The Palingenesis Of Brownfields Through Nature.
A comparative case analysis

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The research proposes a critical reflection on the self-regenerative potential of brownfields thanks to spontaneous rewilding, envisioning them as laboratories of experimentation capable of triggering alternative and adaptive forms of urban regeneration. Guided by the concepts of urban palingenesis, spontaneous ecologies and common goods, the contribution investigates how episodes of prolonged abandonment can cause unexpected processes of ecological rebirth and civic mobilization. A comparative

Introduction

In an era marked by increasingly evident and interconnected environmental crises, the regeneration of degraded ecosystems is no longer merely a desirable option but an urgent necessity (EU, 2024)[1]. The intensification of climate change, the progressive loss of biodiversity, and the alteration of ecological balances are placing Territorial and Urban Planning before unprecedented challenges. In this scenario, the quest for sustainable regeneration strategies, combining environmental resilience, social inclusion, and territorial enhancement, becomes a priority. To strengthen resilience, planning must engage with ecosystems' inherent ability to self-transform and adapt. It also requires acknowledging the ecological memory embedded in landscapes—their capacity to retain, rework, and rearticulate past interactions into new ecological trajectories, often beyond human foresight.

The recent Nature Restoration Law (2024), approved at the European level, represents a strong institutional signal in this direction[2]. It establishes a binding obligation for Member States to imple-

analysis of three emblematic cases - Canvey Wick (UK), La Goccia (Italy) and Bullicante Lake (Italy) - shows how local communities, associations and informal actors can redefine landscapes, functions and values of brownfields. The comparison highlights a constant tension between top-down models of reclamation and bottom-up approaches of care and re-appropriation, suggesting a paradigmatic shift: moving from technical and standardized interventions to open, relational, multi-species and situated processes.

ment concrete measures for the restoration of ecosystems, placing ecological regeneration at the center of environmental and territorial policies for the first time in history. This measure is not just about protecting existing nature but it proposes activating real processes of ecological reconstruction, even in the most apparently compromised and anthropized areas, profoundly rethinking urban and territorial practices as well as the concepts of degradation, abandonment, and value.

Within this framework, brownfields – former industrial, productive, military, or infrastructural areas in a state of abandonment – emerge as both critical nodes and potential resources. According to data provided by the European Environment Agency (EEA) and the European Observation Network for Territorial Development and Cohesion (ESPON), tens of thousands of disused sites exist across Europe, mostly concentrated in urban, peri-urban areas or post-industrial regions. These spaces are often viewed as "urban voids" or "scars on the landscape" (BenDor, Metcalf, Paich, 2011), difficult to reintegrate into economic and settlement cycles due to pollution, functional fragmentation, or regulatory misalignment.

The contribution intends to offer a critical and operational reflection on a hypothesis that overturns the dominant narrative: what if abandonment were not only an urban and economic pathology, but also an ecological and social resource?

Starting from the concept of "palingenesis", understood as a profound and transformative regeneration of the territory, an alternative interpretation of brownfields is proposed: no longer seen as spaces to be remediated and converted according to predefined models, but as adaptive laboratories capable of hosting non-conventional, often unplanned, yet deeply sustainable forms of regeneration.

The paper focuses on those brownfields in which local communities have recognized–and actively defended–the ecological and symbolic value of spontaneous habitats that emerged during periods of abandonment. These experiences have attempted to move beyond the functional and market logic behind urban redevelopment and to overcome the normative and

procedural boundaries imposed by conventional regeneration processes—usually solely led by institutions—opening up to more situated, inclusive, and transformative visions of the relationship between space, nature, and citizenship. Within these practices lies a radical reversal of the urban paradigm: planning is no longer seen as a top-down imposition, but as the operation of active listening to what territory has already become and what is becoming.

The purpose of this article is therefore to shift the focus away from traditional brownfield recovery—based on technical, regulatory, and economic interventions—toward a broader understanding of regeneration, capable of embracing the complexity of living systems and the potential inherent in abandonment. This also means questioning the political, social, and cultural implications of such a perspective, evaluating how to recognize, valorize, and—in some cases—not intervene at all.

Two fundamental research questions emerge:

- Can the product of abandonment represent ecological and social value? How can brownfields be reinterpreted as fertile spaces, capable of generating new balances between humans and nature?
- How can spontaneous rewilding be recognized and integrated into brownfield regeneration processes? What tools, approaches, or visions can allow a transition from a logic of reclamation to one of accompaniment of natural processes?

Answering these questions corresponds to expanding the field of brownfields regeneration by including Nature-based Solutions (NbS), community management forms, and non-anthropocentric approaches to spatial transformation: recognizing, above all, that in many cases, the rebirth of brownfields depends on its ability to be left alone and to regenerate according to its ecological rhythms and logics.

The following work is part of the Italian National Recovery and Resilience Plan (NRRP) research project RETURN (multi-Risk science for resilient communities under a changing climate[3], strengthening research chains on environmental, natural and anthropic risks at a national level in a multi-risk dimension, and is based on a comparative analysis of case studies selected from different peri-urban and urban contexts across Europe. The case study analysis also contributes to the RETURN network by supporting the transfer of knowledge and practices toward concrete application, to informing the regeneration of targeted sites, like the Bagnoli-Coroglio SIN (Site of National Interest) (Naples, Italy), nationally designated contaminated site identified by law for reclamation (L. 426/1998 - Italian national law on contaminated sites).

Starting from these successful experiences in terms of protection of brownfield spontaneous naturalization, the aim is to identify effective and transferable practices and replicable models to activate a new form of "territo-

rial palingenesis", founded on the synergy between communities, abandonment, spontaneity, and regeneration. It is only by embracing the complexity and unpredictability of these processes that a new territorial imaginary can be built—one that finds value even in the unfinished, the temporary, and the wild.

Six sections define the structure of the contribution: (1) Introduction; (2) State of the Art and Theoretical Framework: Brownfields Spontaneous Rewilding in Europe, a field still to investigate; (3) Materials and Methods: from Abandonment to Palingenesis; (4) Spontaneous Ecologies in Brownfields: a comparative analysis of practices of reappropriation and alternative development visions; (5) Discussion; (6) Conclusions and prospectives.

State of the Art and Theoretical Framework: Brownfields Spontaneous Rewilding in Europe, a field still to investigate

The paragraph provides a reflection on 'operative' etymologies, starting from the notion of brownfield, framing *palingenesis* and finally understanding the concept of spontaneous rewilding, to construct the theoretical framework of reference and simultaneously laying the groundwork for the methodological body and future application developments. Furthermore, the state-of-the-art analyses of pioneering studies in the spontaneous rewilding of brownfields identifies a research gap.

Acknowledging that there is no common official definition of brownfields in Europe (Morar et al. 2021; Rey, Laprise, Lufkin, 2022), this study embraces the EEA definition of brownfield as 'land within the urban area on which development has previously taken place' (EEA Glossary), in compliance with the UK tradition in framing these sites as previously developed land (PDL) (Oliver et al. 2005). The EEA description does not address the aspect of contamination, which brownfields have usually been identified with – examples of direct connections between brownfields and real or potential contamination are Canadian and United States official definitions (Canadian Brownfield Network; U.S. Environmental Protection Agency, 2021) or, in the European panorama, Bulgarian, Danish, Polish and Italian legislation (University of Mining and Geology, Sofia; Danish Environmental Protection Agency; Polish Ministry of Environment; L. 426/1998 - Italian National Law on contaminated sites; Italian Ministry of Environment, 1999). This perspective underlines the role of land-use history over soil contamination as the primary defining criterion, shifting attention toward spatial legacies and the structural imprint of past development, e.g. heavily anthropogenic uses. EU Member States adopt different frameworks for brownfield identification–some strictly linked to signs of contamination. The absence of a univocal definition is one of the factors hindering the construction of a European common dataset on brownfields, which

is still lacking (Thornton et al. 2007; Bez, Ash, Boyce, 2024), notwithstanding the prominence of these sites in European policies regarding sustainable urban development. The fragmentation of data is linked to both EU and national states deficiencies: on one side no EU soil legislation exists, on the other each State should monitor contamination on land and manage historical contamination but not all of them have developed georeferenced nationwide brownfield databanks – only 12 states have detailed registers on potentially contaminated sites (Paya Perez, Rodriguez Eugenio, 2018; EEA, 2022). So, detailed quantification of the phenomena cannot be reconstructed (APAT, 2006). This is why an inclusive approach is essential in order to collect official data on brownfields across Europe. The EEA definition thus allows for a wider and heterogeneous territorial scouting of brownfield sites, including abandoned infrastructures and manufactures not strictly affected by pollution issues. Moreover, such a broad-spectrum perspective allows the recognition of neglected spaces that, despite lacking immediate economic value or formal recognition, often host dynamic ecological processes. These landscapes—frequently omitted from planning agendas—have revealed, in various contexts, a latent regenerative capacity and an unexpected biodiversity richness, particularly through spontaneous rewilding phenomena. Acknowledging these emergent ecologies is a crucial step toward reframing brownfields as potential laboratories for socio-ecological innovation.

Action on brownfields today is fully recognized across Europe as a priority among strategies adopted in response to objectives such as limiting soil sealing and urban sprawl, contrasting ecosystemic degradation, particularly with respect to soil ecosystems, and implementing biodiversity (CLARINET, 2002; EC, 2012; EC, 2021). PDLs are considered strategic resources for their proximity to urban areas or their location within urban fabrics, which often means direct access to main infrastructures and services. These factors contribute to the global identification of brownfield redevelopment as a vehicle towards long-term urban sustainability (Wang et al. 2021; Sessa, Russo, Sica, 2022); still, international collaborations are quite limited (Jaceck et al. 2022) and most of these sites remain today neither remediated nor transformed.

The reasons behind process stagnation are connected to both technical, economic, environmental and social dimensions: brownfields are predominantly redeveloped through environmental remediation projects using traditional remediation techniques (*soil washing, thermal desorption, etc.*), which are often highly costly, slow and invasive processes. Moreover, brownfields are stigmatized as unsafe spaces for human permanence, raising the issue of safeguarding public health because of contamination. Focusing on the

first theme, conducting large-scale remediation techniques with traditional technologies heavily dependent on chemical reagents, heat and electricity, results in huge social, economic and environmental costs (USEPA, 2008; Hou et al. 2014; O'Connor et al. 2019), which impact both territories and communities. Besides, institutions are not always prepared to manage such complex projects, missing funds, competence, or vision for brownfield redevelopment. So, brownfields still constitute an extensive percentage of underused urban areas, in most cases abandoned and marginalized for years since the end of their productive lifecycle. The apparent immobilization of these areas corresponds to a stasis in the contribution to the surrounding economy and human community, leaving nature "room for *manoeuvre*". Non-human agents govern the decommissioning lifecycle (suspended phase – see Fig.1), generating autonomous 'ecological regeneration' (Coppin & Bradshaw, 1982). Still, this spontaneous rewilding is usually not investigated and is often destroyed in canonical remediation to remove contaminants, following the 'tabula rasa' model which aims to restore the original 'clean' condition. This approach implies a myopic view of urban regeneration, which prefers profit to protecting existing values and heritage and is not interested in experimentation: nature has an extraordinary ability to regenerate spontaneously (Bradshaw, 2000) and spontaneous reclamation, which relies on natural solutions, allows ecosystems to recover biodiversity without direct human intervention, fostering innovative solutions. Spontaneous rewilding is not intended to replace necessary remediation; where human-health or environmental risks are present, remediation remains essential. Still, when conditions allow, spontaneous, low-energy ecological processes can be integrated as evidence-based alternative or complementary pathways, thereby avoiding indiscriminate 'tabula rasa' approaches.

In this paper, ecological regeneration is framed as palingenesis–from Greek gr. παλιγγενεσία, comp. of πάλιν «again» and γένεσις «generation», "remade according to genesis"–, known in ancient philosophy as the innovation or transformation of the individual or the cosmos, a process of progressive purification and liberation of the soul according to the Orphism and the Pythagorean; finally, the lemma in question means regeneration, renaissance, renovation, renewal, purification and rebirth in both its figurative and literature declinations (Treccani, 2022). Palingenesis is intended as renaissance through nature, a gentle accompaniment that does not aspire to restore a 'preconstituted pure state', on the contrary, it proposes an ecological and adaptive alternative to the dominant narrative, based on spontaneous rewilding. Spontaneous rewilding is also known as auto-rewilding (Tsing, 2017) or passive rewilding (Pereira & Navarro, 2015), un-

like active rewilding, it is not related to human activity or the aspiration to repristinate a no longer living ecosystem: 're-wilders' – animals, plants, and other organisms – proceed on their own in reconquering spaces, managing ecological succession and generating ‹‹"novel ecosystems", feral spaces, wastelands or the third landscape›› (Guetté, Carruthers-Jones, 2022). As a matter of fact, spontaneous rewilding in brownfields defines novel ecosystems, understood as systems composed of biotic, abiotic and social elements and of their interactions, that tend to be self-organizing and exhibit new qualities, differing from historically prevalent ecosystems (Hobbs et al. 2013).

Considering that ecosystems resulting from spontaneous rewilding are less described and documented (Guetté, Carruthers-Jones, 2022), it's not surprising that transnational or even national data on spontaneous rewilding in brownfields have not been elaborated yet. The role of nature in brownfield self-regeneration is not central in contemporary debate, except for some pioneering studies (Mathey et al. 2018; Masood & Russo, 2023; Wolff et al. 2023; Jin, Qian, Yuan, 2024; Ludovici & Pastore, 2024). In particular, Mathey et al. (2018) and Masood and Russo (2023) focus on brownfields perception collecting data through surveys; Wolf et al. develop an evidence base-support system for land use decision uncovering the role of brownfields in UTS (Urban Tree Systems) connectivity; Jin et al. (2024) structure an approach to identify urban rewilding opportunity spaces (UROS) in urbanized areas; finally, Ludovici and Pastore (2024) map Milan Metropolitan Area informal urban biodiversity to unravel the capacity of spontaneous nature's agency in reclaiming urban brownfields. Even if some of these studies are not precisely targeted towards the study of brownfield regeneration, they constitute an innovation in the field. While Masood and Russo (2023) explore the public's opinion–according to results widely supportive–on brownfield regeneration through rewilding projects in the UK, Mathey et al. (2018) investigate innercity brownfields and their spontaneous vegetation uses and perceptions by the urban population in Dresden and Leipzig (Germany), revealing their ecological and social potential for users. The two German cities were selected for both their industrial legacy–deindustrialization and urban shrinkage produced many brownfields–and their growing population and economic power: in cities experiencing demographic growth, what is the future of brownfields colonized by spontaneous vegetation? Working in the same direction and context, Wolf et al. (2023) develop a replicable model in Leipzig for prioritizing re-naturalized brownfields in strengthening green infrastructure connectivity; the tool can be used to assess and compare implementing NbS elsewhere. In Chongqing (China), Jin, Qian and Yuan (2024) evaluate and map UROS at the city-scale; among

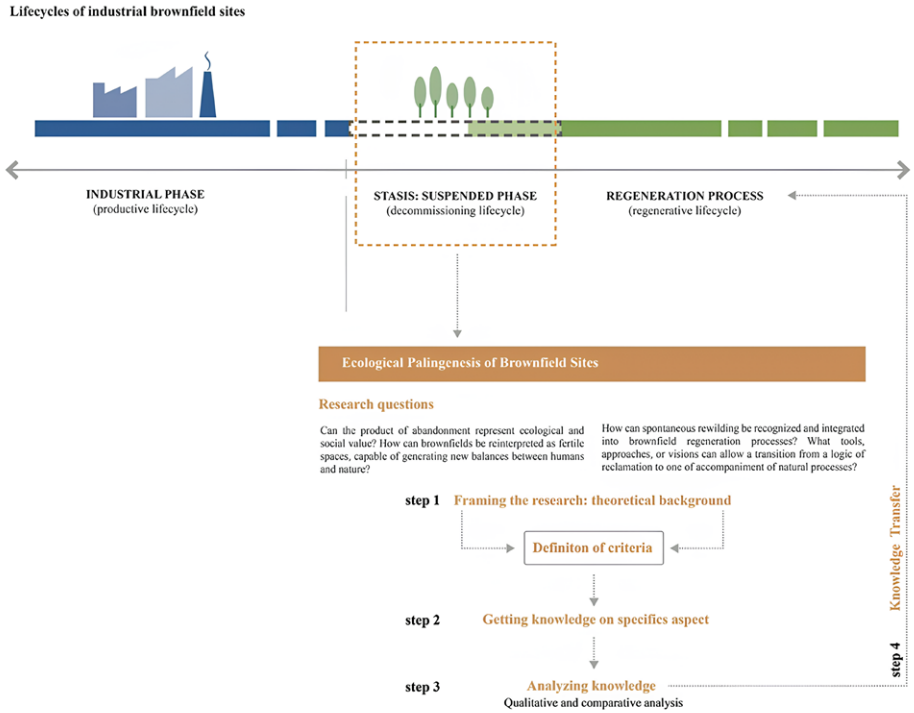
the results of this extended analysis, ‹‹the unused lands within urban core areas››, namely brownfields, have been identified as crucial elements for advancing urban rewilding. These spaces are Ludovici and Pastore's focus in their mapping of informal biodiversity in Milan Metropolitan region: starting from a database on existing and potential spontaneous rewilding in the region, the study intercepts "leftover urban areas", e.g. contaminated sites, former agricultural areas and urban voids, with awareness regarding their possible future ecological succession growth and the social conflict between public and real estate interest in development projects.

The aforementioned studies advance the field by raising awareness, addressing methodological approaches, and constructing a situated atlas and dataset, but they do not describe, analyze, or compare existing practices. The contribution proposes a pilot comparative analysis focusing on three emblematic European case studies.

Materials and Methods: from Abandonment to Palingenesis

The investigation is grounded in a qualitative and comparative approach conceived as a critical tool for developing interpretative and operational categories. The methodological framework builds upon urban political ecology and ecological autopoiesis, recognise brownfields (with ecological value) as self-organizing systems shaped by human and non-human interactions. In this sense, the study is closer to the traditions of interpretative research in urban studies and landscape ecology than to standardized protocols of quantitative assessment, and it adopts the logic of case-based reasoning (Yin, 2014; Flyvbjerg, 2011) to read specific urban situations as bearers of paradigmatic values. The three cases examined – Canvey Wick (Canvey Island), La Goccia (Milan), and Bullicante Lake (Rome) – were selected because they are emblematic of the same phenomenon: the transformation of abandoned industrial areas into spaces of ecological and civic regeneration through spontaneous rewilding, in urban or peri-urban contexts exposed to speculative pressures and institutional conflicts.

The study takes the time of decommissioning—the suspended interval between the cessation of productive uses and any subsequent redevelopment—as a critical window in which spontaneous ecologies take shape. Within this frame, we examine the civic recognition of these emergent natures, understood as a process of reading, care, and public legitimation capable of steering alternative pathways of regeneration. The term *palingenesis* is adopted to imply an evolutionary process of transformation and adaptation, that can be seen as a self-healing process of the territory in ecological terms: nature reoccupies abandoned spaces and transforms them into vital habitats. This perspective aligns with theories such as



Gilles Clément's "Third Landscape" or "urban wilding", which assign value to transitional and evolving landscapes arising from the interaction between abandonment and biological spontaneity.

In methodological terms, the research adopts the case study method in its comparative and multi-case form (Stake, 1995; Yin, 2014). Each site—Canvey Wick, La Goccia, and Bullicante Lake—is treated as an autonomous unit, defined by spatial boundaries, actors, and trajectories of use and abandonment. The comparative design follows a logic of replication, where findings from one case are confronted with others to refine hypotheses and highlight both convergences and divergences. Rather than aiming at statistical generalization, the study pursues transferability: cases are interpreted as critical and emblematic, capable of generating insights applicable to similar contexts. The analytical framework integrates seven coding categories (ecological processes, level of environmental contamination, history of abandonment, main ecological process, governance and conflict, political-economic interests, institutional recognition, symbolic values) and is supported by triangulation of data sources (scientific literature, institutional reports, and civic narratives). This methodological approach aligns with interpretative traditions in urban and landscape studies, and with grounded theory logics, where theoretical assumptions are continuously revised in light of empirical evidence.

The collected material draws on a plurality of sources, ranging from the international scientific literature on rewilding and brownfield regeneration (Bradshaw, 2000; Mathey et al.,

Research methodology framework.
Source: from authors
Fig. 1

2018; Ludovici & Pastore, 2024) to regulatory and technical documents produced by European and national institutions (EU Regulation 2024/1991 on the Nature Restoration Law; EEA, 2022; APAT, 2006), and what can be defined as grey literature: reports from environmental NGOs such as Buglife and Land Trust for the UK case, civic dossiers and materials produced by associations such as Osservatorio La Goccia in Milan or Forum Territoriale del Parco delle Energie in Rome, together with press articles, websites and statements from local movements. The use of these non-academic sources responds to a deliberate choice: to include the narratives and discourses that communities have constructed around these places, which represent key instruments of symbolic and political activation.

Given the scarcity and uneven indexing of peer-reviewed evidence on the spontaneous rewilding of brownfields, we mapped cases through an exploratory search spanning the open web (Google), scholarly databases (Scopus, Google Scholar, Web of Science), and institutional/NGO repositories. We employed bilingual (EN/IT) Boolean queries—e.g., ("brownfield rewilding" OR "spontaneous rewilding") AND ("urban" OR "peri-urban")—covering 2000–2025. Inclusion criteria targeted European urban/peri-urban brownfields with (i) documented decommissioning, (ii) evidence of spontaneous ecological processes (species lists, monitoring reports, expert assessments), and (iii) traces of civic engagement; we excluded greenfields and cases driven exclusively by engineered remediation. Screening (title/abstract to full text) was followed by triangulation against institutional documents and NGO materials to mitigate discovery bias.

These materials were read and cross-related through a comparative coding grid, not intended to flatten the singularities of the cases but to highlight their recurring features. Seven main categories emerged: the ecological dimension (processes of spontaneous succession, biodiversity, ecosystem functions); the history of use and abandonment (with the related levels of contamination and institutional marginalization); governance and conflict dynamics (negotiations, resistances, cooperation among communities, institutions and private actors); political-economic interests (real estate pressures, urban plans, strategies of economic valorization); institutional recognition (legal protections, remediation or ecological restoration programs); and social and symbolic value (civic narratives, artistic and cultural practices, processes of collective appropriation. This comparative synthesis across the three brownfield case studies illustrates how spontaneous rewilding produces distinct trajectories of ecological and civic regeneration under different governance and socio-ecological conditions. This articulation enabled the construction of a comparative matrix that highlights analogies and divergences, showing

Criteria	Canvey Wick (Canvey Island, UK)	La Goccia (Milan, Italy)	Bullicante Lake (Rome, Italy)	Abstracted Insights / Transferable Patterns
Previous use of the site (productive lifecycle)	Former oil refinery (never operational) located in an industrial zone characterized by the presence of petrochemical plants	Former industrial site for gas and coal production	Former industrial excavation turned into a lake	Industrial origins—whether through failure, decommissioning, or disaster—shape both symbolic narratives and perceptions of risk
Period and forms of abandonment	Disused since the 1970s; no later redevelopment.	Progressive abandonment since the 1980s; full closure until 2011.	Post-war abandonment and industrial decline culminating in a groundwater flooding event in 1992, which led to the formation of the lake.	Duration and nature of abandonment critically influence both ecological succession and civic mobilization
Level of environmental contamination	Residual hydrocarbons and heavy metals	Contamination by hydrocarbons and metals	Presence of an unconfined aquifer and potentially contaminated sediments (incomplete data)	Contamination thresholds define the boundary between spontaneous rewilding and the need for technical remediation
Recognition of main ecological processes	"Open mosaic" habitats with high invertebrate diversity	Mature urban woodland rich in native and pioneer species	Hybrid lake–woodland ecosystem with high avian biodiversity	Spontaneous ecologies demonstrate self-organizing capacity and the ability to provide complex ecosystem services
Type of regeneration	Initially spontaneous, later managed by NGOs and communities	Partially spontaneous, later managed by community and currently under EU restoration project	Fully spontaneous, self-managed by local community	The different governance trajectories show how rewilding can evolve from informal care to institutional recognition
Civic participation	Volunteering, environmental education, observation	Active citizens' committee, partial co-design	Strong civic activism, ongoing territorial stewardship	Civic participation acts as a catalyst for the legitimacy of environmental rewilding and regeneration processes
Conflict and governance	Long negotiation, now institutionalized and NGO-led	Initial conflict with institutions, now partially integrated	Ongoing open conflict with private owners and institutions	Conflict acts as a structuring force, shaping trajectories of governance and recognition
Institutional recognition	Yes – Site of Special Scientific Interest (SSSI)	Partially – EU-funded ERDF project	Partial – Nature Monument status excluding 3 hectares	Institutional recognition comes after civic mobilization
Ecological value	Over 2,000 invertebrate species, specialized habitats	Valuable for pollinators and native species	350 spontaneous plant species, 89 bird species (9 protected), 4 bat species	The biodiversity of rewilded brownfields can surpass that of designed green spaces
Symbolic and social value recognized by communities	Environmental education and entomological research	Resilient urban renaturalization	Emblem of environmental justice, right to nature, and civic resistance	The recognition of their value transforms marginal areas into cultural arenas that become central to community interest
Political-economic interests	Initial business park redevelopment projects, later abandoned	Ongoing real estate pressures and university expansion plans	Persistent speculative interests, fragmented ownership and contested land uses	Spontaneous rewilding is generally tolerated as long as it does not conflict with dominant market logics or economic valorization strategies

Comparative matrix of the three case studies
Tab. 1

how the same factors – abandonment, spontaneity, conflict – generate different outcomes depending on socio-institutional contexts and prevailing economic pressures.

From a methodological standpoint, the research adopted a process of triangulation (Denzin, 1978), constantly comparing scientific data, technical documents, and civic testimonies. The goal is not so much cross-verification, but the construction of a plural discourse capable of holding together different forms of knowledge: ecological, normative-institutional, social, and symbolic. Triangulation is thus interpreted as a critical practice, useful to convey the complexity of places that are not only physical spaces but also arenas of conflict and collective imagination.

Nevertheless, there are intrinsic limitations to this approach. The research does not rely on direct environmental surveys (for instance, soil chemical analyses), but on existing studies and institutional reports; grey literature, while rich and valuable, inevitably conveys the partiality of militant narratives; temporal coverage is uneven, concentrated mainly in the last two decades. Despite these limitations, the combination of academic, institutional, and civic sources allows for the delineation of a robust and culturally meaningful framework, one that emphasizes not only ecological processes but also the dynamics of meaning and power accompanying the rebirth of brownfields.

Finally, the comparison between the three cases has not been conceived as a classificatory exercise, but as a critical device for interrogating the role of abandonment in the production of new urban forms. In this sense, the methodological analysis is aligned with theoretical reflections on the landscape as a "third" space (Clément, 2004) or on spontaneous ecologies as producers of collective imaginaries (Cooper et al., 2024), suggesting that brownfields should be read not only as objects of technical regeneration, but as laboratories of cultural and political transformation.

Spontaneous Ecologies in Brownfields: a comparative analysis of practices of reappropriation and alternative development visions

Starting from the methodological framework, this section explores how spontaneous ecologies have taken on a regenerative role in three selected brownfields, helping to silently reactivate marginalised territories and reformulate their meanings and uses. Within this lens, we treat the period of stasis—the suspended interval between decommissioning and any formal project—as an analytical hinge. It is in this window that spontaneous assemblages consolidate ecologically and, crucially, become legible to publics: walks, counts, mappings and everyday uses translate biophysical change into civic recognition and claims. The timing and strength of this recognition are not neutral: they are filtered by contamination thresholds, ownership regimes and market

Spontaneous rewilding and industrial ruins of the former Canvey Wick refiner
Source: https://newgeographies.uk/event/david-blandy-2/
Fig. 2

pressures, which together condition whether emergent ecologies are preserved, selectively integrated, or erased. Reading the cases through this temporal hinge clarifies how similar drivers (abandonment, spontaneity, conflict) can produce divergent governance pathways and values, as synthesized in Table 1 and elaborated in the Discussion. The comparative reading applies the analytical grid introduced in the Methods section, translating qualitative descriptions into shared interpretative dimensions. Each case is analysed along eleven coding categories – level of environmental contamination, recognition of main ecological processes, conflict and governance, political-economic interests, institutional recognition, symbolic and social value, etc. – to identify convergences and divergences. This systematic approach ensures that narrative accounts correspond to explicit analytical parameters.

The focus is not on design outcomes or institutional planning tools, but rather on bottom-up processes of recognition, valorisation, and claim-making that have turned abandoned landscapes into contested spaces with renewed centrality.

In each case analysed, spontaneous ecologies - emerged in the time of waiting for traditional planning - acted as transformative devices, capable of interrupting the inertia of abandonment and opening up new readings, practices and imaginaries. Not mere voids, but places where practices of care, conflict, presidium and production of meaning have been activated, questioning value hierarchies and functionalist visions of urban space.

The analysis aims to restore the variety of these civic trajectories, highlighting how the emergence of unplanned ecologies has sustained alternative narratives of urban regeneration, based not on the annihilation of the existing landscape, but on its recognition as a living, cultural and ecopolitical resource.

Canvey Wick: a brownfield rainforest

Situated on the Isle of Canvey in the Essex region of the United Kingdom, the Canvey Wick area is a prime example of how spontaneous ecologies, emerged on a disused and contaminated industrial site, can become an object of institutional and collective recognition.

The area of approximately 93.2 ha, originally marshland, was destined to house an oil refinery, never completed due to the global oil crisis of the 1970s. The soil showed traces of pollution due to the presence of chemical residues and polluting materials. Despite the compromised ecological condition of the site, the soil slowly favoured the establishment of adaptable life forms, triggering a process of spontaneous recolonisation led by pioneer vegetation. The soil, consisting of sandy and nutrient-poor materials from free-draining dredging carried out for the construction of the refinery, has, in fact, transformed into a well-drained and dry one. These characteristics, combined with

strong sun exposure and the presence of open surfaces, have generated a warm and dry microclimate ideal for many thermophilic invertebrate species (McGill, 2018). In the absence of anthropogenic disturbance, this ecological mosaic has favored the spontaneous establishment of new habitats with over 2,000 invertebrate species, many of which are rare and endangered[4].

Today, Canvey Wick is recognised as the "rainforest of Britain" and what makes it interesting is not only the ecological richness that has emerged, but the way in which it has been discovered, narrated and defended by a network of local actors. As described by Land Use Consultants (2007), groups of naturalists, conservationists, volunteers and citizens began to frequent the site, documenting the presence of rare species, organising collective observation and environmental education. This bottom-up ecological reading work performed a fundamental function: it made visible what appeared invisible or insignificant, transforming a seemingly empty brownfield into a shared ecological heritage.

The residents of Canvey together with Buglife, after years of various industrial development projects, embarked on a three-year campaign to protect the site from the threat of a business park development[5]. Only after years of campaigning and negotiation the site was formally designated as a Site of Special Scientific Interest (SSSI) in 2005, one of the highest forms of ecological protection in the UK context[6].

The area is currently managed by Buglife and the Royal Society for the Protection of Birds (RSPB) on behalf of the Land Trust, responsible for monitoring the soil, limiting the spread of contaminants and protecting this unique natural community (Fig. 2).

Canvey Wick shows how environmental renaissance can activate new forms of community belonging and management. Ecology here is not an aesthetic or technical framework, but has become a cultural, educational, relational

Writing on the wall enclosing the former refinery site: "Behind this wall lies the Goccia forest" — a message that reclaims visibility and recognition for a spontaneous urban woodland hidden from view.

Source: https://perimetro.eu/gennaio2021/bosco-la-goccia/
Fig. 3

engine. The former abandoned industrial site is now a living landscape, not designed but observed, narrated and guarded: a laboratory of coexistence between humans and non-humans, in which ecological spontaneity becomes a lever for constructing new territorial meanings. While in Milan and Rome rewilding remains a contested terrain, in Canvey Wick civic action has already found institutional resonance: what began as local observation and care has become an officially protected landscape, showing that recognition can grow from the ground up.

La Goccia Park: experimenting with the care of a spontaneous urban forest

In the heart of the Bovisa district, in the northern part of the city of Milan, the former gasometers area - named 'La Goccia' after its distinctive drop-like spatial configuration - is an extraordinary example of a brownfield transformed by the slow action of spontaneous nature into an unexpected urban forest.

On about 42 ha - part of an industrial area abandoned between the 1980s and 1990s - a spontaneous urban forest has developed, consisting of more than 2,000 trees (plane trees, ash trees, poplars, lime trees) and a rich fauna including birds, hedgehogs, foxes and birds of prey such as the eagle owl[7]. This area, closed and fenced off until 2011, remained invisible to the public eye for a long time. Thanks to the pressure of local associations, including La Goccia Observatory and Terrapreta association, the forest has begun to be explored, mapped and narrated. Many of the species that have colonised the site are indigenous or adapted to harsh environmental conditions. La Goccia's floristic composition is the result of a long process of spontaneous regeneration that took place on land polluted by hydrocarbons and heavy metals, residues of disused industrial activities. In order to preserve the ecosystem generated while starting remediation activities, NbS, such as phytoremediation, have been experimented on small portions of the site to assess the ability of certain plant species to absorb or stabilise pollutants in the soil. In the meantime, the Municipality of Milan and the Polytechnic University of Milan (POLIMI), among the main actors involved in the urbanisation of the area, have promoted a redevelopment plan that envisages the demolition of part of the forest to create new university buildings and urban services, including residences and offices. This prospect generated a strong conflict between institutions and active citizenship, which claimed the value of the forest as an ecological, cultural and symbolic heritage. The forest has thus been reinterpreted as an "urban common" and an experimental laboratory of alternative urban regeneration, based on conservation rather than redevelopment (Fig. 3). Among the most significant initiatives is the creation of the "Sculpture Forest"[8]: a site-specific public art project with in-

stallations that preserve the landscape while enhancing its legibility and identity as a living place. Together with walks, collective readings and educational workshops, these artworks have helped to strengthen the link between community and territory, generating a process of civic appropriation and ecological care.

Today, the area is part of the GOCCIA project ("Green Opportunities to Clean-up Contaminants through an Interspecies Alliance"), financed by ERDF (European Regional Development Fund) and led by the City of Milan with partners including POLIMI, Terrapreta and Open Impact. The strategy involves ecological remediation, participatory co-planning and the maintenance of spontaneous biodiversity as a common good. The project, running from 2024 to 2028, aims to transform the area into an urban living lab, accessible to the citizens[9].

In conclusion, La Goccia is at the centre of a still open process, suspended between ecological enhancement and building pressure, in which the recognition of the forest as a spontaneous and resilient urban landscape is confronted with strongly profit-oriented development logics. The experience of La Goccia reveals how civic activation can transform a marginalised urban void into a contested landscape, charged with meaning and capable of suggesting alternative imaginaries for the future of the city.

Bullicante Lake: an unexpected landscape, recognised and reclaimed by the community

In the eastern quadrant of Rome, within the dense fabric of the Prenestino-Pigneto district, the former Snia-Viscosa industrial area represents one of the most emblematic cases of spontaneous ecological regeneration and civic mobilisation for territorial defense in an urban context. Decommissioned after World War II and long left in a state of neglect, the

Bullicante Lake – Civic activism and spontaneous nature within an abandoned industrial site in Rome.
Source: https://animaloci.org/lake-bullicante/
Fig. 4

site underwent an unexpected transformation in 1992, when a building excavation for the construction of a private car park intercepted an aquifer, generating the formation of a natural lake of significant surface area and depth[10]. This unexpected event triggered, over time, a process of spontaneous renaturalisation that led to the development of a rich and articulated ecosystem within a highly urbanised context.

The so-called Bullicante Lake now covers an area of about 14 ha and has a high degree of biodiversity: according to monitoring conducted by local associations and scholars, there are more than 350 plant species - many of them indigenous - and almost 90 bird species, including birds of prey, passerines and protected species such as the kingfisher. There are also species of amphibians, reptiles and mammals (including hedgehogs, foxes and bats), as well as around 30 species of dragonflies and damselflies. This variety is made possible by the coexistence of wet and wooded, which have developed without planned human intervention, but through a slow and progressive process of biological colonisation (Gatti, 2021).

However, the ecological value of the area has been ignored by institutions for years, and the site has repeatedly risked being the object of speculative projects. Starting in the 2000s, a network of associations, committees and informal groups - including the Permanent Territorial Forum Parco delle Energie, supported by entities such as Terrapreta and Fridays for Future - initiated a bottom-up process of claims, demanding the recognition of the area as an ecological common good and actively opposing building plans (Fiocca, 2022). The mobilisations have included awareness-raising campaigns, signature collections, garrisons, legal actions and environmental education activities. In this context, spontaneous nature was reinterpreted not as a mere urban anomaly, but as a generator of ecological, social and symbolic value. As Do and Fassari (2023) point out, Bullicante Lake can be interpreted as a "hybrid nature-vein", in which industrial remains and ecological processes intertwine, generating a liminal landscape, neither totally natural nor completely artificial, capable of nourishing new practices of civic use and collective appropriation (Fig. 4).

The civic action obtained its first institutional recognition in 2020, with the designation of the area as a Natural Monument by the Lazio Region[11]. However, there are still critical issues related to incomplete statehood, urban planning restrictions that have not been fully implemented, and pressure from private parties claiming building rights[12]. The lake and its surrounding landscape are today at the centre of a permanent conflict between opposing visions: on the one hand, that of development based on urbanisation and real estate development; on the other, that of an ecological urban regeneration, which recognises the value of

spontaneous transformations and promotes participatory processes of care and protection. The case of Bullicante Lake clearly shows how bottom-up ecological recognition practices can produce new forms of landscape signification and open up new spaces for negotiation between citizens and institutions. The emerging landscape is neither designed nor planned, but rather the result of self-organised ecological relations.

Discussion

The comparative analysis of the three case studies offers a key insight: abandonment does not inherently equate to emptiness or decline, but can act as a latent infrastructure for regeneration. In specific conditions, it can instead become a catalyst for regeneration, activating unforeseen ecological, social, and symbolic dynamics. Far from being inert or dysfunctional, brownfields emerge as complex terrains where alternative visions of urban transformation can take shape, especially in times marked by ecological precarity and growing socio-spatial inequalities.

Across the cases of Canvey Wick, La Goccia, and Bullicante lake, spontaneous rewilding processes have led to the emergence of rich and multilayered ecosystems—sometimes more biodiverse than those planned through institutional green infrastructure. This demonstrates that regeneration can, at times, unfold without direct human intervention, relying instead on the autonomous resilience of ecosystems. Yet this spontaneity is rarely absolute. Rather, it is embedded in layered socio-political contexts, shaped by interactions between civic actors, scientific communities, and institutions, each contributing to the construction of meaning and legitimacy. A common thread in all three sites is the tension between top-down remediation frameworks and bottom-up

Spontaneous rewilding in the Bagnoli Coroglio SIN, Naples, Italy.
Source: S.Piccirillo, May 2025
Fig. 5

processes of care, defense, and reinterpretation. Regeneration, in this sense, is not a technical fix or a definitive state, but a negotiated and ongoing process of spatial re-signification. Here, the notion of palingenesis acquires particular relevance: not as a nostalgic return to a presumed original condition, but as a situated reconfiguration of space, guided by partial, contingent, and evolving practices. Within this dynamic field the examined cases unsettle dominant vocabularies of remediation, calling instead for relational, inclusive and gentle approaches to ecological and urban transformation (Bizzotto, Raimondi, 2024).Moreover, the role of communities appears central, not merely as stakeholders, but as co-producers of ecological value and stewards of urban commons. The resistance surrounding Bullicante lake goes beyond the protection of a habitat; it embodies broader claims for the right to nature and environmental justice. Similarly, the struggle for La Goccia has shown how civic imagination can shift institutional agendas and produce alternative forms of planning, anchored in care, memory, and collective agency. At the heart of these experiences lies a redefinition of value itself. Ecological richness is not limited to biological indicators, but extends to symbolic, affective, and cultural registers. The very presence of unwanted species, informal uses, or decaying infrastructures becomes generative—capable of hosting novel forms of life, meaning, and attachment. These cases argue how what is often framed as failure, waste, or error may instead serve as a substrate for unexpected ecologies and relational forms of inhabiting space. Emerging ecologies call for a fundamental shift in planning perspectives, urging contemporary governance to embrace the unexpected, the unconventional, the out of the norm and recognizing difference as a fully legitimate form of sustainability. This means moving beyond rigid models and energy-intensive projects, and instead reorienting policies toward lighter, more adaptive forms of coexistence that can value what escapes conventional urban regeneration frameworks. It also invites a reconsideration of human-centered logic: not all regeneration must translate into human use or access. In some cases, safeguarding ecological processes may require leaving areas untouched, acknowledging that their value lies not in what they offer people but in their ability to exist and thrive on their own terms.

The examples of Canvey Wick and La Goccia particularly emphasize this shift: degraded soil, leftover materials, or even illegal practices (such as motocross and unauthorized walking) have unintentionally supported biodiversity and social experimentation. Such dynamics reveal a dissonance between anthropocentric planning frameworks and the complex, often non-linear, logics of ecological regeneration. Ultimately, this discussion points to a broader paradigm shift—from regeneration as a goal

to regeneration as a continuous, open-ended process; from prescriptive planning to dialogic, adaptive, and multi-actor approaches. In this light, brownfields are not merely remnants of industrial decline, but testbeds for envisioning just, resilient, and multispecies futures. The challenge ahead is not simply to "green" these landscapes, but to attune planning and institutional policies to the ecologies, practices, and meanings that already inhabit them. In this perspective, the conclusions that follow do not mark an ending but a passage from observation to proposition. They gather the main findings and translate them into possible directions for action, policy and research. What emerges is an invitation to consider spontaneous rewilding not just as a natural process but as a way of imagining regeneration itself: open, adaptive and shared.

Conclusions and perspectives

The comparative study of selected European cases does not only fulfill a knowledge-building function but also serves as a key step in transferring knowledge within the RETURN research project. Observing how, in different contexts yet marked by similar structural conditions–long-term abandonment and exclu-

sion from both planning agendas and everyday urban life–, spontaneous ecological and civic dynamics have taken shape, offers valuable tools for rethinking the case of Bagnoli-Coroglio in Naples. In Bagnoli too, more than three decades of stasis and neglect have allowed the emergence of unexpected and resilient biodiversity, which remains largely ignored or dismissed by official narratives of remediation and urban transformation. Observing other trajectories helps reframe the gaze toward this landscape–often perceived as marginal–and recognize its ecological, symbolic, and cultural potential (Fig.5).

The analyzed cases do not offer prescriptive models, but rather interpretive frameworks useful for imagining alternative forms of urban transformation, more attentive to ecological contingency and civic activism. Recognizing spontaneous ecologies as a living and evolving heritage does not mean contrasting regeneration, but rather reorienting it toward more inclusive, situated, and non-anthropocentric forms of coexistence. It means embracing incompleteness and ecological improvisation as legitimate components of planning, valuing what arises outside conventional frameworks. At the same time, this research invites a redefinition of traditional categories of urban regeneration: no longer based on functionalist logics and linear temporalities, but on hybrid, adaptive, and participatory processes capable of valuing what already exists. In this light, brownfields emerge as true territorial laboratories, where cities can be reimagined starting from what grows at the margins–unexpectedly and often outside the scope of formal planning. This requires not only a shift in perspective but also a deeper transformation of planning paradigms: moving from design as imposition to regeneration as a practice of listening, care, and negotiation. Ultimately, what emerges is a call for more sensitive and inclusive regeneration as an opportunity to radically question the very foundations of urban value: to ask for whom and for what we regenerate, and how new forms of territorial recognition–including multispecies alliances–can take shape.

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Notes

[1] The European context is particularly relevant, as the continent's long industrial history and high urban density have produced a large number of derelict sites. At the same time, EU environmental and territorial policies have made brownfield regeneration a strategic component of the ecological transition.

[2] Under its previous biodiversity strategy, the EU had set itself a voluntary target to restore by 2020 at least 15 % of degraded ecosystems, in line with the global commitment under the UN Convention on Biological Diversity (Aichi Target 15). This target was not met. Studies indicate that restoration activities did take place in all Member States, but at a level that was significantly lower than required to reach the goal set.

[3] This study was carried out within the framework of the Extended Partnership RETURN, funded by the European Union – NextGenerationEU under the National Recovery and Resilience Plan (PNRR), Mission 4, Component 2, Investment 1.3, D.D. 1243 of August 2, 2022 (Project Code: PE0000005).

[4] https://www.canveyisland-tc.gov.uk/canvey-wick (accessed on 15 July 2025)

[5] https://www.buglife.org.uk/our-work/buglife-england/canvey-wick/canvey-wick-the-journey-so-far/ (accessed on 16 July 2025)

[6] https://thelandtrust.org.uk/space/canvey-wick/ (accessed on 15 July 2025)

[7] https://www.parcogoccia.com/ (accessed on 12 July 2025)

[8] https://www.rigeneriamoterritorio.it/un-ponte-tra-i-parchi-nord-di-milano/ (accessed on 13 July 2025)

[9] https://www.comune.milano.it/aree-tematiche/pnrr-fondi-europei-e-nazionali/progetti-ue/progetti-in-corso/goccia (accessed on 13 July 2025)

[10] https://animaloci.org/it/il-lago-bullicante/ (accessed on 11 July 2025)

[11] https://www.ansa.it/sito/notizie/magazine/numeri/2022/11/28/rischia-di-morire-il-lago-bullicante-miracolo-di-roma_50be2812-fb52-48c3-860c-52661f337cb1.html (accessed on 16 July 2025)

[12] https://ilgiornaledellambiente.it/pericolo-lago-bullicante-miracolo-naturalistico-roma/ (accessed on 16 July 2025)

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