2026/2029 STRATEGIC PLAN: THE ELSA RIVER AND THE CITY OF COLLE

Valuing natural and historical-cultural heritage, and developing green infrastructure

Municipality of Colle di Val d'Elsa

Intervention Line:

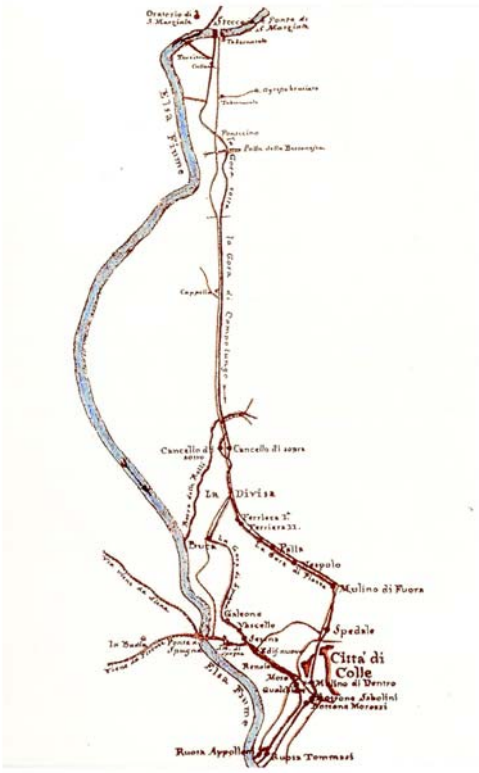
Enhancement of natural and historical-cultural heritage and green infrastructure for local Public Administrations

Competent Authority: Municipality of Colle di Val d'Elsa (Siena)

Priority Interventions: Ecological transition, management of anthropic flows, and ecomuseum redevelopment of the water system

1 The River and the City

The Elsa River and the Via Francigena represent the two primary strategic and identity-defining axes around which the territory of the Municipality of Colle di Val d'Elsa has been intricately structured—from a settlement, economic, and social perspective. Since the origin of the community, the water resource has constituted the matrix of urban and productive development. This historical symbiosis found its greatest engineering and monumental expression in the "Gore" system: a dense network of artificial canals whose genesis dates back to just before the year 1000. The original promoter of the first ditch excavation was the Abbot of the Badia di Spugna, in agreement with the Aldobrandeschi counts, with the objective of overcoming the vulnerability of the facilities along the riverbed—which were cyclically swept away by the river's winter floods—thus utilizing the perennial waters of the Elsa in total safety.



Historically, the waters are diverted from the main course of the Elsa through the "steccaia" (weir) infrastructure of San Marziale. From this hydraulic junction, equipped with flow-regulating sluice gates, the water channels by gravity, crossing the entire valley floor and the urban fabric at the foot of the Città Alta (Upper Town), before being returned to the river near Via della Ferriera. The historical route, which has remained almost unchanged over the centuries, is divided into four fundamental segments:

- **Gora Maestra or Gora di Campolungo**: The initial stretch that extends from the San Marziale weir to the "divisa" (a stone watershed/splitter) located at the height of Via 25 Aprile.

- **Gora di Spugna or Gora Aldobrandina**: The right branch that diverges from the "divisa" to serve the ancient settlement and the curtis (manorial court) of Spugna.
- **Gora di Piazza**: The left branch that entered beneath the city walls, skirting the old church of San Iacopo, the current Via Mazzini, and the monumental Piazza Arnolfo di Cambio.
- **Terminal stretch of the "Botroni" and "Le Ruote"**: Where the channels flow parallel to each other in the open air before the final drop leading back into the Elsa.

Over the centuries, this hydraulic system has provided the constant kinetic energy required to power a dense network of industrial workshops ("edifizi andanti ad acqua," or water-driven mills): mills, fulling mills for textiles, tanneries, copper smithies, and, most notably, the historic paper mills. The paper industry was the true engine of subsistence and economic resilience for the Colligiana population, reaching a peak of 31 active paper mills during periods when the wool trade was in sharp decline. Therefore, the river and its *gore* do not merely constitute a fundamental ecological corridor; they represent the backbone of the "factory-city," integrating industrial memory with the hiking appeal of the Via Francigena as a driver for slow, conscious tourism.

2 The River Park and Overtourism Challenges

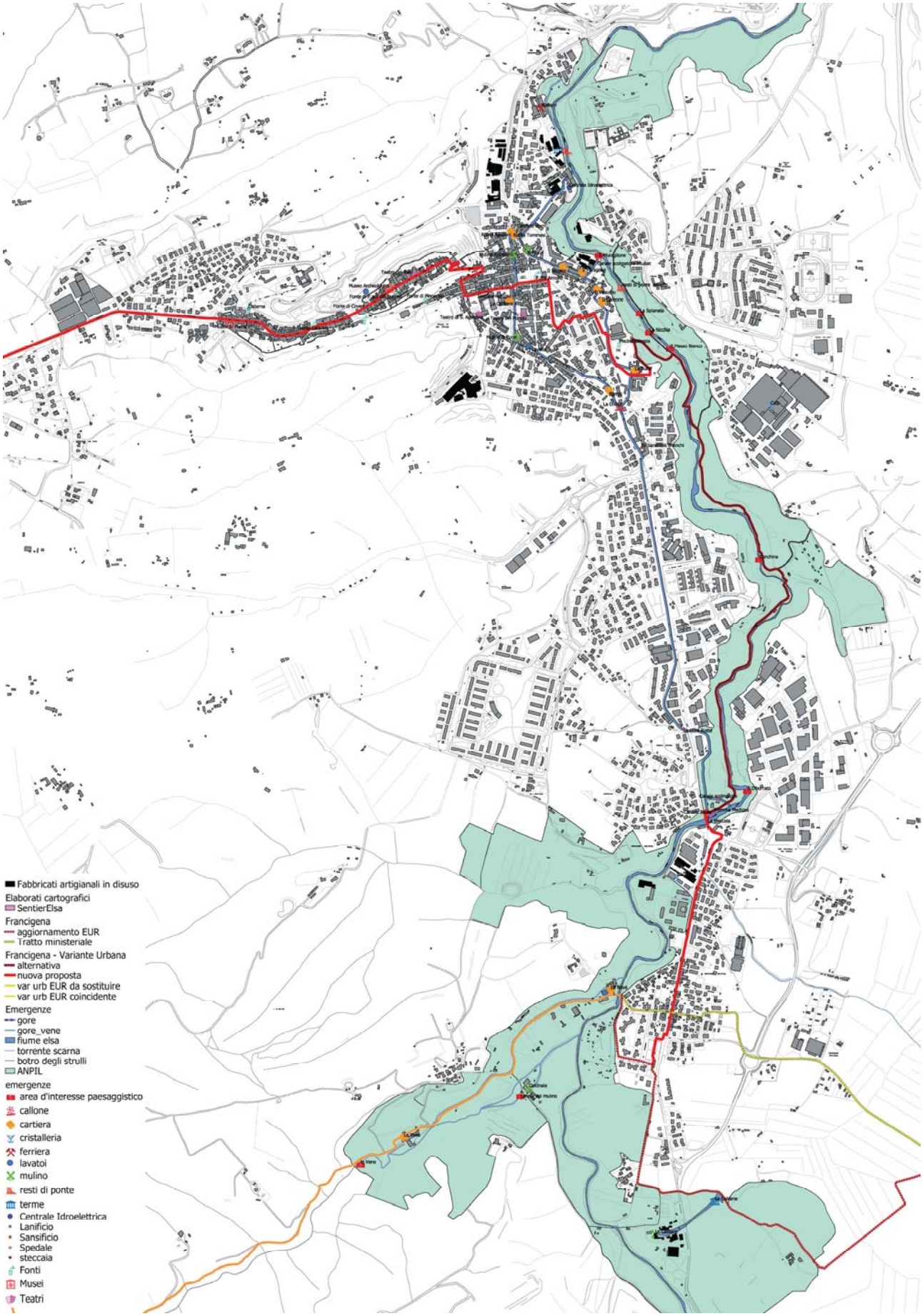
The natural heritage associated with the river course is protected at the local level through the **A.N.P.I.L.** (*Area Naturale Protetta di Interesse Locale* – Protected Natural Area of Local Interest) "Parco Fluviale dell'Alta Valdelsa," formally established by the Tuscany Region through Regional Council Resolution no. 256 of July 16, 1997. Currently, the governance of the protected area is under the direct management of the Municipality of Colle di Val d'Elsa, supported by a *pro bono* Technical-Scientific Committee with advisory, policy-steering, and mandatory consultative functions regarding extraordinary interventions.

The core of the Park's tourism and educational use is the hiking trail known as "**SentierElsa**." The path stretches for approximately 4 kilometers along the Elsa riverbed, starting from the southern boundary of San Marziale and reaching the Spugna bridge, right in the heart of the urban center. Accessibility and viability of the trail have historically been ensured through small-scale bioengineering interventions and infrastructure, such as the crossing in the San Giorgio area, the Apollo and Equiseti fords, as well as wooden steps, protective railings, and small footbridges to overcome obstacles.

In recent years, the growing media and landscape popularity of the SentierElsa has triggered **overtourism** dynamics (tourist overcrowding), concentrated primarily during the spring and summer months. This uncontrolled and unplanned anthropic pressure generates multi-dimensional critical issues:

- **Degradation of green infrastructure:** The constant strain caused by high visitor volumes accelerates the wear and damage of railings, footbridges, and steps, necessitating continuous and costly routine maintenance interventions.

- **Impact on ecosystems:** Off-trail trampling, littering, and noise pollution pose a direct threat to riparian flora and the fragile aquatic micro-habitats identified by scientific authorities. For instance, a decline in sightings of the black-crowned night heron (*nitticora*)—a heron species present in Italy only in limited areas and therefore requiring protection and preservation—is already observable.
- **Economic disconnection and the "hit-and-run" effect:** There is a significant asymmetry between the high influx of hikers along the river and their low penetration rate into the historic center and the city's museum circuit. River tourism remains confined to the riverbed, failing to generate significant or stable economic benefits for local businesses and cultural institutions.


Fabbricati artigianali in disuso
Elaborati cartografici
SentierElsa
Francigena
aggiornamento EUR
Tratto ministeriale
Francigena - Variante Urbana
alternativa
nuova proposta
var urb EUR da sostituire
var urb EUR coincidente
Emergenze
gore
gore_vene
fiume elsa
torrente scarna
botro degli strulli
ANPIL
emergenze
area d'interesse paesaggistico
callone
cartiera
cristalleria
ferriera
lavatoi
mulino
resti di ponte
terme
Centrale Idroelettrica
Lanificio
Sansificio
Spedale
steccaia
Fonti
Musei
Teatri

3 Key Characteristics of the Park Based on UNISI Studies

The field research conducted by the University of Siena (Department of Life Sciences and Department of Physical, Earth and Environmental Sciences), under the coordination of Professor Claudia Angiolini and Dr. Tiberio Fiaschi, has revealed a landscape of extraordinary biological value of Community interest. Vegetation studies have confirmed the presence within the Park area of 11 habitats of conservation interest protected by the Habitats Directive 92/43/EEC, 3 of which are classified as priority habitats (*).

The main ecological characteristics mapped by the University of Siena are listed below:

- **Inland Aquatic Habitats (the most widespread)**: Within the canal and the main course of the river, two habitats are present: habitat 3150 (natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation) and habitat 3260 (water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation). These are characterized by submerged or floating plant communities that indicate a perennial water supply.
- **Riparian and Muddy Bank Habitats**: Along the banks subject to seasonal fluctuations, we find habitat 3270 (rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation), habitat 3280 (constantly flowing Mediterranean rivers with Paspalo-Agrostidion vegetation and Salix and Populus alba galleries), and habitat 3290 (intermittently flowing Mediterranean rivers). Associated with these are the tall-herb humid grasslands of habitat 6420 (Molinio-Holoschoenion) and the fragmentary formations of hydrophilic tall-herb fringes of habitat 6430, populated by hygrophilous species such as Epilobium hirsutum and Lythrum salicaria.
- **Riparian Forest Habitats**: The hygrophilous forest consists of two fragmentary yet crucial plant communities (cenoses): habitat 92A0 (Salix alba and Populus alba galleries) and habitat 91E0* (alluvial forests with Alnus glutinosa and Fraxinus excelsior). The latter is classified as a priority habitat (*) consisting of riparian alder forests, which are highly vulnerable to indiscriminate logging and the invasion of opportunistic alien species.
- **Priority Habitat of Petrifying Springs (7220)**:* This represents the most significant naturalistic feature of scientific value in the entire Park. On cliffs, waterfalls, and dripping rock faces subject to calcium carbonate deposition, calcareous tufa formations develop, colonized by stable mats of specialized bryophytes and hygrophilous mosses (including Cratoneuron filicinum, Apopellia endiviifolia, and Didymodon tophaceus).

- **Threat Factors Identified by UNISI**: Studies highlight that the conservation of these biological habitats—particularly site-specific and priority habitats such as 7220*—is strictly dependent on maintaining the chemical-physical water quality and the hydrogeological balance of the Elsa River. Any anthropic alteration of the water flow, excessive water abstraction, or physical modification of the riverbed poses an immediate risk to the ecological balance and the survival of the protected flora and fauna.

4 The Future of the Park (Macro-Project Actions)

The strategic planning for the future of the River Park aims to transform the protected area into an advanced model of "urban Green Infrastructure," tapping into POR FESR (ERDF Regional Operational Programme) funding streams and European environmental programs. The objective is to reconcile habitat conservation with the economic and tourism development of the city through three closely interconnected Macro-Actions:

Action 1: User Services and Tourist Flow Management

- **Eco-compatible infrastructure for parking areas**: Design and installation of prefabricated, self-cleaning, low-impact sanitary modules within parking and access areas for the SentierElsa.
- **Maintenance and upgrading of parking areas**: Surface renovation of commuter parking lots using permeable, eco-friendly paving to mitigate runoff and reduce the visual impact of parked vehicles.
- **Replacement and digitalization of parking meters**: Installation of smart parking meters equipped with electronic payment systems, sensors to monitor stall availability, and dynamic pricing models, also serving as a deterrent to regulate tourist influx during peak seasons.
- **Upgrading and implementation of signage**: Installation of new bilingual directional and information signage both at parking hubs and along the hiking trail. Panels will integrate ecological behavioral guidelines and QR codes for educational resources.
- **Tourist digitalization via "VisitWeb"**: Development and enhancement of the official institutional tourist portal with sections dedicated entirely to the Elsa ecosystem. The system will enable real-time monitoring of the trail's carrying capacity and promote staggered guided tours.

Action 2: Park Maintenance and Permanent Scientific Monitoring

- **Routine and extraordinary maintenance of the SentierElsa**: Activation of a cyclical preventive maintenance plan based on bioengineering techniques. Interventions will include controlled mowing (to prevent the proliferation of alien species), restoration of damaged protective railings, reinforcement of steps and wooden footbridges, and safety upgrades for the San Giorgio, Apollo, and Equiseti river fords.
- **Continuous environmental and biological monitoring**: Establishment of a permanent agreement with the University of Siena to ensure continuity for the floristic, vegetational, and faunal surveys already conducted. Activities will focus on monitoring the health status of the 11 protected habitats, with specific emphasis on the 7220* petrifying springs and the 91E0* alder forests, to identify early indicators of water stress or anthropic degradation.

Action 3: Governance, Participation, and Historical-Cultural Connection

- **Reconstitution of the Management Body and transition to Natura 2000**: Structural reform of the protected area's management body, moving beyond the current municipal consultative model. The goal is to initiate the institutional process to upgrade the A.N.P.I.L. into a Site of Community Importance (SCI/SAC) under the European Natura 2000 Network, thereby elevating protection standards and the capacity to attract EU funding.

- **Active participation processes**: Activation of participatory pathways and co-design roundtables involving citizens, environmental guides, local associations, and economic operators in drafting the Park's usage regulations.
- **Cultural incentives and flow redistribution ("Wanderer's Passport")**: Development of territorial marketing strategies to connect the Park's natural use with the city's historical heritage. The "Wanderer's Passport" will be introduced—a loyalty tool (print and digital) that rewards visitors with stamps for visiting key monuments, particularly the city's museum circuit (Crystal Museum, Archaeological Museum, etc.). Upon completing the stamps, visitors receive a gift or a dedicated discount, incentivizing the conversion of hikers into cultural tourists.
- **Connection with the Water System and the Gore**: Physical and functional integration of the SentierElsa with the urban Gore itinerary. This action involves the recovery and valorization of historical paths along the Gora Maestra di Campolungo, the Gora di Spugna, and the Gora di Piazza (beneath Via Mazzini and Piazza Arnolfo), networking the ancient manufacturing structures, historic paper mills, and hydraulic artifacts (such as the San Marziale weir). This integrated system will form an "Ecomuseum of Water and Paper," bridging natural biodiversity with industrial archaeology. In this regard, a proposal will be submitted to the Superintendency for Archaeology, Fine Arts, and Landscape to establish an "intangible heritage designation" for the Gore system.
- **New training for Environmental Inspectors**: Provision of further qualification programs for volunteers, emphasizing synergy with the Municipal Police and the monitoring of littering along the SentierElsa.
- **Community Educational Pact & Outdoor Education**: A collaboration with local schools is planned, featuring an effective balance between theoretical classroom workshops (waste reduction, school eco-centers) and field lessons to study the habitats of Community interest mapped by the University of Siena (such as the 7220* priority habitat), alongside the development of specific projects proposed by students.

ALLEGATI:

- Study UNISI
- floor plans
- river contract