Regenerative Remediation

Creating sustainable post-remediation human and ecological value from impaired properties

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Sustainability Initiatives of the Carter Presidency (1977-1981)

A trained nuclear engineer, served as a lieutenant in the U.S. Navy, where he worked on pioneering nuclear submarine technology. His technical expertise and hands-on experience with nuclear power greatly influenced his energy policies as President.

1977 — Creation of the Department of Energy
Consolidated energy policy, focused on conservation, renewable energy, and nuclear regulation

1977 — Soil and Water Conservation Act
Required national soil and water conservation plans, enhancing sustainable land management

1978 — National Energy Act
Promoted energy conservation, renewable energy, and reduced dependence on foreign oil

1980 — Superfund Act (CERCLA)
Enabled federal cleanup of hazardous waste sites and spurred environmental remediation projects

1980 — Public Lands and Alaska Conservation Act
Protected 100+ million acres of Alaska's land, advancing habitat preservation and ecosystem stewardship

Agenda

- 01 Global Remediation Market
- 02 Remediation & Nature-Based Solutions
- 03 Regenerative Remediation Solutions
- 04 Leading the Industry


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Global Remediation Market
Growth Projections
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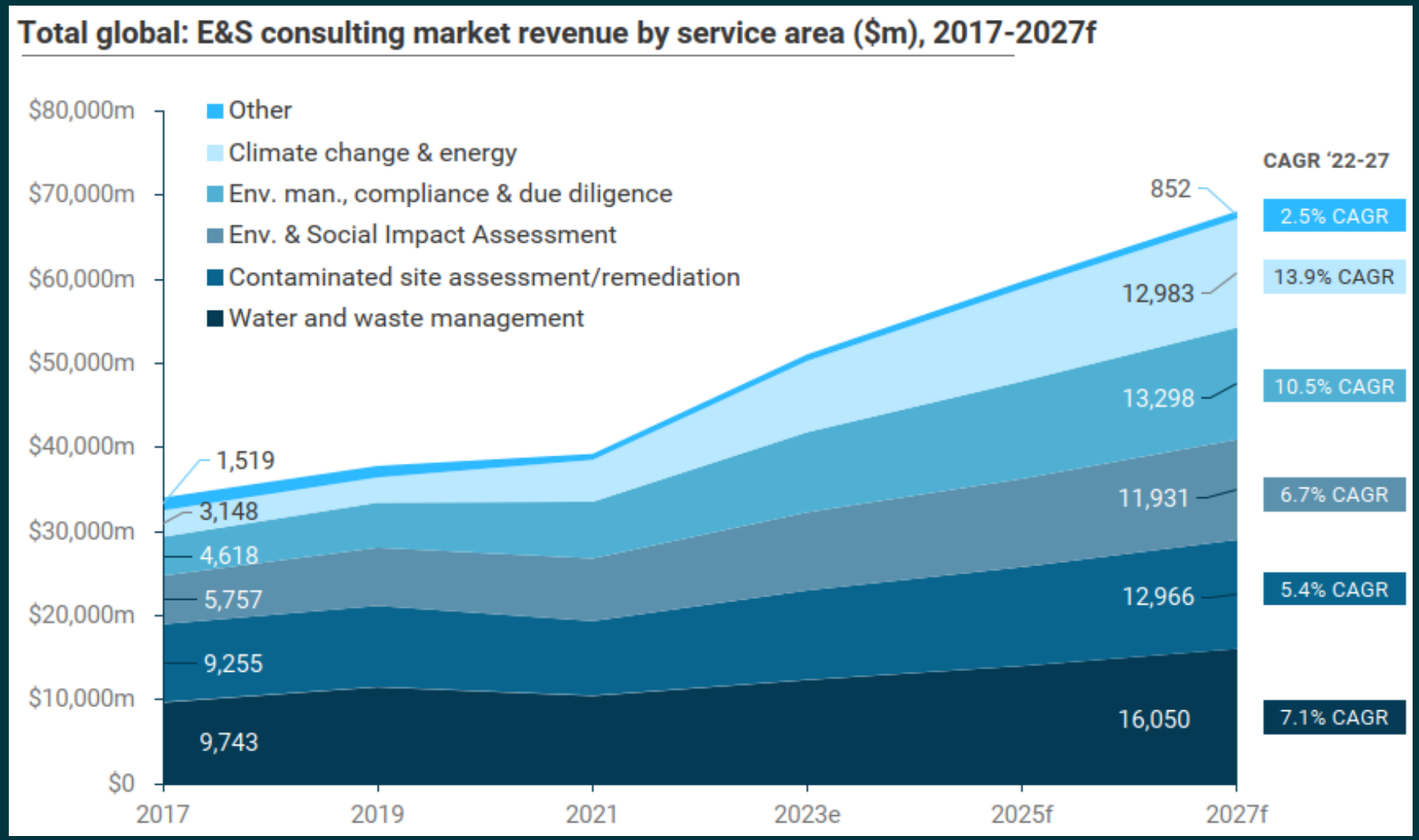
Global Demand for Environmental Consulting Services



- Remediation is expected to grow 5+% annually
- All other Environmental Consulting Services are expected to grow twice as fast
- Why settle for 5%?

Environmental Analyst, UK, June 2024

Environmental Justice

Policy makers are elevating environmental justice

The focus here is on hazardous waste sites, not so much climate justice

- The early industrial revolution saw factories sited near waterways
- Communities grew around those factories
- Factories closed, hazardous waste sites and blighted communities remained

Remediation projects can elevate ecology & communities

- Think rewilding instead of mowing
- Parks instead of chain link fences

The Owner Predicament

What do multinational corporations and defense agencies have in common?

- Vast portfolios of idle or “environmentally distressed real estate”
- Compliance has been the cost-effective approach
- But accelerated “asset retirement” is the goal
- And while ESG has lost some emphasis in some places
- Boards would love to reduce environmental liabilities….
- …and celebrate uplifting community success stories

The Opportunity – Part 1

Nature based solutions are an easy one

- Employing and adapting natural approaches can shift the paradigm away from resource-intensive solutions
- Try as we might, remediation requires expenditures of finite resources and contributes to our carbon footprint
  - Some remedies are energy and resource intensive, and may have unintended social or environmental consequences
  - Nature based solutions can minimize impacts on the environment and surrounding community and optimize solutions

The Opportunity – Part 2

Regenerative remediation is a bit harder, a bit more site-specific

- Yes, we should all seek opportunities to embed environmentally and socially beneficial elements into our site cleanups.
- But for regenerative remediation to truly work, we need to do a bit more
- Understand the community, the stakeholders and their needs
  - Is there a land use goal or development driver?
  - A legal driver or regulatory policy objective?
  - Are there opportunities to align functions within the owner organization that might not typically be joined at hip?
- With this framework understanding, truly tailored solutions can be developed

The Opportunity – Part 3

- With a truly **regenerative solution**
  - Regulators may accept more attainable end points
  - Stakeholders can support an accelerated approvals process
  - Corporate or government investment can be unlocked
- Collectively these features and drivers can accelerate completion
- And regenerative remediation often requires a multidisciplinary approach, providing for more interesting and fulfilling work
- On an industry scale this could lead to higher revenue growth…
  - Remember the 5%?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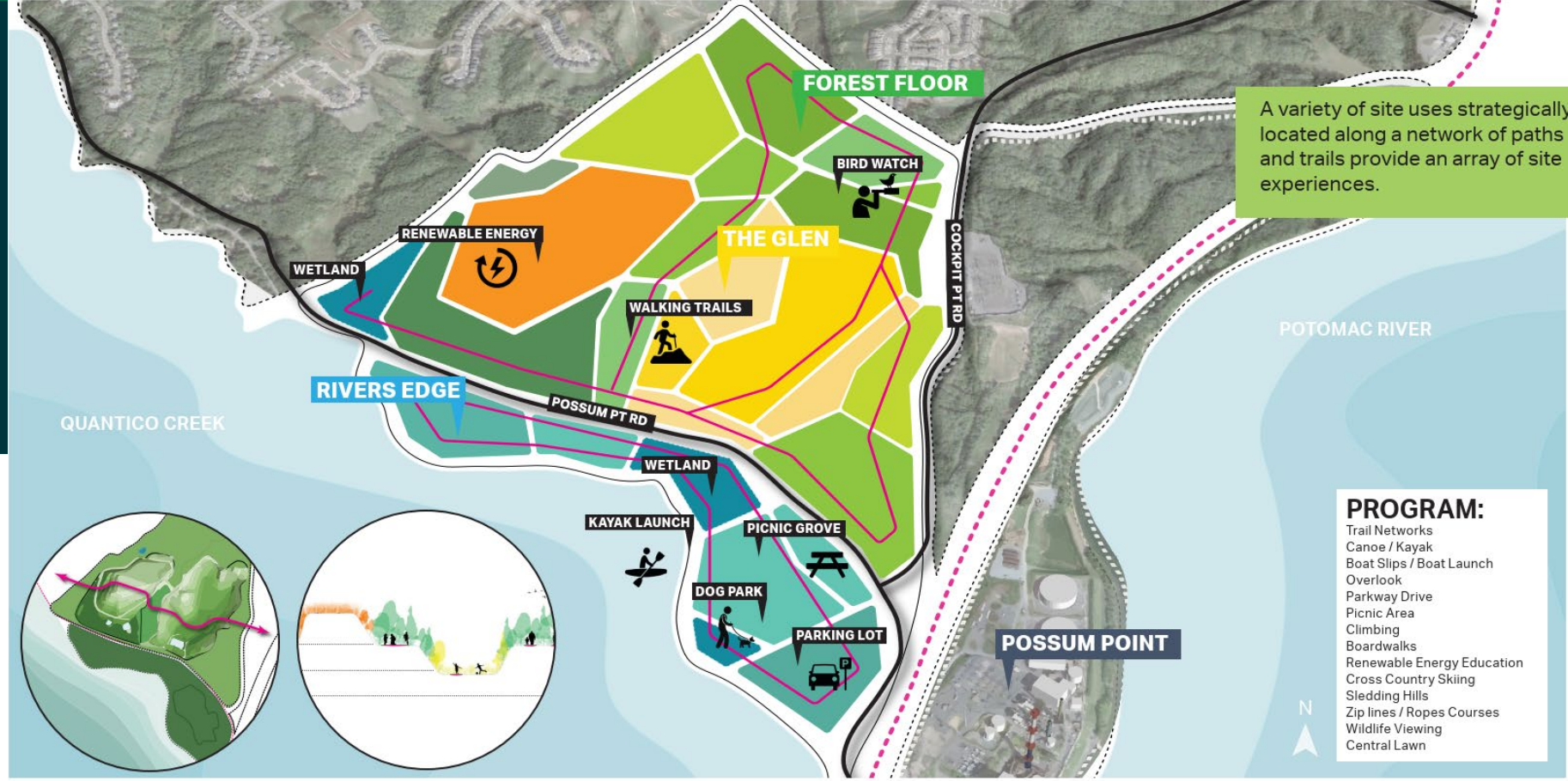
Possum Point (Virginia), Dominion Energy

- CCR pond closure: 4.7 MCY landfill
- Coordinating with local citizen task force for post-closure site uses

Diverse Community Programming

Layered Ecologies

A unique vertical landscape created by the remediation process provides opportunity for restoration of historic ecologies intertwined with new human experiences.



A variety of site uses strategically located along a network of paths and trails provide an array of site experiences.

PROGRAM:

- Trail Networks
- Canoe / Kayak
- Boat Slips / Boat Launch
- Overlook
- Parkway Drive
- Picnic Area
- Climbing
- Boardwalks
- Renewable Energy Education
- Cross Country Skiing
- Sledding Hills
- Zip lines / Ropes Courses
- Wildlife Viewing
- Central Lawn

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Mystic River Boathouse Park

Ecological uplift

- Green engineering living shoreline solution to increase biodiversity

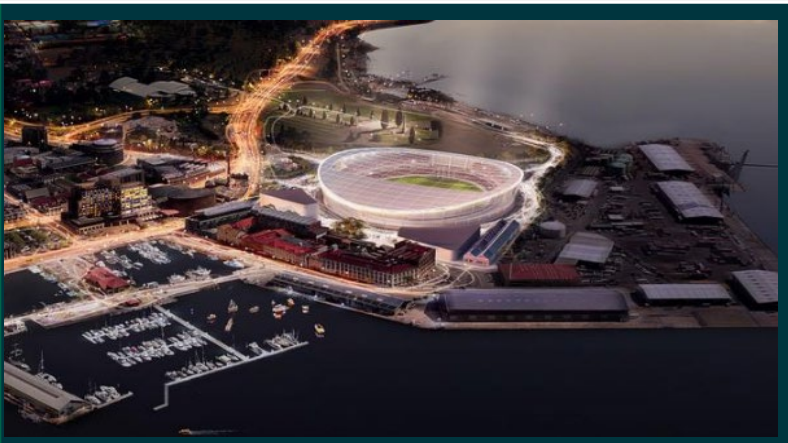
Community uplift

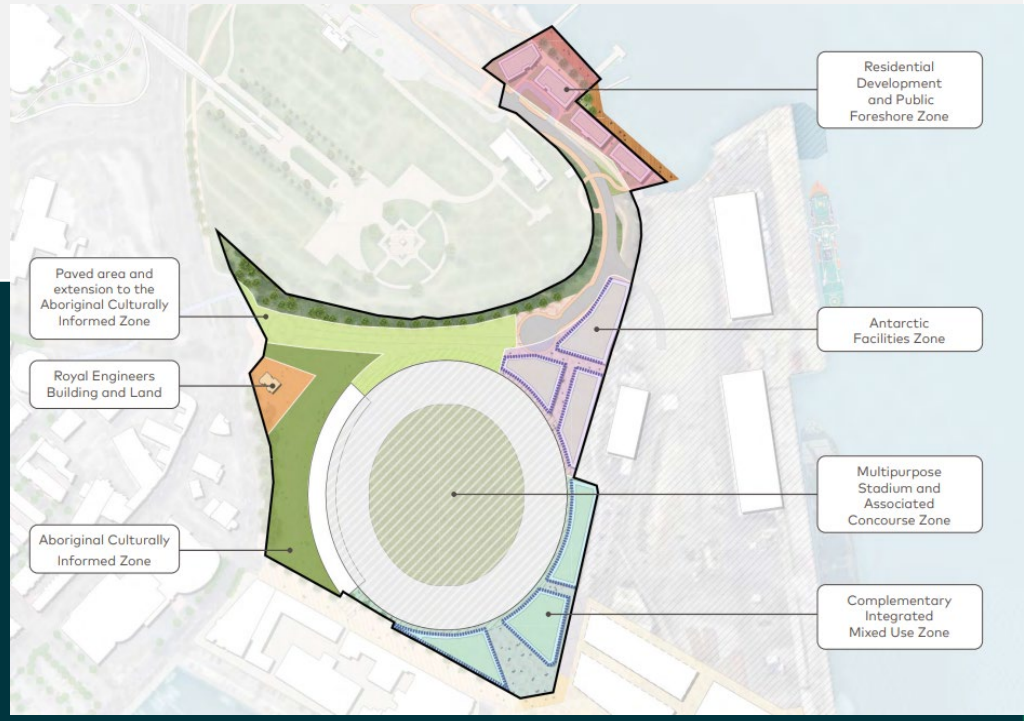
- Enhanced public use including rowing club river
- Public river access, boat docks and ramp
- Modern boat house for rowing club
- Elevated grade to address sea level rise and level site

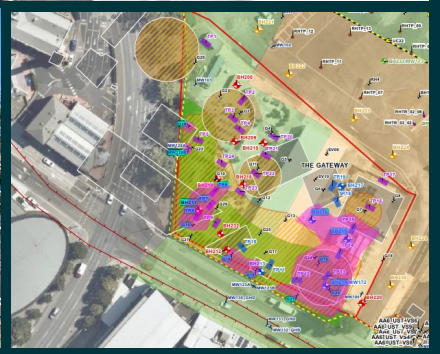
Macquarie Point

Macquarie Point Redevelopment Project – restoration of a 9.3 ha site in the heart of Hobart impacted by former land reclamation, gasworks operations, bulk fuel storage and handling, and railway activities

Remediation is enabling the return of the site to the community for a proposed multi-purpose stadium, an Aboriginal Culturally Informed Zone, an Antarctic Facilities Zone, residential housing and commercial use, and public open space







BASF East Newark, New Jersey

an Environmental Justice Community

East Newark 2020 US census data

- 2,594 population
- 86% non-English speaking
- 33% below NJ median income
- 24% in poverty

Site Impacts

- 1875 – wharf built over flood plain with urban fill
- 1930 – thread manufacturing shifts to the US south, wharf area used for jewelry manufacturing
- Contaminated urban fill and hot spots remain

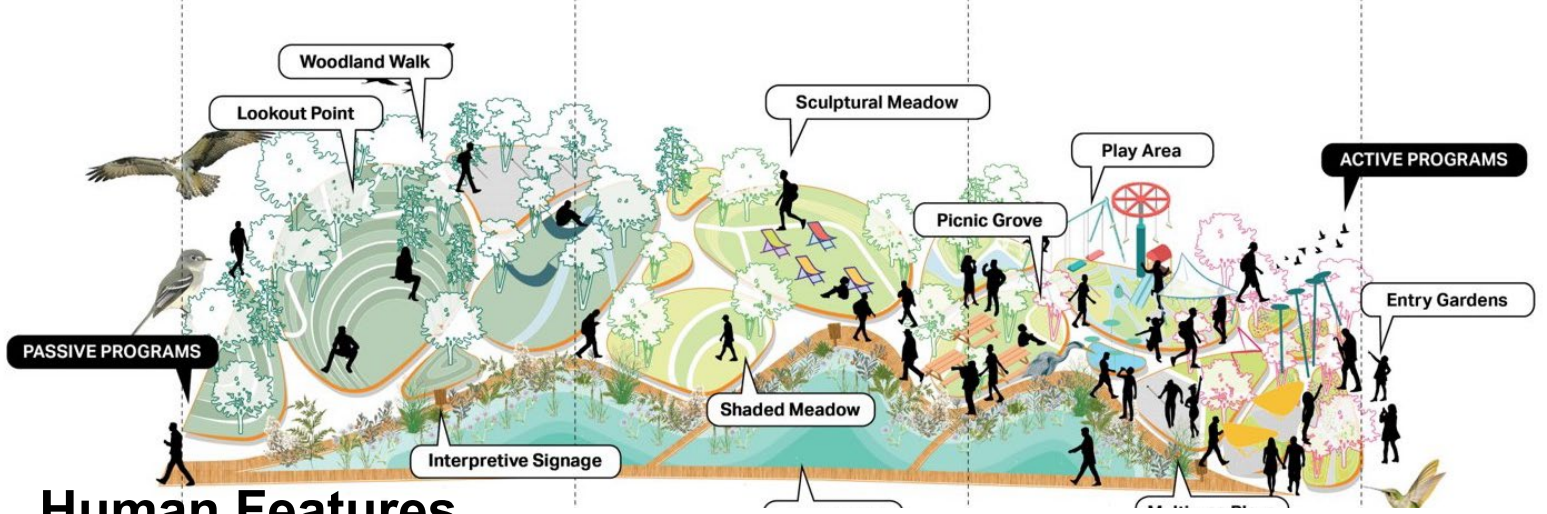
BASF East Newark

- BASF developed a creative project-based agreement with the US Department of Justice (DOJ) to settle a Natural Resource Damages Assessment (NRDA)
  - Provides the community it's first municipal park
  - Provides the government flexibility in establishing the damages assessment
  - Accelerates the government's recovery of the assessment by 10 years
- Provides credits to BASF for NRDA claims at two other contaminated sites:
  - Diamon Alkali Superfund Site: , which is the lower 17-mile stretch of the Passaic River
  - Berry's Creek Study Area: , a wetland and 6.5-mile-long tributary to the Hackensack River
- Allows BASF to maximize the value of the project
- Avoids high cost of Litigation

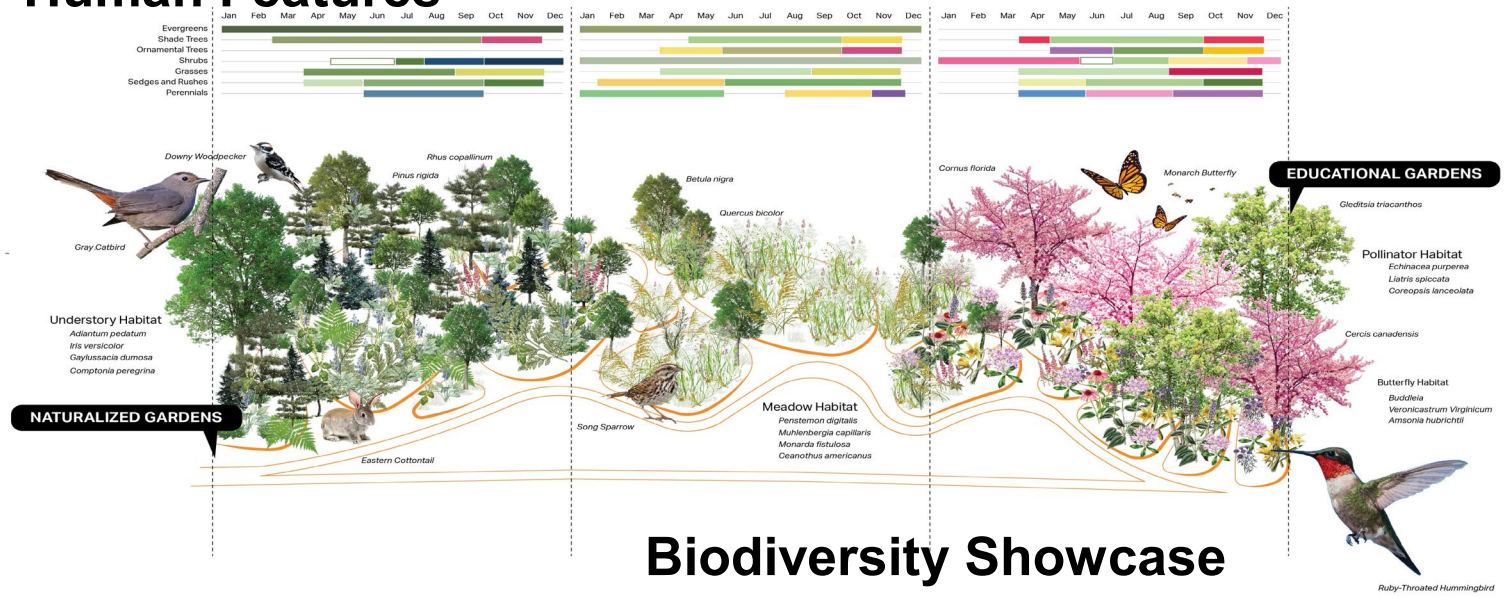
BASF East Newark

- Remediation – state Led
  - PCB and metals hot spot removal
  - Two-foot clean fill barrier placed over “historic urban fill”
- Restoration - Trustees Led (US DOI FWS & NOAA)
  - Design focused on biodiversity and human | ecological connectivity
  - Pollinator gardens, meadows, wooded areas, native plantings
  - 300-meter riverfront boardwalk weaving through natural landscapes – deciduous and evergreen forest, pollinator habitats, rain gardens, scenic overlooks
  - Playground and wooded amphitheater
  - Rain Gardens capture 100% stormwater provide a green infrastructure educational centerpiece

East Newark Key Features



Human Features



Upland Ecologies

Biodiversity Showcase

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BASF East Newark, NJ

Upper Left

Board walk and rain gardens along river, forested amphitheater

Lower Right

Pollinator gardens and shade features

BASF East Newark, NJ

View from park entrance
with planters in mid-ground

BASF East Newark, NJ

Amphitheater less
future forest, view upstream

BASF East Newark, NJ

View from atop amphitheater, looking down “spine” to the left, with raingardens and the boardwalk to the right and City of Newark.

Construction Camera – 10/22/24

Leading the Industry

The argument for regenerative remediation is strong

- Projects achieve better environmental and social outcomes
- Clients can accelerate asset retirement
- Regulators can achieve faster closure and community benefit
- Consultants can leverage multidisciplinary teams to create more meaningful projects


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