee the protection of urban infrastructure, or any man-made structures such as bridges, within the federal

Table 3. Proposed Objectives and Actors in the Tecate Urban River Park

Objective	Organizations
Establish priorities for the Park	Stakeholders
Create recreational areas and open green space	*Paramunicipal*
Approve management and conservation plans	*Paramunicipal* uses the *plan de ordenamiento de territorial*
Design and execute a development plan for the river zone	*Paramunicipal*
Establish development restrictions with legal backing. Protect the recharge zones for the aquifer	*Paramunicipal* zones river park land and issues development permits
Charge for services provided by the river park	Costs are decided by the *paramunicipal* (who serves as the comité técnico of the *fideicomiso*) and carried out and administered by the *fideicomisarios*
Acquire land through exchange or purchase; receive lands or other goods in the form of donations	*Fideicomiso*
Rehabilitate flora and fauna through restoration projects	*Paramunicipal* approves a project and hires workers through the *fideicomiso*
Maintain the streams and drainages in a natural state, avoid concrete channelization, and protect the slopes. Provide protection against erosion and flooding using natural materials that integrate into the environment	The *paramunicipal* advises on "ecotechnology" alternatives to concrete structures; CNA and SIDUE maintain oversight and both agencies are part of the *paramunicipal* advisory board
Contract personnel to monitor the park	*Paramunicipal* and *fideicomiso*

Sources: Author and Gutiérrez Lacayo 2004

zone. CNA and the Comisión Estatal del Agua (State Water Commission, in Spanish CEA) would continue to oversee water rights, concessions, and discharge into national waters. CNA would continue to own the federal zone land under the river, although the administrative title would be conceded to the Municipality of Tecate.

Phase Two of the Kumiai Corridor Plan: "Welding" the Four Sections

Phase two involves merging the four sections—Campo, County of San Diego, Tecate, and Cuchumá. In phase one, the challenge was to merge management objectives among agencies, private parties, NGOs, and other stakeholders. Phase two is admittedly more difficult because it involves land acquisition, as well as protection and management, across international borders.[8]

Because of the success of the Servidumbre Cuchumá, that ecological easement should be expanded through Rancho La Puerta and other private lands so it reaches and joins the Tecate Urban River Park. In those easements, low-impact development or grazing densities could be negotiated. On the east side of the river park, from the San José Bridge to Joe Bill Canyon, similar ecological easements between the CNA federal zone and private landowners could be created. At the border, CNA lands could be eased with BLM lands in the United States the way Rancho Cuchumá was eased with BLM lands for the Servidumbre Cuchumá.

One drawback to developing multiple easements with a "conservation cocktail," is that if each parcel uses different easement terms, the overall conservation objectives for a contiguous, integrated Kumiai Corridor may not be met. To help increase the contiguity of conservation objectives, a trinational NGO could be created to bring upstream and downstream landowners and stakeholders to the table. The NGO could create a memorandum of understanding (MOU) or similar agreement to define the overall conservation objectives for the Kumiai Corridor and formalize the partnerships among the actors. The NGO could also provide the third-party oversight for easement contracts in Mexico.

Long-Term Administration and Funding for the Corridor

On the Campo Reservation, the Campo Environmental Protection Agency (Campo EPA) and the Tribal Council administer natural resources and the Tribal Council has the power to enforce the decisions made for the protected area. Financial support for conservation projects that improve the land may be available through the U.S. Department of the Interior, the U.S. Department of Agriculture, or the Tribal Lands Initiative. Ecotourism, workshops, performances, and sales of cultural products (such as baskets made from riparian reeds) could provide income for residents.

San Diego County conservation easements would be legally binding and the land trust that holds the land would be responsible for monitoring the easement terms. Maintenance for trails and picnic areas, for example, could come from user fees, Campo Creek River Conservancy memberships and donations, San Diego County funds, or BLM, for example.

For the Tecate section, with approval from the *paramunicipal*, the *fideicomiso* could hire a salaried employee to enforce the rules of the Tecate Urban River Park. Educational programs would inform citizens and industries of park rules. If there were insufficient funds, then community residents would be the caretakers in the park. Construction of recreational trails would allow easy passage for the resident caretakers; this form of "community watch" can be successful. Trails and interpretive signs could serve as demarcations for the river park boundaries; other protected areas stress demarcation as an important and necessary enforcement tool (Breymeyer and Noble 1996; Gutiérrez Lacayo, et al. 2002). A telephone hotline would allow residents to report violations anonymously. Fines collected from violators would go toward cleanup of the illegal activity or toward mitigation projects in other parts of the river park. With the proper management, the Tecate Urban River Park *fideicomiso* could act as a land mitigation bank, receiving fines from violators of municipal and river park laws and purchasing additional land for the Kumiai Corridor.

After formal protection is established, a United Nations Educational, Scientific, and Cultural Organization (UNESCO) Man and the Biosphere Reserve or World Heritage site could be developed to draw international attention, protection, or funds for the Kumiai Corridor. Biosphere reserves are areas where the coastal or terrestrial ecosystems serve conservation, human development, and research functions (UNESCO 2004a). UNESCO's "Cultural Heritage" status can provide a monument, a group of buildings, or the site of historical, aesthetic, archaeological, scientific, ethnological, or anthropological value. "Natural Heritage" status emphasizes physical, biological, and geological features (UNESCO 2004b). The Kumiai Corridor does contain threatened species of universal value and places of universal cultural value (Pronatura 2003). Both the United States and Mexico would have to submit a separate application for inscription on the World Heritage List, along with a detailed management plan. UNESCO economic assistance is available for the preparation of management plans and for the maintenance of sites (UNESCO 2004b).

Entrepreneurial opportunities for all three nations include ecotourism (cabins, hiking, horses, bird watching, fishing), produce and artisan markets, and wilderness pass sales. Trinational cooperation could lead to U.S. funding (perhaps through private foundations, such as the International Community Foundation) for the construction of structures, such as a Kumiai community center, a *transfronterizo* cultural center, museums, a research laboratory, a water-testing laboratory, river park offices, trails, or camping/hiking rest stops.

Once implemented, it is important to measure the success of the Kumiai Corridor plan quantitatively and qualitatively (TNC 2000). Suggestions include calculating:

- Number of hectares protected
- Change in aquifer levels
- Change in well production
- Change in sediment loading
- Change in leaf area index (foliage)
- Number of jobs created
- Revenue attracted
- Revenue of the "land mitigation bank"

- Number of donors
- Number of stakeholders involved in the NGO

Binational environmental indicators are needed to quantify other environmental impacts such as changes in air quality, water quality, biological integrity, and so forth.

Conclusions

The proposed trinational corridor would bring many services to its residents and neighbors—clean water and air, wildlife, cultural heritage, green open space, recreation, and economic opportunities. This chapter outlines the challenge of identifying the optimal tools for conservation in each political and administrative unit. The blueprint offered here presents a few options for land conservation, but promotes perpetual ecological easements as the long-term regional planning tool with a vision for the future.

Theoretically, phase one follows the approach of TNC, seeking small, simple, and "do-able" strategies within national boundaries (TNC 2000). Phase two—welding protected areas across international boundaries—is obviously more complex. However, in Mexico, for example, mixing approaches and organizations (such as the *paramunicipal*, *fideicomiso*, easements, and a trinational NGO) offers a robust solution that may withstand political and economic swings. In other words, long-lasting political support for Kumiai Corridor protection could be greater with numerous vested entities and with a variety of tools, or a "conservation cocktail." An important benefit of cooperatively managing human, economic, and natural resources among three nations is the long-term cooperative bonds that result. This blueprint may guide other areas of the U.S.-Mexican border, as it provides options and strategies for bridging political and administrative boundaries.

Endnotes

[1] This chapter contains valuable contributions from: Miguel Ángel Vargas Téllez, Fernando Ochoa, and Martín Guitiérrez Lacayo, Pronatura, A.C.; Mike Connolly and Phil Green, Campo EPA;

Patricia Ramírez, CESPTE; Ana Espinoza, CEUSS; Bertha Hernández, IRSC-SDSU; Michael Wilken-Robertson, CUNA; Mario Salzman, Fundación La Puerta, A.C.; and Anne McAnaney, International Community Foundation.

[2] The proposed park involves ecological rehabilitation and recreational enhancement of the urban Tecate River riparian zone (see "The Tecate Section" for details).

[3] A foundation with an environmental/cultural focus.

[4] Funded by the State Water Resources Control Board, County of San Diego, Institute for Regional Studies of the Californias, and the Geography Department at San Diego State University.

[5] For example, the Institute for Regional Studies of the Californias at SDSU (see Ganster, et al. 2002; Michel and Graizbord 2002), California State Polytechnic University, Pomona, Studio 606, Department of Landscape Architecture, and Arizona State University's School of Planning and Landscape Architecture.

[6] With funding from Fundación la Puerta.

[7] From a presentation by Mario Salzman in Tecate in April 2004.

[8] An example of how difficult this welding process is can be seen from efforts to simply merge GIS data across the California-Baja California border (Wright and Griffin 1993).

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Appendix A

Back Country Land Trust
California Environmental Protection Agency (Cal EPA)
Campo Environmental Protection Agency (Campo EPA)
Colegio de la Frontera Norte (College of the Northern Border) (COLEF)
Comisión Estatal de Agua (State Water Commission) (CEA)
Comisión Estatal de Servicios Públicos (State Commission of Public Services of Tecate) (CESPTE)
Comisión Nacional de Agua (National Water Commission) (CNA)
Comisión Nacional de Areas Naturales Protegidas (National Commission for Protected Areas) (CONAP)
County of San Diego
Dirección General de Ecología (State Secretary of Ecology) (DGE)
Fundación la Puerta, A.C. (La Puerta Foundation, A.C.)
Instituto de Culturas Nativas (Native Cultures Institute) (CUNA)
International Boundary and Water Commission-Comisión Internacional de Límites y Aguas (IBWC-CILA)
International Community Foundation (ICF)
Kumeyaay Indian communities: Campo Band of Kumayaay Indians, San José de la Zorra, San José Tecate, Juntas de Neji, and San Antonio Nécua
Mountain Empire Resources Information Taskforce (MERIT)
Municipalidad de Tecate (Municipality of Tecate)
Pronatura, A.C.
Proyecto Bioregional de Educación Ambiental (Bio-regional Environmental Education Project) (PROBEA)
San Diego State University (SDSU)
Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food) (SAGARPA)
Secretaría de Infrastructura y Desarollo Urbano del Estado (State Secretary of Infrastructure and Urban Development) (SIDUE)

Secretaría del Medio Ambiente y Recursos Naturales (Secretary of the Environment and Natural Resources) (SEMARNAT)
Terra Peninsular, A.C.
The Nature Conservancy (TNC)
U.S. Environmental Protection Agency (EPA)
Universidad Autónoma de Baja California (Autonomous University of Baja California) (UABC)
University of California at San Diego (UCSD)