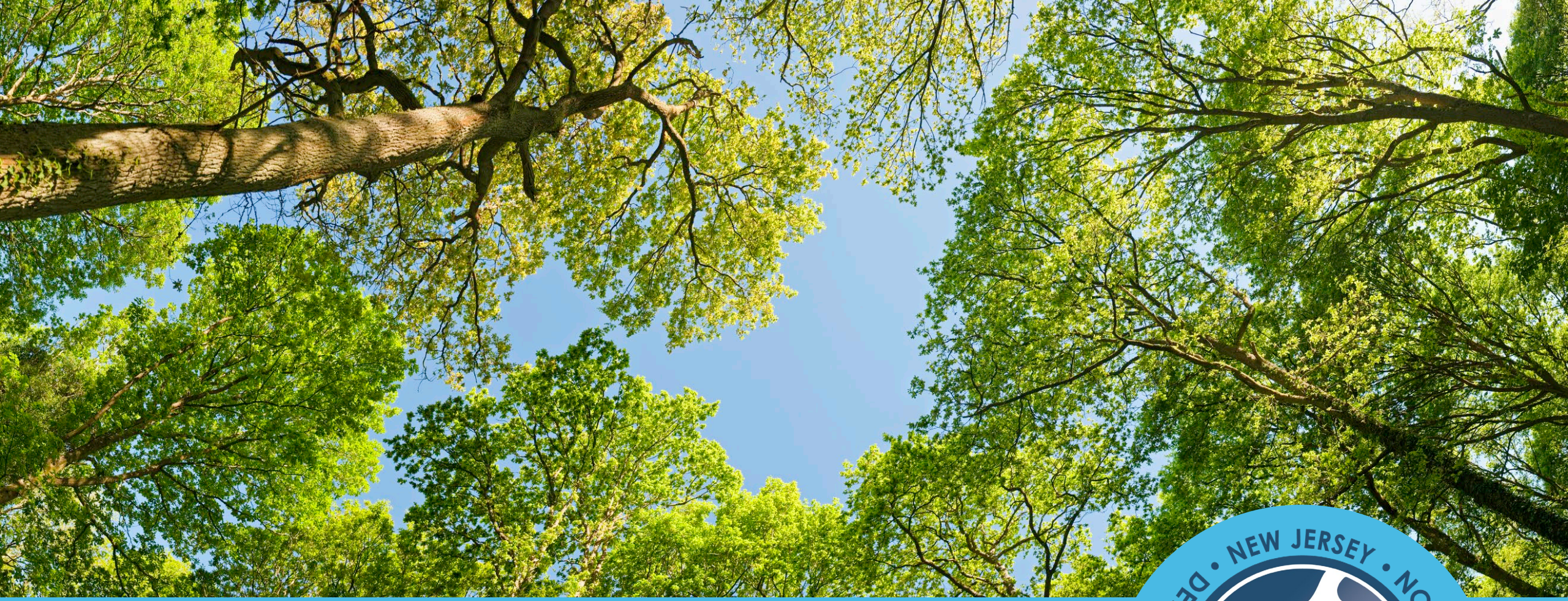

Proposed Natural Resource Restoration Settlement: Ciba-Geigy Superfund Site, Toms River, N.J.

March 13, 2023

AGENDA

- Introduction & Overview
  Sean Moriarty, Deputy Commissioner
- Accountability Efforts
  Michael Gordon, Senior Advisor
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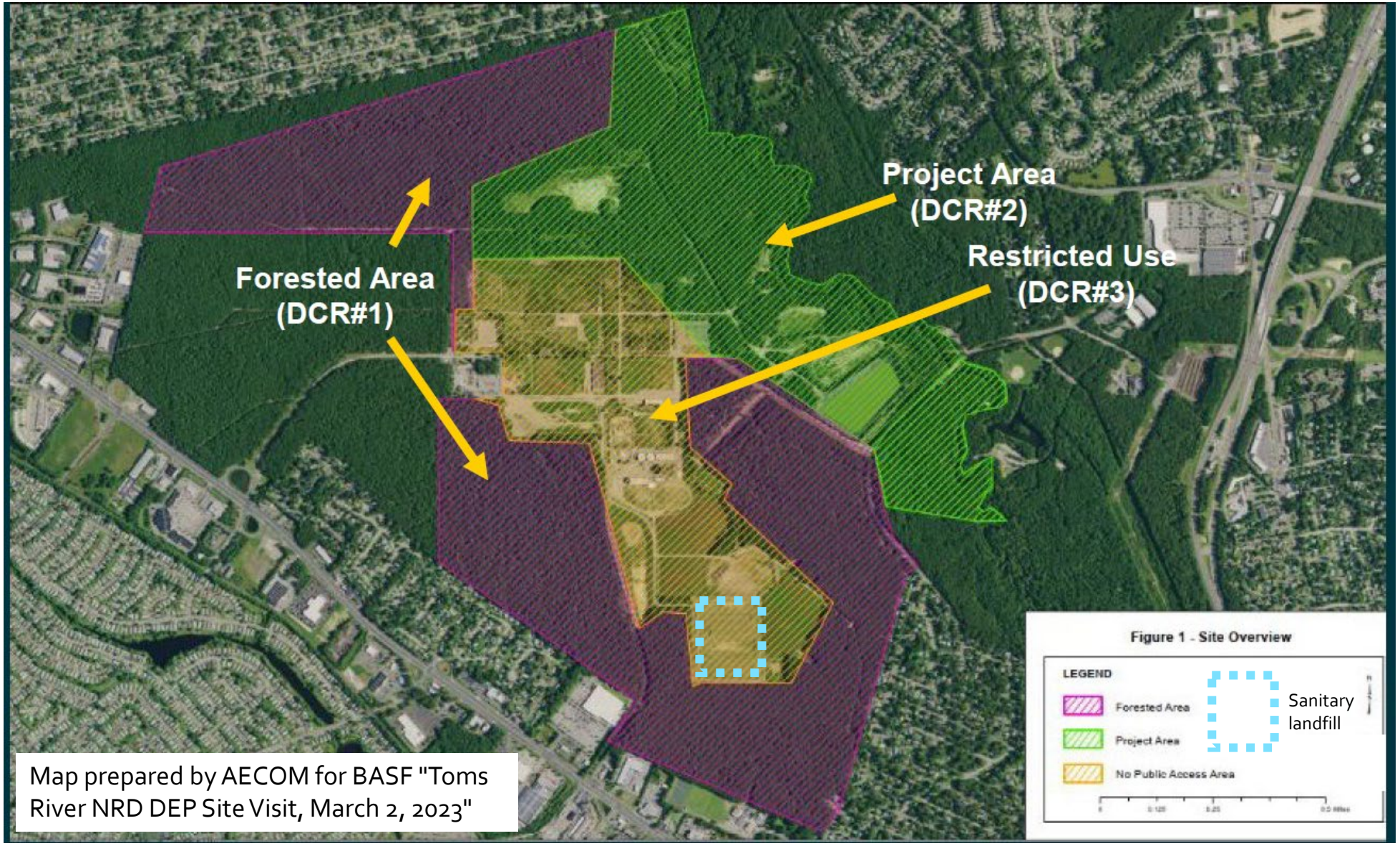
Site Overview



Map prepared by AECOM for BASF "Toms River NRD DEP Site Visit, March 2, 2023"

Full site: ~1,320 acres

Active Operations: 320 acres

Undeveloped: 1,000 acres

Preservation: 1,000 acres total.

- **Undeveloped (publicly accessible):** 790 acres
- **Operations Area (restricted use):** 210 acres

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Accountability Efforts

Remediation

- Clean up polluted sites by addressing contamination and by reducing the potential for exposure in accordance with applicable standards under oversight of a regulatory agency (EPA/DEP).

Personal Injury & Other Individual Claims

- Compensation for personal injuries, property damage, lost local revenue, and other individual claims.
- Pursued by individuals, private property owners, and local government units.

NRD

- Compensation to public for injuries to natural resources (groundwater, surface water, wildlife) due to the release of hazardous substances based on extent and duration of injury.
- Seeks equivalent compensation through land preservation, monetary compensation, restoration projects.
- Duty of natural resource trustee (DEP).

Prior Accountability Actions

1983

EPA places Ciba Geigy Site on the Superfund Site List and begins 40 years+ active investigation and remediation of the impacts from the site operations (~$300 million spent).

1985

State indicts Ciba Geigy for illegal dumping of hazardous waste.

1992

Ciba Geigy pleads guilty. Pays $9 million penalty (~$21 million today); reimburses DEP for millions in enforcement costs; agrees to immediately spend $50 million towards addressing site environmental conditions.

2000's

Thousands of Toms River residents obtained tens of millions of dollars in compensation and other relief after bringing litigation and claims against Ciba Geigy for personal injury including cancer claims, property damage, and medical monitoring.

Proposed NRD settlement specifically does not limit any individuals' or other public entity's rights to seek compensation.

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Superfund Clean-up: Investigation

- **1983:** Listed on the National Priorities List (Superfund site) – EPA lead agency
  - NJDEP reviews EPA actions and concur if protective of environment and public health
- **1983-2000:** EPA conducts full site investigation and assess feasibility of remedial measures
  - Assess areas of potential contamination through, among other things: (1) soil and groundwater sampling; (2) firsthand observations; (3) historical record review; and (4) review of historic aerial photography for evidence of disturbance.
- **Ongoing**: EPA utilizes phased remedial approach – designated two Operable Units (OUs)
    - OU 1 – Groundwater – April 24, 1989 Record of Decision
    - OU 2 – Source Areas – September 29, 2000 Record of Decision
- EPA website:

  CIBA-GEIGY CORP. | Superfund Site Profile | Superfund Site Information | EPA

  https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&id=0200078

Superfund Clean-up: Investigation

1. **Investigate Site**
   - Determine areas where contamination may exist
     - Historical aerial photographs show disturbed areas used for waste disposal and operations
     - Historical records review
   - Take samples in area where operations and waste disposal occurred
     - Install wells and take groundwater samples
     - Take soil samples
   - Compare sample results to regulatory standards to determine if remediation is necessary
2. **Feasibility Study** – evaluates options for remediation
3. **Records of Decision** – document the selected remedies
   - Operable Unit 1 – Groundwater – Record of Decision issued in 1989
   - Operable Unit 2 – Source Areas – Record of Decision issued in 2000

Superfund Clean-up: Remediation

Groundwater Remediation

- Contaminated groundwater is pumped and treated to meet applicable water quality standards
- Treated groundwater is discharged back to groundwater on the property
- Groundwater is monitored quarterly, and pumping adjusted as needed based on data

Removal and Excavation of Contamination

- 47,000 drums removed and disposed off site
- 341,000 cubic yards of soil and debris excavated
- 299,000 cubic yards of soil treated and backfilled on site

Additional Remedial Actions Completed

- 28 acres of caps installed and 1.3 miles of slurry walls – caps installed over areas where treated soil was placed and on landfill cells 1 and 3
- Toms River monitored semi-annually – results show no impacts to River from groundwater contamination

Operable Unit 1
Groundwater Record of Decision, signed 4/24/89 by EPA

Objectives of Groundwater Remediation

- Prevent use of contaminated water
- Restore aquifer to drinking water standards

Remedial Actions

- Irrigation wells sealed
- Classification Exception Area/Well Restriction Area
- Groundwater treatment
- Approximately 1 million gallons per day are extracted and treated; early on was up to 4 million gallons per day
- Treated water discharged back to groundwater on the BASF property
- Contaminated groundwater plume has gotten smaller overall

Operable Unit 2
Source Areas Record of Decision, issued 9/29/00 by EPA

Objectives of Source Area Remediation

- Address potential risks associated with direct contact with surface soils
- Shorten timeframe for the groundwater remedy – meet remediation goals faster

Remedial Actions

- 47,055 drums removed from the Drum Disposal Area (DDA) and disposed off-site
- Contaminated Soil from:
  - Drum Disposal Area (DDA)
  - Filter Cake Disposal Area (FCD)
  - Former South Dye Area (FSD)
  - Borrow Compacted Area (BCA)
  - Backfilled Lagoon Area (BLA)
- Soil excavated, treated and then capped in the DDA/FCD/FSD area
- Area capped with impermeable cap and vegetated cover
- Slurry wall surrounds area
- Equalization Basins (EQ Basins)
  - Excavation and ex-situ treatment of soil – treated soil backfilled
  - In-situ treatment of soil below the water table (saturated soils)
  - DNAPL remains – BASF will be installing pumping wells to remove DNAPL

Operable Unit 2: Source Areas

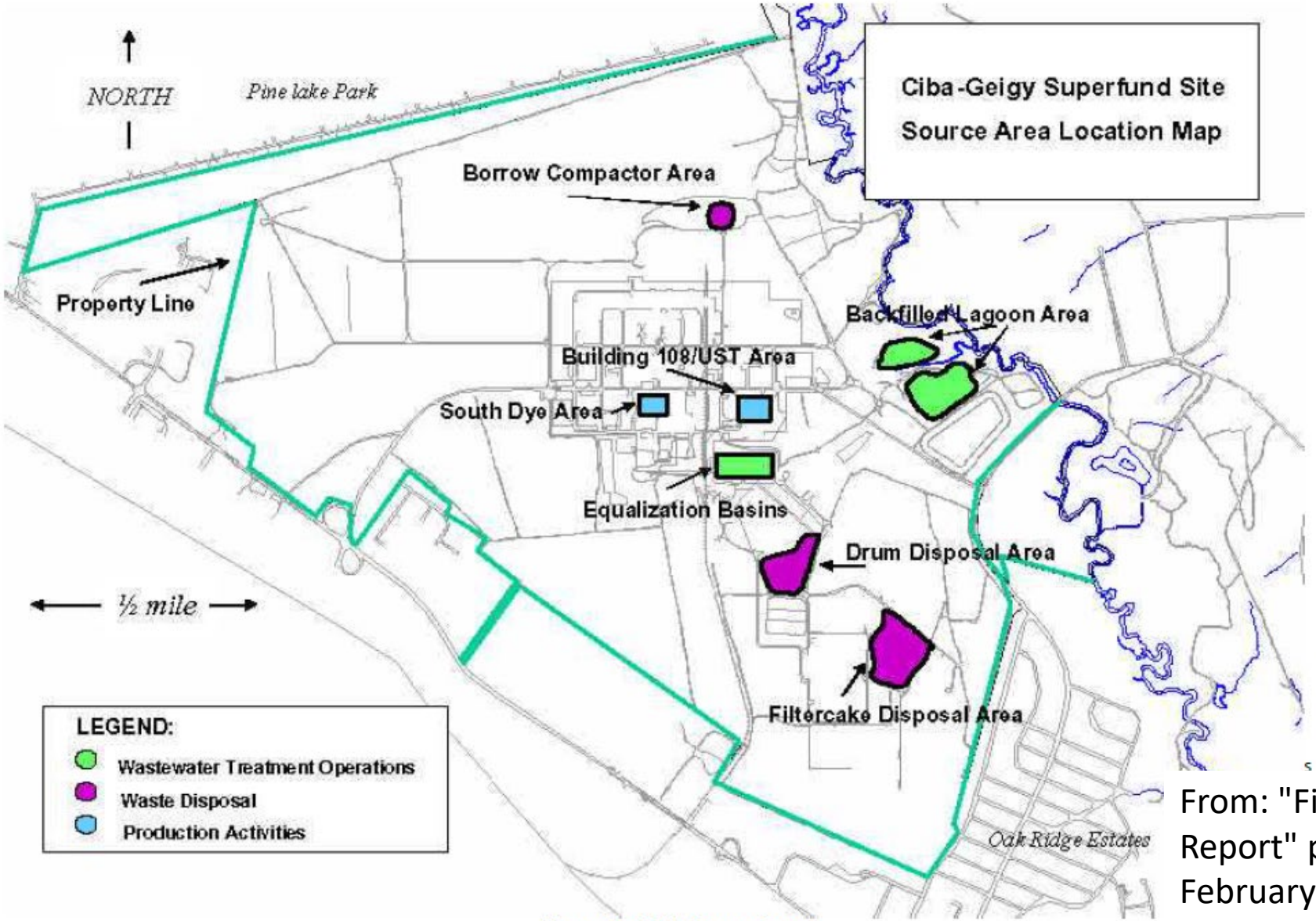


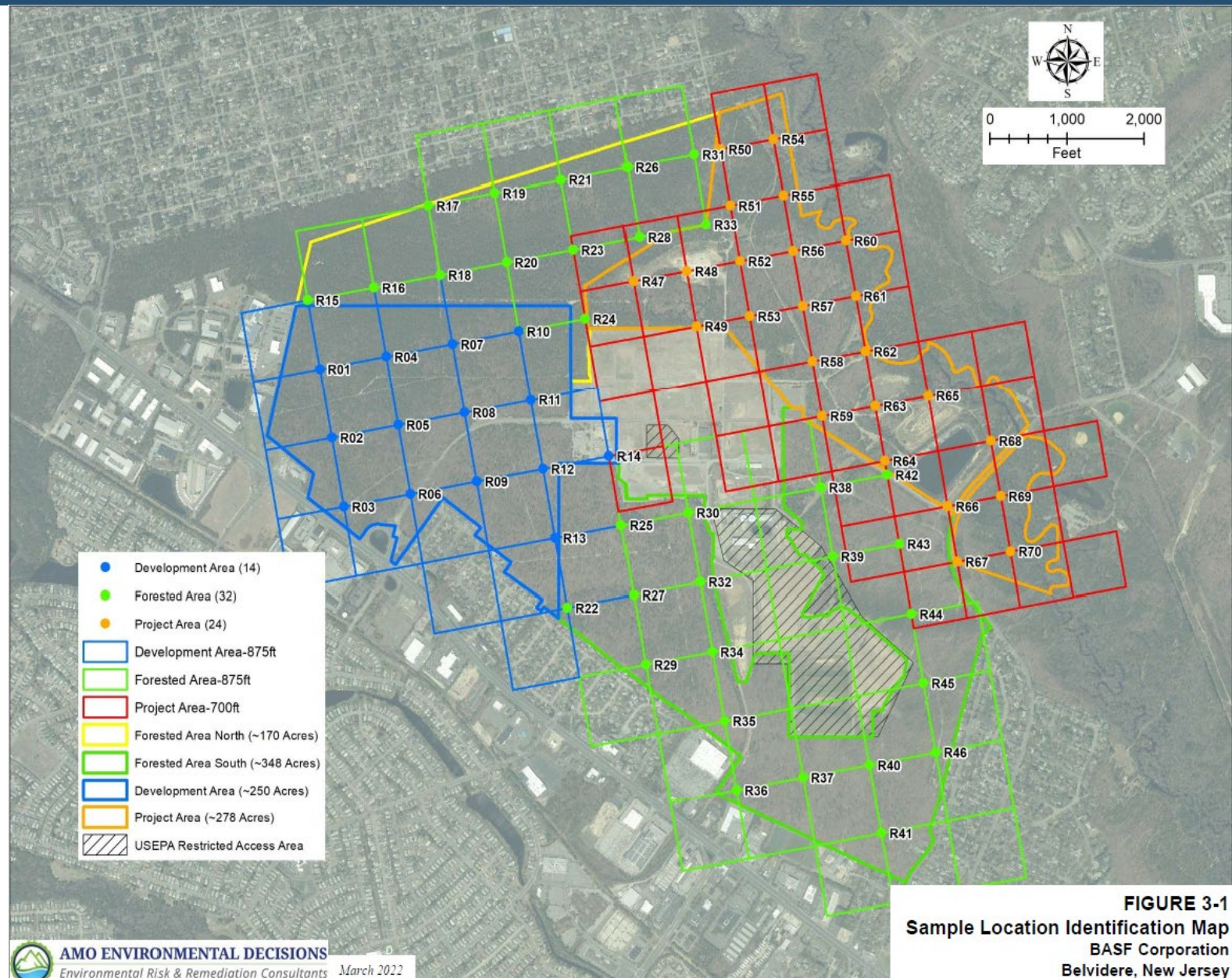
Figure 1 – OU2 Source Areas

From: "Five Year Review Report" prepared by EPA. February 22, 2023

Public Access Sampling

Soil sampling conducted in 2022 throughout 1,000 acres of preservation area show no concern for public recreational use

- Samples collected from 0 to 2 feet in depth to assess risk of contact exposure
- Samples meet residential soil remediation standard
- BASF has committed to address any areas that may require further remedial action for recreational use



Future Monitoring & Maintenance Activities

- BASF is responsible to remediate all contamination at the property related to former operations and disposal and will retain that responsibility

- Under EPA oversight, BASF is optimizing the groundwater extraction and treatment system by installing new wells and will be extracting DNAPL in the EQ Basin area

- BASF has committed to sample soil in areas that may have PFAS (per- and polyfluoroalkyl substances) contamination and will be required to conduct any remediation necessary to meet regulatory standards and ensure preservation areas are suitable for recreational use
    - DEP posted soil remediation standards after 2022 sampling occurred

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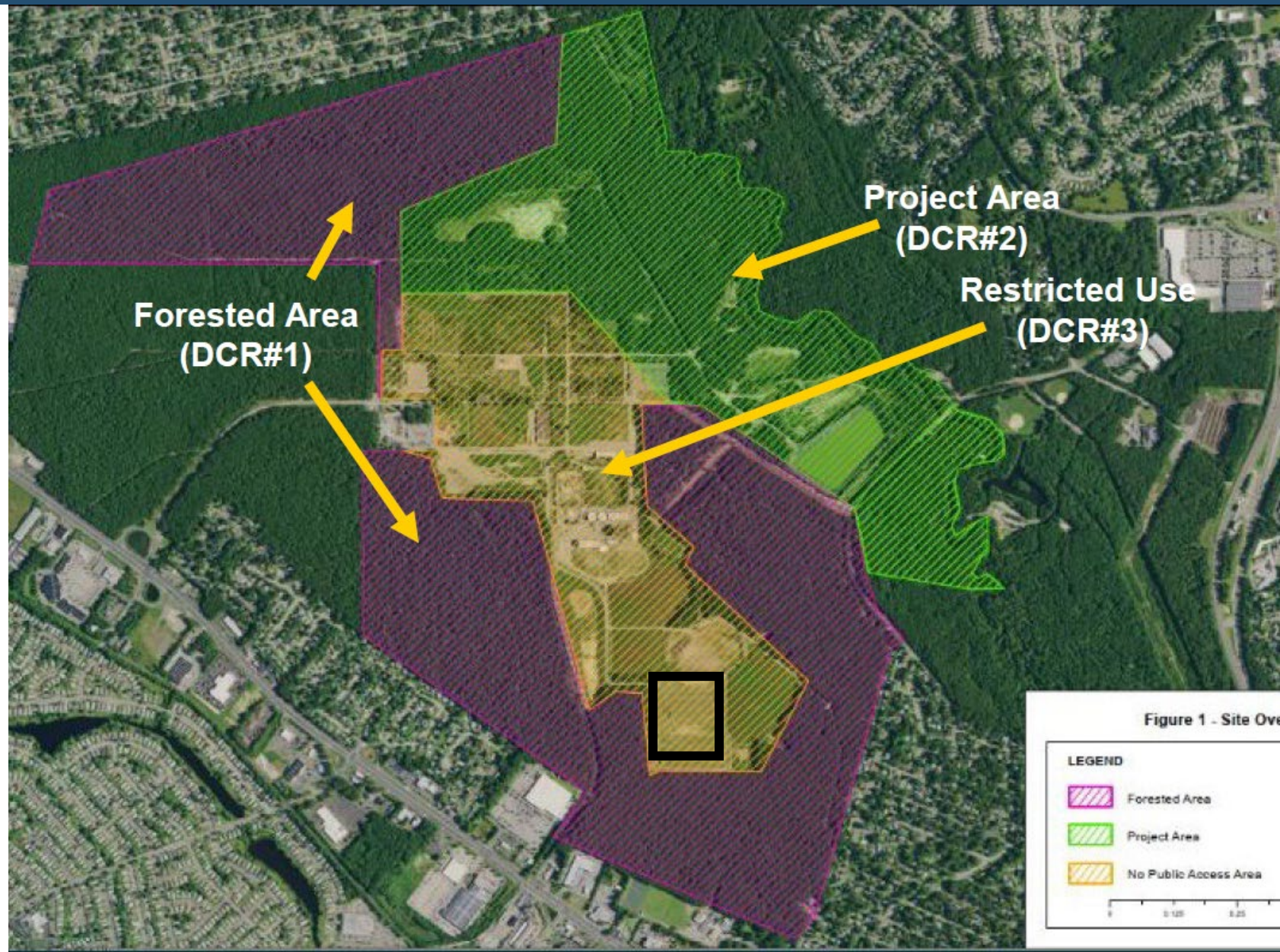
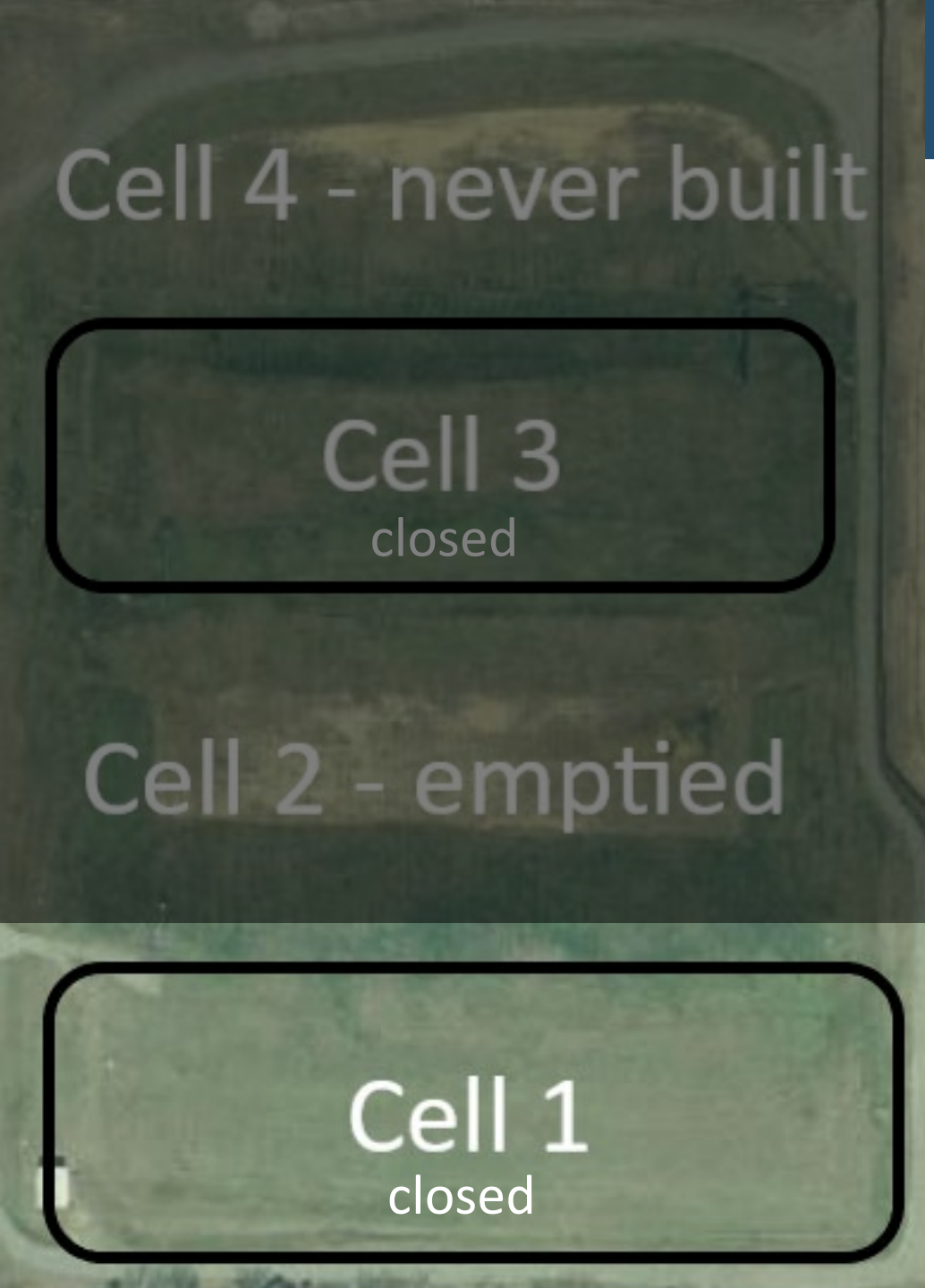
DEP-Regulated Sanitary Landfill

- Landfill is not considered a Superfund (CERCLA) source area.
- Permitted under NJ Solid Waste Rules (NJAC 7:26).
- Four cells allowed; one never constructed.

Sanitary Landfill





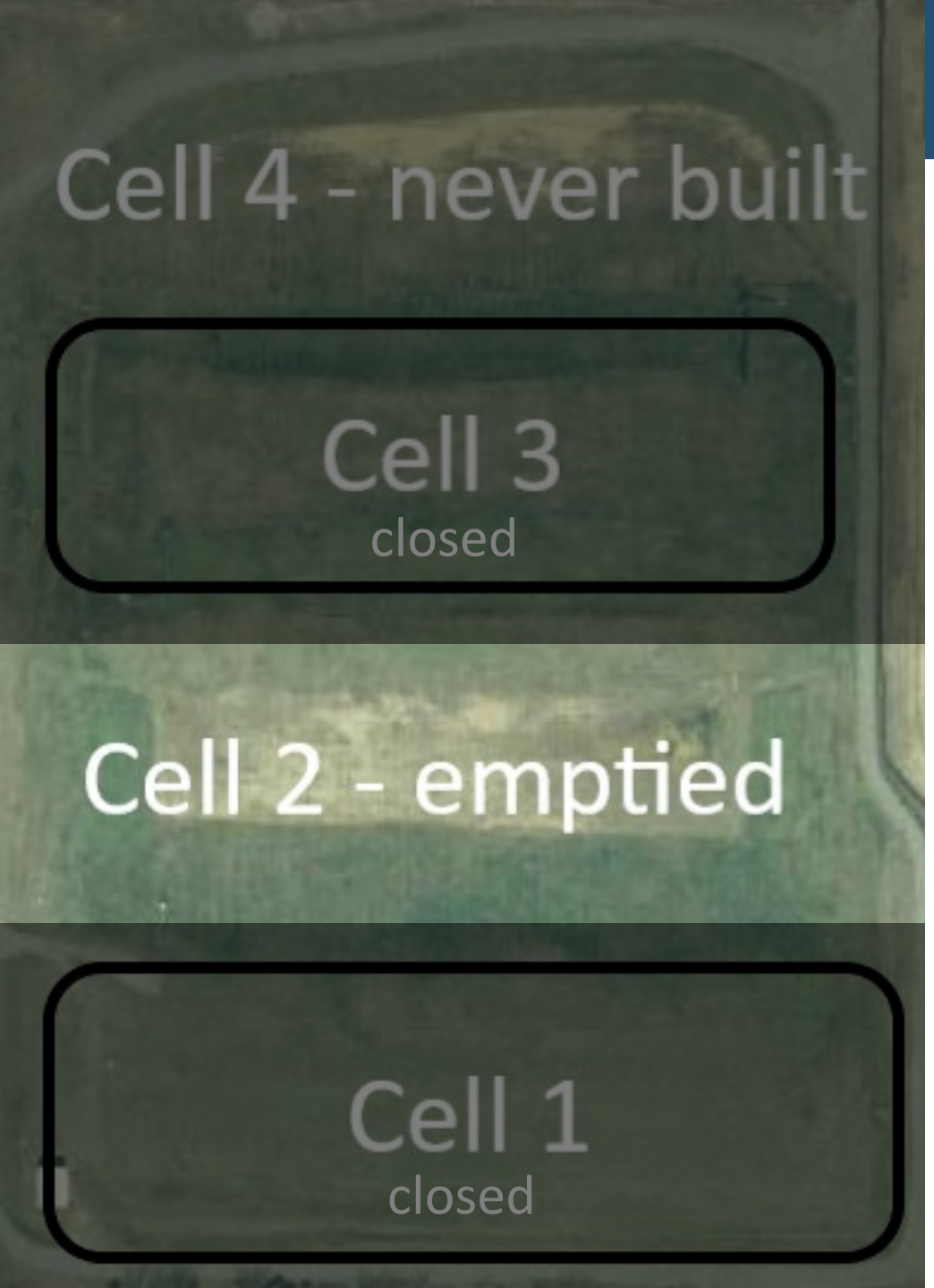
DEP-Regulated Sanitary Landfill: Cell 1

Operations

- Operated 1977-1982
- Approved for disposal of dry wastewater treatment sludge and dry non-hazardous chemical waste.
- Leachate (waste contaminated liquids) collection and leak detection – double liner system

Closure

- 1984 – Capped with PVC membrane and vegetative cover
- 1992 – Administrative Consent Order (ACO) – Orders cap upgrade due to suspected disposal of unauthorized materials (solvents)
- 1994 – Upgraded cap installed – double PVC membrane with 1 geosynthetic clay liner (GCL) on top – Hypalon membrane on northern slope.
- 2012 – Upgraded cap completed on northern slope – double PVC membrane.



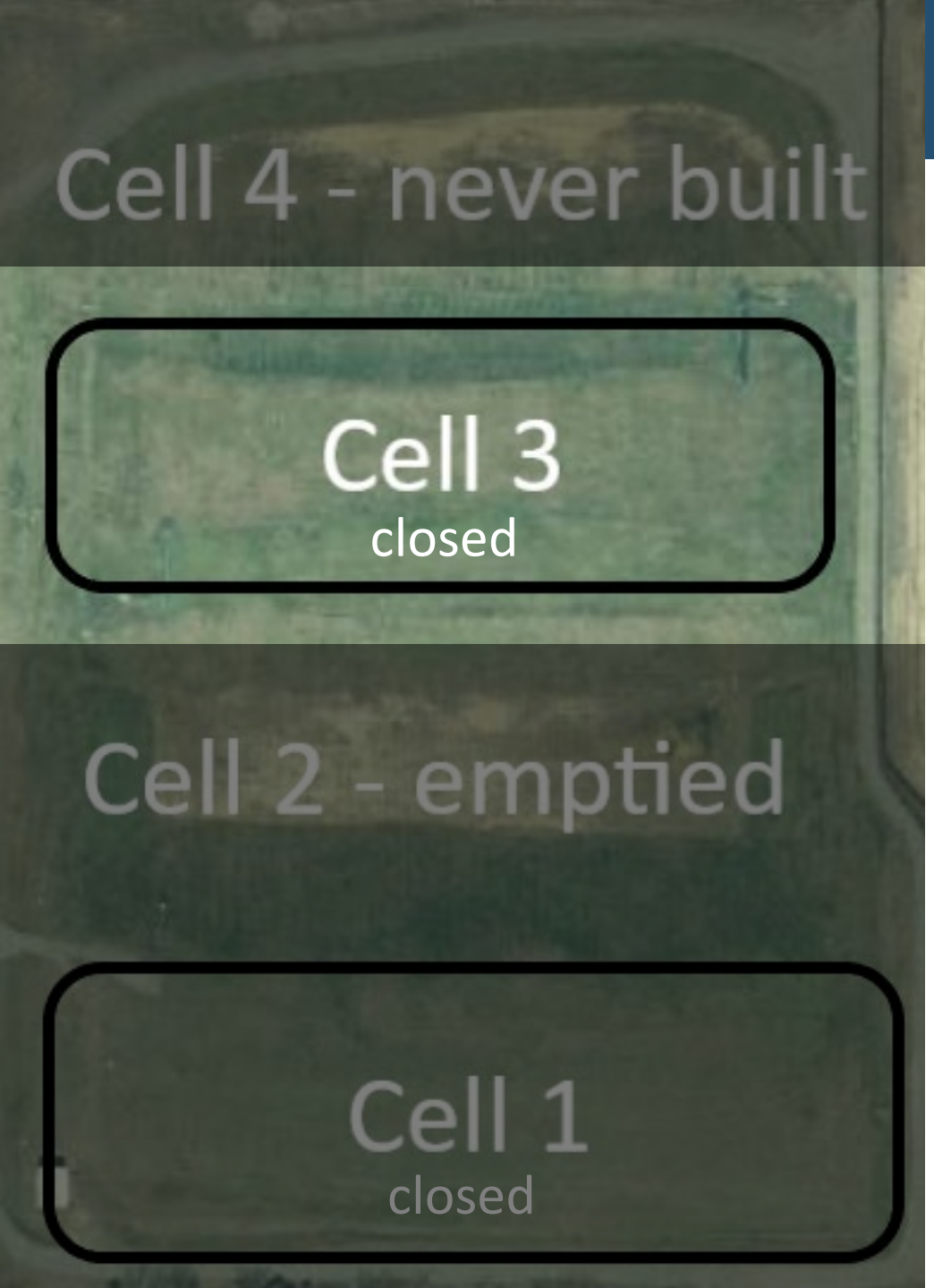
DEP-Regulated Sanitary Landfill: Cell 2

Operations

- Operated 1982 through 1984.
- Approved for disposal of dry wastewater treatment sludge and dry non-hazardous chemical waste.

Closure

- 1984 – Inspections discovered unauthorized wastes (drummed liquids and likely hazardous waste) – disposal discontinued.
- 1985 – ACO – Orders removal of drums.
- 1985/86 – 15,000+ drums removed and sent off-site – 48% hazardous waste - sludge and liner system remained.
- 1992 – ACO – Orders Cell 2 sludge and liner disposal into Cell 3.



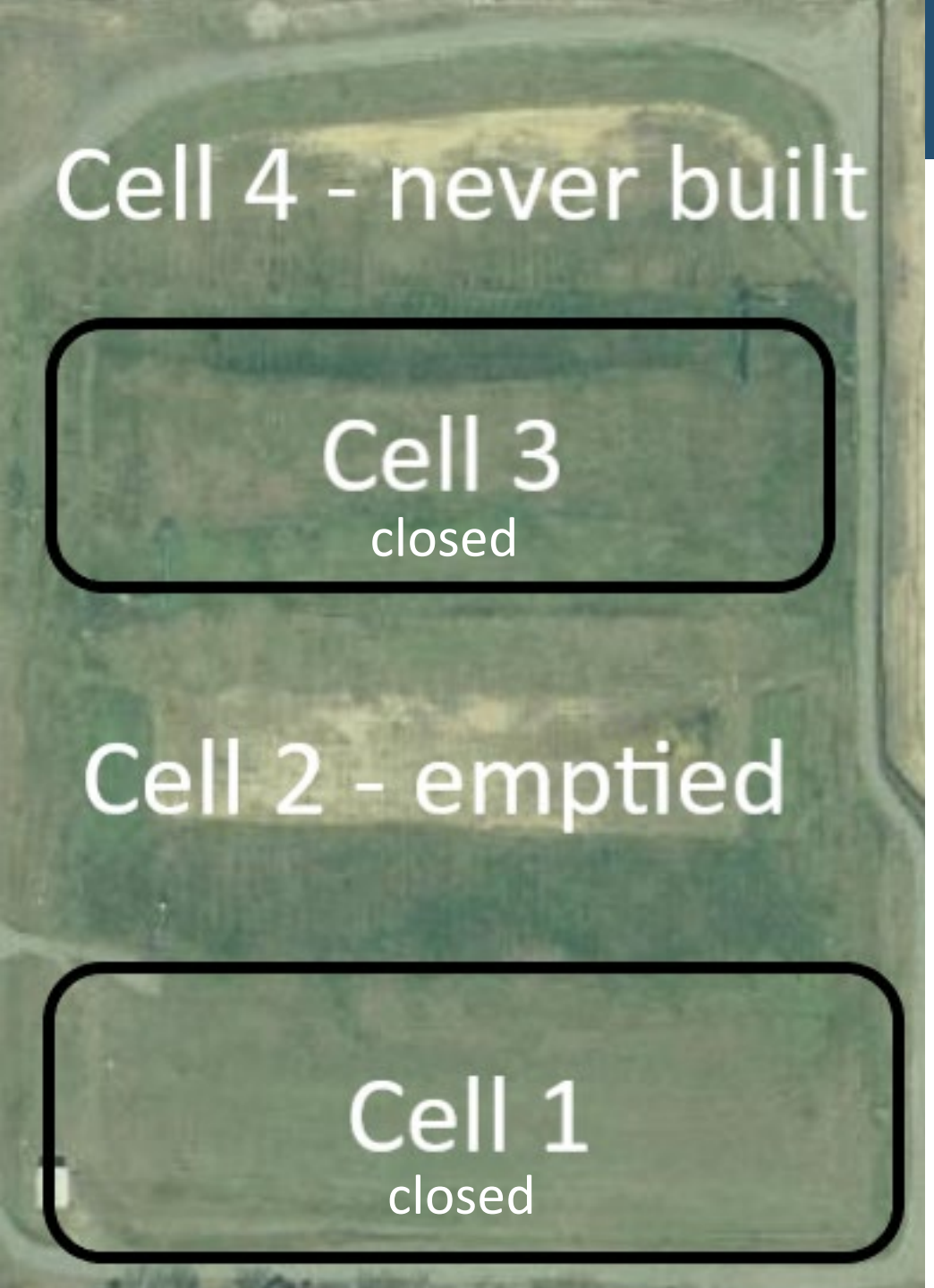
DEP-Regulated Sanitary Landfill: Cell 3

Operations

- Operated 1988 through 2006.

Background

- Double composite liner system – High Density Polyethylene (HDPE) and clay
- Leachate collection and leak detection
- Liner meets USEPA's hazardous waste standards
- On-site wastewater treatment sludge only.



Landfill Closure

- Landfill fully capped in accordance with DEP standards.
  - Includes composite capping prevent infiltration, ensure containment and eliminate exposure risks (very flexible polyethylene (VFPE) membrane over geosynthetic clay liner (GCL)).
- No evidence of landfill leakage: monitored through 3 waste-specific parameters (2-butanone; 4-methyl-2-pentanone; toluene).
- BASF responsible for 30-year post closure care period (2012 – 2042)
  - Extended as necessary to protect human health or the environment.
- Post-closure care includes: (1) operation, maintenance and monitoring of environmental controls (cap, storm water controls, gas vents, and security measures; (2) collection and treatment of leachate; (3) groundwater monitoring; (4) routine reporting to DEP.

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What are Natural Resources?

All land, fish, shellfish, wildlife, biota, air, waters, and other such resources held in trust by the Commissioner for the benefit of the public.

What is Natural Resource Restoration?

Remedial actions, like a Superfund cleanup, may not return injured natural resources to their condition before the contamination. Responsible parties must make up for the difference through restoration activities and compensate the public for the period of time that the natural resources remained injured.

What are Natural Resource Damages?

Natural Resource Damages or "NRD" refers to the means of compensating the public for the lost value of, injury to, or destruction of natural resources due to the discharge or release of hazardous substances into the environment.

Common Forms of Compensation to the Public

Land Preservation

Groundwater injuries

- Preservation of acreage necessary to provide water quality and recharge benefits comparable to the injured resource.

Restoration Projects

Groundwater and/or ecological/habitat injuries

- Responsible parties can implement natural resource restoration projects to offset injuries.
- Examples: habitat creation and/or enhancement, creation of public access and other restoration or enhancement projects.

Monetary Compensation

Groundwater and/or ecological/habitat injuries

- Monetary equivalent to value of resources needed to compensate for injury
- Funding used on preservation or restoration projects with nexus to the injury.

Voluntary Settlement v. Litigation

Voluntary Settlement

Potentially responsible party approaches DEP to voluntarily settle NRD liabilities

- Compensation and restoration occurs in a shorter amount of time
- Guaranteed outcome for the public

Litigation

- DEP initiates court action seeking to hold responsible parties accountable for NRD, with uncertain outcomes
    - Longer time to achieve restoration goals for public benefit
    - Unknown outcome from costly process

Other Considerations

Onsite Preservation at Source of Injury

- Consistent with New Jersey Constitution, BASF's legal obligation to preserve 1,000 acres is in the closest proximity to the historical injury
- The proposed preservation will not allow sale for development in the future and BASF will be foregoing profit from a future sale (based on other reported areas sales, highest and best use of property value would be approaching $200 million or potentially more)

BASF's funds will be used to implement and construct the projects

- Construction costs could reach tens of millions of dollars
- BASF will also reimburse DEP for $100,000 of the Office of Natural Resource Restoration's administrative cost

Continued Cleanup under CERCLA

- BASF's proposed resolution of its NRD liability does not alter or impact in any way its continued obligations to perform the Superfund cleanup under EPA oversight.
- BASF has publicly reported that the company and its predecessors have spent ~$300 million already on the Superfund cleanup.

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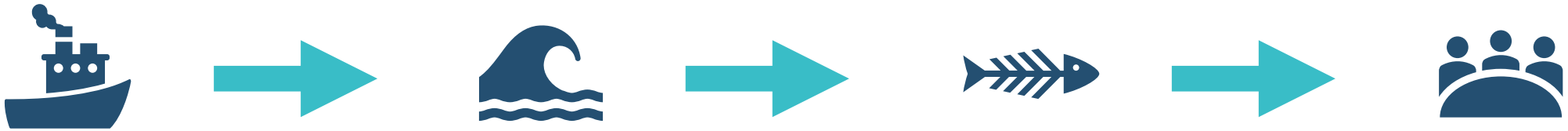
NRD Process

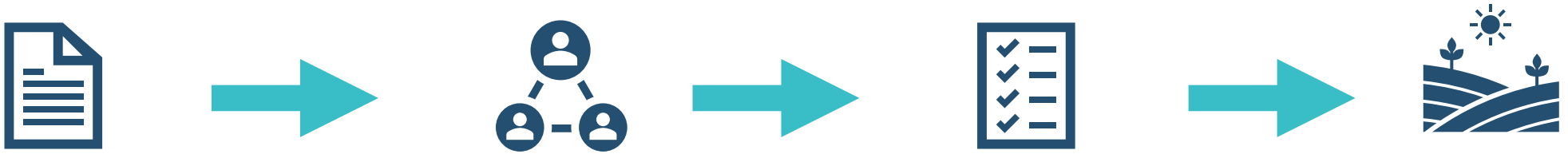


Spill Event

Injury to Natural Resources

Natural Resource Injury Assessment

Litigation or Voluntary Settlement



Consent Judgement/Draft Settlement

Public Comment / Engagement

Finalize Settlement Agreement

Resources Restored

Spill Event

A spill is the event in which hazardous substances are released into the environment.

At the **Ciba-Geigy Toms River Superfund Site**, improper waste disposal of sludge and process wastes throughout the site's operational history (1952-1996) resulted in extensive contamination of **natural resources**.

Natural Resource Injury Assessment for Ciba-Geigy

Groundwater Injury

- Groundwater below the Ciba-Geigy site was affected by the chemicals and wastes improperly disposed of on the site. Sampling of the groundwater was performed, and the plume was delineated.

Other Historic Ecological Impacts

- Discharges to Toms River
- Atlantic Ocean
- Terrestrial habitats
- Based on 2001 Public Health Assessment (https://www.nj.gov/health/ceohs/documents/eohap/haz_sites/ocean/toms_river/ciba_geigy/cgc_ha_3_01.pdf)

Natural Resource Damage Assessment Models

Ecological / Habitat Injury

Habitat Equivalency Analysis (HEA)

- Equates amount of natural resource injury to the amount of restoration needed to offset the injury
- Calculates the cumulative injury to a habitat type through time in Discounted Service Acre Years (DSAYs)
- Calculates the cumulative uplift from a restoration project through time in DSAYs

Groundwater Injury

Resource Equivalency Analysis (REA)

- Quantifies the contaminated volume of groundwater over the duration of the injury
- Calculates the land area (acres) or other recharge means necessary to provide an equivalent recharge volume of clean water to the aquifer

Groundwater Injury: Resource Equivalency Analysis (REA)

Injury Duration (Past and Future) 90 Years (1955-2045)	• Total estimated time of groundwater injury expressed in years • Injury start date based on site operational history since no analytical data exists. • Future injury end date based on approved ground water model.
Inflation Rate 3%	• 3% inflation rate adjustment. • In natural resource economics, the inflation rate accounts for the time value of a natural resource unit (i.e., a dollar in the past is worth more than a dollar today, which is worth more than a dollar in the future).
Quantity of Injured Groundwater Maximum plume ~522 acres	• Expressed as gallons based on maximum spatial extent of the plume in acres, geologic formation porosity, annual rainfall and duration (past, present and future) of groundwater plume.
Equivalency ~1,200 acres	• Recharge an equivalent volume of clean ground water to offset volume of impacted ground water.
Restoration 1,000 acres permanently preserved (532,504,086 gals)	• Amount of land in acres needed based on annual rainfall for replacement of impacted groundwater volume. Other appropriate aquifer recharge projects or monetary compensation can be substituted for land preservation.

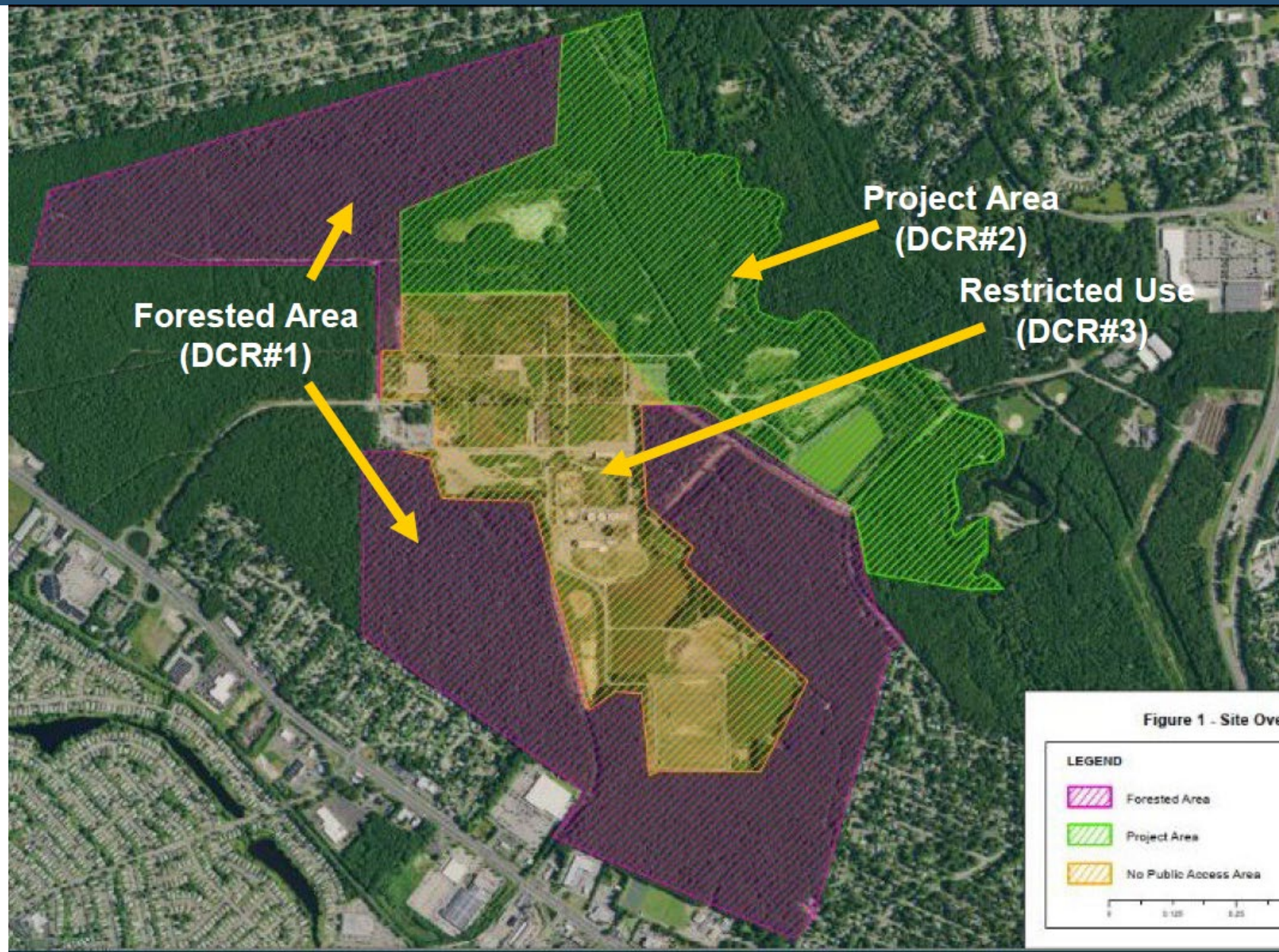
Settlement Agreement

- 1,000 acres
- 3 Deed of Conservation Restrictions (DCR)
- Land preservation provides compensation for groundwater injuries
- Ecological injuries compensated for by restoration projects and creation of public access opportunities

DCR 1 – Forested Habitat, **534ac**

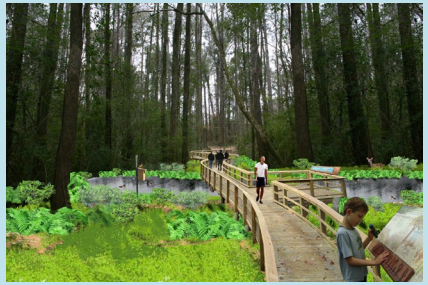
DCR 2 – Project Area, **251 ac**

DCR 3 – Uplifted grassland, pollinator meadow, and solar array with engineering controls for capped materials, **215 ac**



Concept Projects for Public Engagement


1. Perched Wetland / Pond Wooded Buffer




4. Floodplain / Wetland Enhancement

7. Forest Restoration


2. Environmental Education Center


5. Grassland / Observation Platform

8. Winding River Park Connection


3. Grassland / Pollinator Habitat

6. Northern Pine Snake / Bat / Turtle Conservation

9. Uplifted Grassland / Pollinator Habitat / Solar Array

Images from BASF where not otherwise attributed.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Feet
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SANITARY LANDFILL
FOREST
WETLAND
FLOODPLAIN
SHRUB
GRASSLAND/POLLINATOR HABITAT

Concept Projects for Public Engagement

1. Perched Wetland/Pond Wooded Buffer

~25 acres of uplift

Concept Projects for Public Engagement

2. Environmental Education Center

~9 acres of uplift

Concept Projects for Public Engagement

3. Grassland/Pollinator Habitat

~4 acres of uplift

Concept Projects for Public Engagement

4. Floodplain/ Wetland Enhancement

~27 acres of uplift

Concept Projects for Public Engagement

5. Grassland/ Observation Platform

~8 acres of uplift

Concept Projects for Public Engagement

6. Northern Pine Snake/Bat/Turtle Conservation

Concept Projects for Public Engagement

7. Forest Restoration

~5 acres of uplift

Concept Projects for Public Engagement

8. Winding River Park Connection

Concept Projects for Public Engagement

9. Uplifted Grassland/ Pollinator Habitat/ Solar Array

~120 acres of uplift

Public Comment Period

Public Notice of the proposed settlement was posted on **December 5, 2022**.

- Comment period to close **April 5, 2023, at 5:00 p.m. Eastern**.
- A response addressing public comments will be posted to ONRR's website after the close of the comment period.

Potential Next Steps

Review and Respond to Public Comments

Public Information Session and Outreach on Project Concepts

Finalize Designs and Begin Construction of Restoration Projects

Restoration Projects Complete

Future steps should the Settlement Agreement become final

More Information

Ciba-Geigy BASF Website: https://dep.nj.gov/basf/

DEP Office of Natural Resource Restoration Proposed Settlements: NJDEP- NRR: Settlements

Public Notice of Draft Natural Resource Damages Settlement Agreement: 20221205-draft-settlement-agreement-basf-notice.pdf (nj.gov)

Proposed Natural Resource Damages Settlement with BASF Corporation in the Matter of Ciba Geigy Toms River Superfund Site: 202105-draft-settlement-agreement-basf.pdf (nj.gov)

Public Health Assessment: Ciba Geigy Corporation March 12, 2001: Docscgc_PHA_fnl.PDF (nj.gov)

EPA Superfund Site: Ciba-Geigy Corp. Toms River, NJ: CIBA-GEIGY CORP. | Superfund Site Profile | Superfund Site Information | US EPA

EPA Site Redevelopment Profile Ciba-Geigy Corp.: Region 2 Ciba-Geigy Site Redevelopment Profile (epa.gov)

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