The Flint River is a nearly 350 mile long river with headwaters directly north of Hartsfield-Jackson Atlanta International Airport. The Flint River flows south through Georgia until it reaches Florida and flows into the Gulf of Mexico.

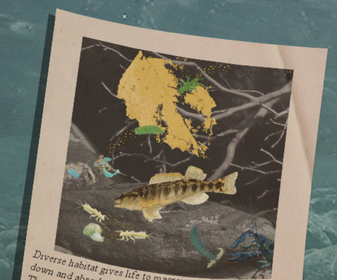
The Flint River is piped under the Atlanta Airport almost immediately downstream from its headwaters. This has shaped the ecological health and recreational function of the river.

Atlanta

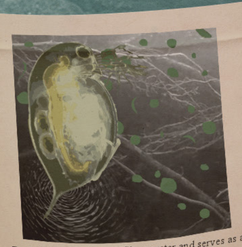
The river crosses Georgia's Fall Line, which divides it between the Southern Outer Piedmont and the Southeastern Floodplains and Low Terraces ecoregions.

Come along as we explore the Flint River, Atlanta Airport, and biodiversity potential of both of these living machines.

Gulf of Mexico



Diverse habitat gives life to macroinvertebrates. They break down and absorb carbon and nutrients from organic matter. These resources are then passed up the food chain.



Daphnia, a zoo plankton filters water and serves as a foundation block of the Flint's entire ecosystem.

Mussels filter suspended solids out of the water column. They reproduce through a symbiotic relationship with trout.

Beginning in Atlanta, the Flint River gathers high levels of chemical and sedimentary pollutants.

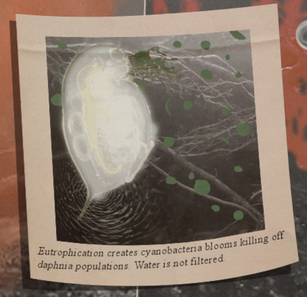
Farmland along the river contribute fertilizer pollutants causing algal blooms and hypoxia.

Atlanta

Recreation is more common further south along the river

Gulf of Mexico

Runoff from developed areas destroys macroinvertebrate habitat. Nutrients and carbon do not move up foodchain but release into the water column and atmosphere.



Eutrophication creates cyanobacteria blooms killing off daphnia populations. Water is not filtered.

Food source losses upstream kill trout. Mussels cannot complete reproductive cycle. Habitat loss kills others.


HEADWATERS
LEGEND
Parcels
Roads
Train tracks
Buildings
Parks
Wooded areas
Parking lots
Turf areas
Rivers and streams
Wetland
Ponds
Detention ponds
ATLANTA AIRPORT + SURROUNDING LANDSCAPES
WE ARE HERE
Our current location
Airport property boundary
Flint River


CONTIGUOUS UNITED STATES
THE PEACH ST
The Atlanta Speedway was built in 1909 by Coca-Cola founder Asa Candler. The tract of land it sat on was comprised of relatively flat farm and swamp pastures as it is though to have contained a Flint River headwater. Costing $400,000 to construct, the Atlanta Speedway was in operation for only one racing season.
1920s
In 1925, the City of Atlanta signs a five year lease for the former Atlanta Speedway. The infield of the track had been used for plane landings for years prior.
The abandoned racetrack sat at what is the north end of the airport today. Approximately 287 acres of land, the site included a swampy landscape around a Flint River tributary.
The first commercial flights at the new airport are mail carrier routes by Florida Airways and Pitcairn Aviation.
In 1929, the City of Atlanta buys the land for $94,400 and officially names the airport Atlanta Municipal Airport.
1930s
Delta Air Lines begins its first service between Atlanta and Birmingham. Delta is the Atlanta Airport's oldest continuous tenant.
DELTA AIR LINES
DELTA AIR LINES SCHEDULES
THE TRANS-SOUTHERN ROUTE
In 1930, Eastern Air Transport begins its first continuous passenger service from Atlanta to New York. Delta adds more passenger service routes and a new control tower is constructed towards the end of the decade.
1940s
HANGAR ONE
ATLANTA HARTSFIELD AIRPORT
The airport is used as a World War II airbase starting in 194 air services continue during this time, with the airport continues to increase. The airport reaches a record of takeoffs and landings in a single day in 1940, making it s busiest airport.
In 1948, airp moved into Hangar One, a war-surplus han construct a new, larger termi
1950s + 1960s
Work on the new terminal begins in 1957. The airport saw more than 2 million passengers a year.
The new terminal opens in 1961. This terminal is designed to accomodate 6 million travellers a year. 9.5 million travellers pass through in its first year. Planning for a greater capacity terminal begins.
In 1971, the airport is renamed William B. Hartsfield Atlanta Airport. The airport's first international service to Mexico also runs this year.
Construction on the new $500 million Midfield Terminal complex begins in 1977.
1970s
1980s
The new terminal complex, which was the world's largest, opens in 1980. The new passenger terminal complex is 2.5 million square feet.
The fourth parallel runway is completed in 1984, increasing the airport's takeoff and landing capacity. The MARTA Airport stop opens in 1988.
WELCOME TO EASTERN AIRLINES AT THE NEW ATLANTA-MIDFIELD TERMINAL
1990s
Atlanta
The Emerald City
A new international concourse opens in 1994 and a $250 million improvement program is completed by 1996.
2000s
The Airport is named as the World's Busiest Airport (for passenger traffic and landings and takeoffs). It saw more than 78 million passengers in 1999.
33° 38' 12" North
84° 25' 41" West
Located 10 miles from Downtown Atlanta
2,1000 Arrivals and Departures every day
23 Airlines Operating
The Plane Train: Three mile loop carrying over 200,000 passengers a day
Georgia's largest employer: 63,000 employees
Five runways
Seven concourses
Triple takeoff/landing capability
Total Airport Area: 4,700 acres
Busiest Airport in the World 23 out of 24 years!
HARTSFIELD JACKSON INTERNATIONAL AIRPORT
Delta Air Lines has remained an important partner of the Atlanta Airport, currently housing its headquarters in facilities in the north corner of the airport. Delta is one of Atlanta's top employers, with over 40,000 full-time employees. The Delta complex includes over 65 acres of impervious parking lots.
Airport expansion plans were shared as early as the late 1960s, and included a $41.75 million land-buying program. Expansion plans included the purchase of entire neighborhoods as well as a handful of schools and churches.
Homes were purchased from residents and then auctioned off for materials by the city. Land surrounding the new expansion was deemed appropriate primarily for commercial and industrial use.
The Atlanta Airport has expanded from 287 acres in its Candler Field days to 4,700 acres today. Its seven concourse terminal complex is 156 acres alone. A three-mile long Plane Train carries 200,000 passengers between these concourses every day.

These birds (and bat), and many more species, were reported in wildlife strikes at the Atlanta Airport in 2023. That year, the airport reported 323 strikes, also including incidents with wildlife such as coyotes and white tailed deer.

To prevent bird strikes, the Atlanta Airport implements sound cannons and other deterrents. Airports across the world have different strategies for handling wildlife on-site. The Munich airport has embraced birds by curating tall-grass landscapes that deter certain bird species from runway-adjacent plots while maintaining a healthy, biodiverse landscape.

European Starlings are one of the most commonly dealt with bird species at the Atlanta Airport. "Exclusion devices" are used to prevent birds from perching on instruments in the airport's infield.

FAA Guidelines suggest that airport personel pursue the following course of action when dealing with recurring wildlife:

1. Habitat Mitigation (remove food, cover, and water)
2. Harassment (wildlife sweeps, implementation of repellants)
3. Depredation (zero tolerance policy for deer, shooting other wildlife when necessary)

Coyotes have caused interference over the years, delaying flight takeoffs when found near runways.

Once, an American Staffordshire terrier show dog escaped her crate and was lost on airport grounds for three days before being found near a detention pond.

U.S. Environmental Protection Agency

Ecoregions of Georgia

The Atlanta Airport falls into Georgia's Southern Outer Piedmont ecoregion, a region is defined by its range of upland forests and natural wetlands.

LAYERS:

Air Circulation
Cones represent the clear air space required for takeoff and landings.

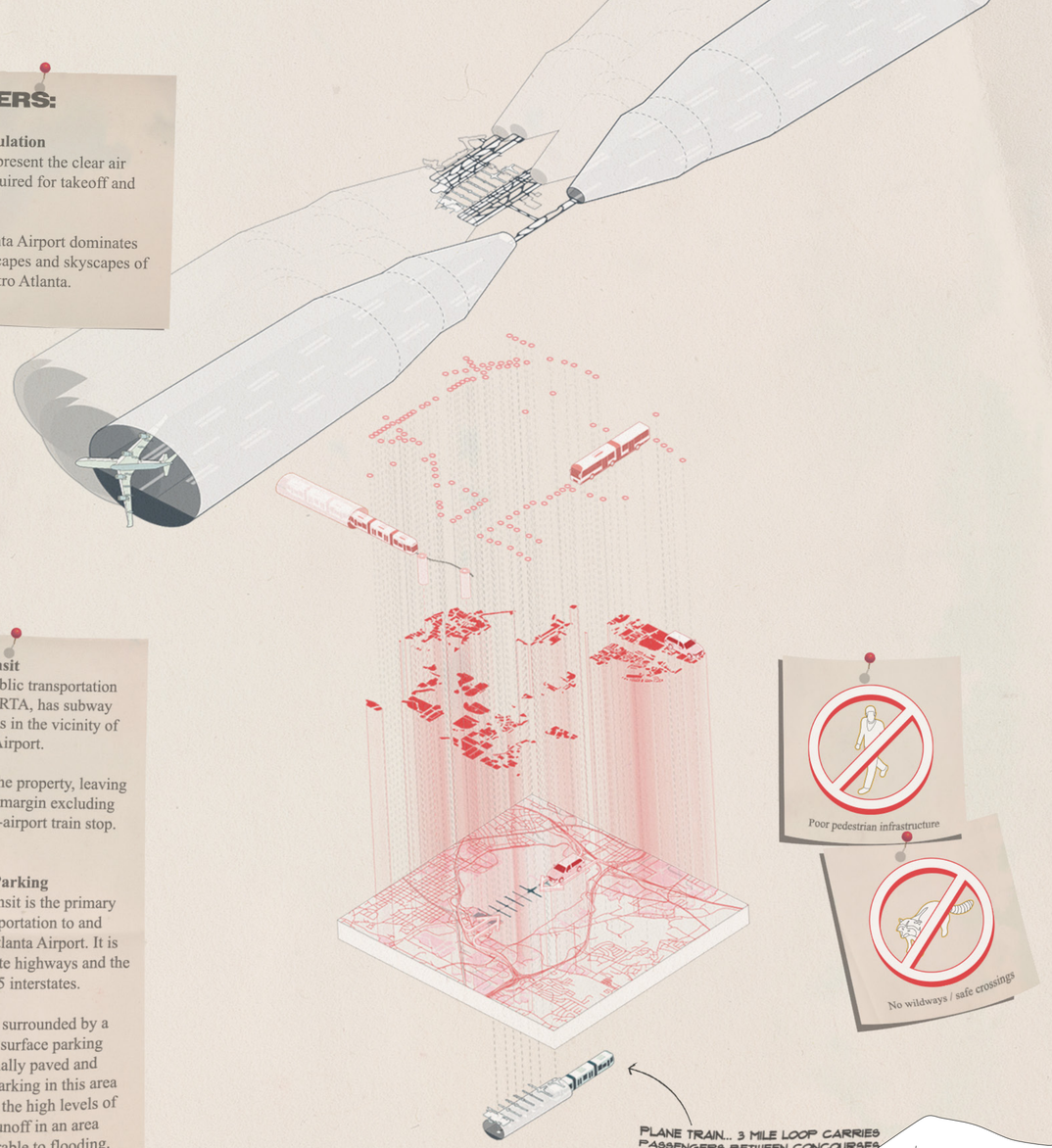
The Atlanta Airport dominates the landscapes and skyscapes of south Metro Atlanta.

Public Transit
Atlanta's public transportation system, MARTA, has subway and bus stops in the vicinity of the Atlanta Airport.

Both circle the property, leaving a significant margin excluding MARTA's in-airport train stop.

Roads and Parking
Vehicular transit is the primary form of transportation to and around the Atlanta Airport. It is circled by state highways and the I-85 and I-285 interstates.

The airport is surrounded by a large mass of surface parking lots. Traditionally paved and low-density parking in this area contributes to the high levels of storm water runoff in an area already vulnerable to flooding.

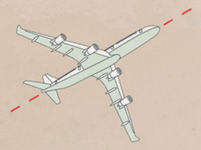


Poor pedestrian infrastructure

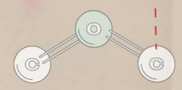
No wildways / safe crossings

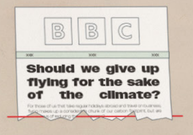
PLANE TRAIN... 3 MILE LOOP CARRIES PASSENGERS BETWEEN CONCOURSES

MACRO



ATL Airport produces 418,878,298 lbs/year





x286,000 every day!

The Atlanta Airport carries flights to over 225 domestic and international destinations

Atlanta's location makes it ideal for connections to the Caribbean and Central America

ATL Airport has been ranked the world's busiest airport 23 out of 24 years

CITY

URBANIZE

Analysis: Atlanta clunks as bottom five U.S. commuter city. Ouch!

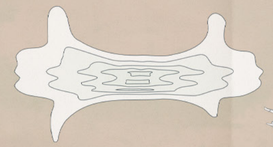
The ATL Airport machine contributes to Atlanta's traffic problem

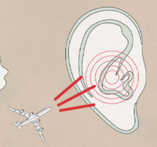
With a massive employee base and limited public transit options, the airport encourages vehicular traffic from passengers and everyday employees

NEIGH-BORHOOD

The Atlanta Journal-Constitution

Maps show metro Atlanta exposure to airport, highway noise





Noise around the ATL Airport has been reported to shatter non storm-proof window panes

Residents describe a constant, though not always distracting, hum of takeoffs and landings. Airport noise is a fact of this area and is noticeably absent (and missed by some) when paused (for weather, operation trouble, etc.)

INDIVIDUAL

WABE

Pedestrian deaths in Atlanta up and Black neighborhoods affected the most

Roadways adjacent to the airport have extremely poor pedestrian infrastructure

Often, sidewalks are missing completely and crosswalks terminate into unsafe and non-designed walkways

This is despite the existence of many residential areas

Poor-to-non-existent pedestrian infrastructure in residential areas near the airport furthers the hostility of the airport machine towards residents.

MICRO

A host of evidence of wildlife found immediately outside of airport property

Tracks along a sandy bank of the Flint River reveal the presence of raccoons, deer, and other wildlife

A beaver chewed the bark off of this stick!

Evidence of beavers and other wildlife from the point above

LAYERS:

Left: IMPERVIOUS

Taxiways and Runways at the Atlanta airport are completely impervious concrete slabs

Surface Parking Lots are a significant amount of land at and directly surrounding the airport

Roadways surround the airport, including major interstates with significant widths of impervious paved surfaces

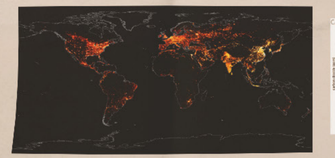
Right: PERVIOUS

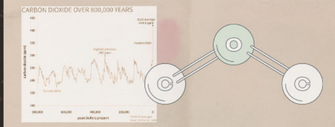
Airport Infield is all swaths of turf grass between taxiways and runways. This also includes slopes at the end of the runways, and planted, sloped buffers between runway and interstate.

Parks are represented by stars, there isa limited number of small public parks in this area.

Wooded areas can be found surrounding the airport in between interstate entrance/exit ramps, and along the Flint River as it enters the industrial corridor south of the airport.

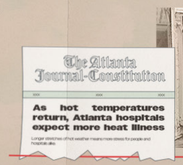
MACRO





Globally, increasing pervious surfaces not only trap heat but prevent the carbon sequestration that would occur with naturally existing soils and landscapes

CITY



Impervious infrastructure at and supporting the airport contribute to urban heat island effect in Atlanta and Metro Atlanta

Some homes were even leveled on film for the 1985 Chuck Norris movie "Invasion U.S.A."

In 1978 the I-85 interstate was moved one-third of a mile to the west to accomodate a new terminal. The Atlanta Airport truly dominates the landscape that it is centered in.

NEIGH-BORHOOD

Over decades, neighborhoods have been swallowed up by airport development

Hundreds of homes were purchased and destroyed to make way for airport expansion and more "compatible" adjacent land uses

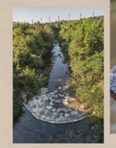
INDIVIDUAL

Though there are wooded swaths of land in this area, they are primarily industry-adjacent and not suitable human-scale use

In 2021, a fuel spill at the Atlanta Airport released 700 gallons of jet fuel onto the runway, draining into the Flint River. The spill killed fish along two miles of the river and the airport was given a find of $40,000. Jet spills have happened before and will always flow off of the airport's large expanse of impervious surfaces down to storm drains which empty into the Flint.

MICRO

Jet fuel and other chemicals from the airport flow into the Flint River during normal runoff and after spills



Pollutants kill imporotant fish and macroinvertebrate populations downstream of the airport

Photos: AJC and Virginie Kippelen

Flint River site visit with Hannah Palmer (Finding the Flint) and R.J. Gipaya (Flint Riverkeeper)

Flint river headwaters

LAYERS:

Culverts
Shown in navy running throughout airport property (outer border)

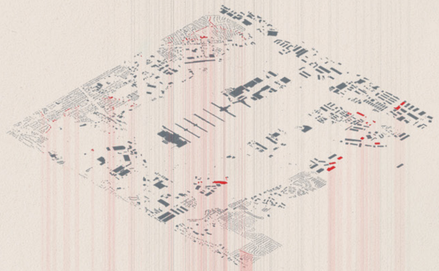
Discharge Points
Shown in red, discharging directly to water bodies surrounding the airport

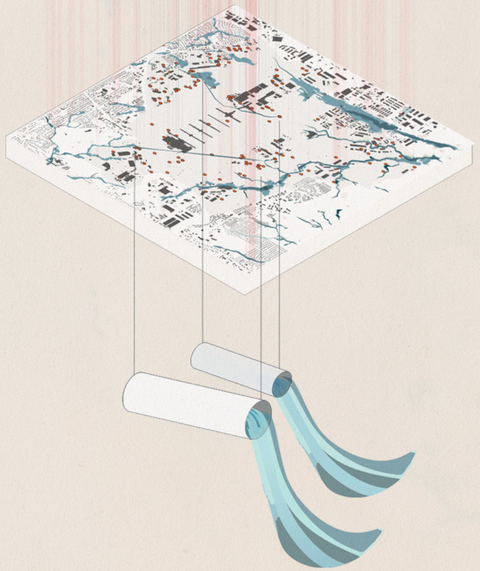
Detention Ponds
Shown in light blue, there are a number of detention ponds on airport property. FAA regulates that detention ponds must have concrete bottoms and a 48-hour dry time -- not all ATL Airport detention ponds satisfy this whlie having no apparent wildlife hazard issues

Flood Risk Buildings
Marked in red, these buildings sit in the flood plain of the Flint River and its tributary streams

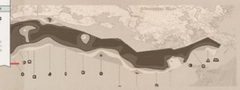
Flood Plain
Shown in blue, there are a number of flood plains surrounding the airport, especially impacting surrounding neighborhoods and the southeast industrial corridor

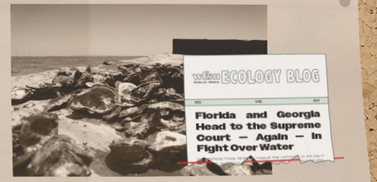
River Piped Under Airport
Almost immediately at its head waters, the Flint River is piped under the ATL Airport. It lets out south of the complex, often carrying pollutant runoff into the ...r as it flows through Georgia, ...d Florida.





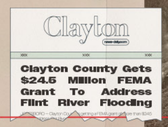
MACRO





Pollutant runoff from every day pollution and larger spills in the Flint River flows to the Gulf of Mexico, creating dead zones depleted of life-supporting oxygen

CITY



Flooding occurs in areas adjacent to the Flint River, exacerbated by poor storm water infrastructure and policy allowing construction in its flood plains

Flooding in this area can be very dangerous, leading to the tragic loss of life as happened in 1992 near the Flint River headwaters.

NEIGH-BORHOOD

Flooding infrastructure in neighborhoods surrounding the airport creates hostile and at times hazardous landscapes cutting through residential yards

Even these culverts and fenced off detention ponds still do not fully protect residents from danger

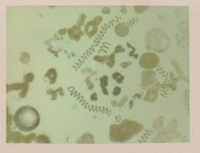
INDIVIDUAL

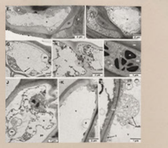
There are almost no places for people to reach and experience the Flint River

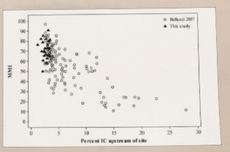
ANIMAL

Pollution leads to fish kills in the Flint River and water infrastructure creates obstacles in what could be wildlife corridors

MICRO







Pollutants also include sediment from eroded stream and river edge conditions

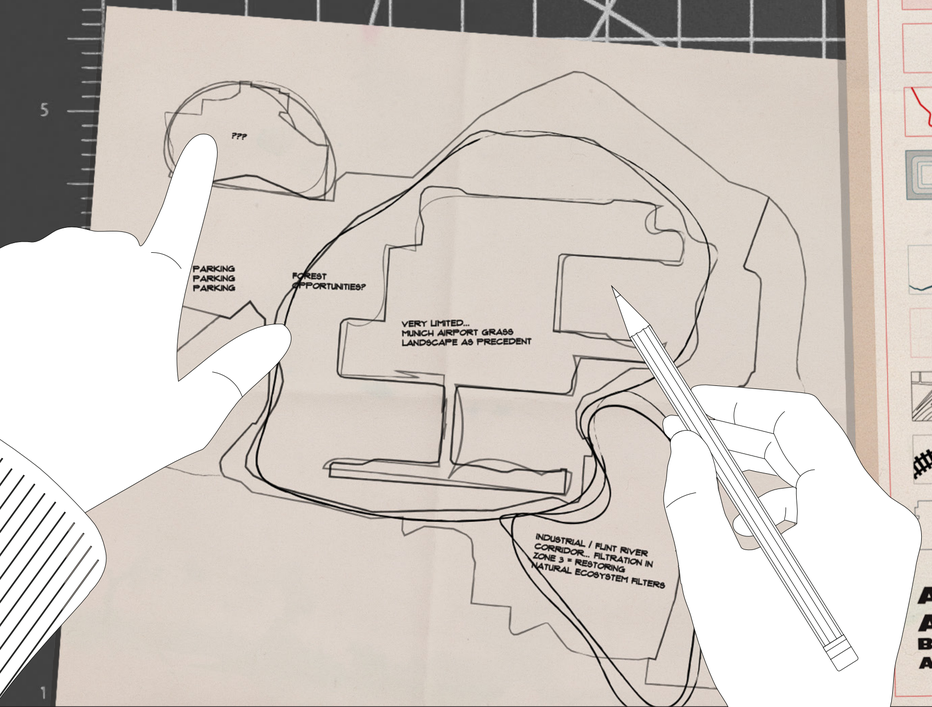
Daphnia are an essential part of the Flint River ecosystem as natural filters

Daphnia populations are threatened by high levels of pollutants caused by impervious surfaces upstream

Zone 1 includes all Atlanta Airport infields, taxiways, runways, and buildings. These pockets have many limitations on them due to FAA wildlife hazard safety regulations. Precedents do show that taller grass can be planted safely if maintained with a regular (though less-frequent) mowing schedule. We will focus on filtration with phytoremediation and charcoal filters in this zone.

Zone 2 focuses on areas adjacent to the infield, stretching to the extents of airport property in most directions. This zone is bound by less limitations than Zone 1, but there are still a number of wildlife hazard considerations. This zone will focus on dense inter-planting in wooded areas, permeable + planted parking lots.

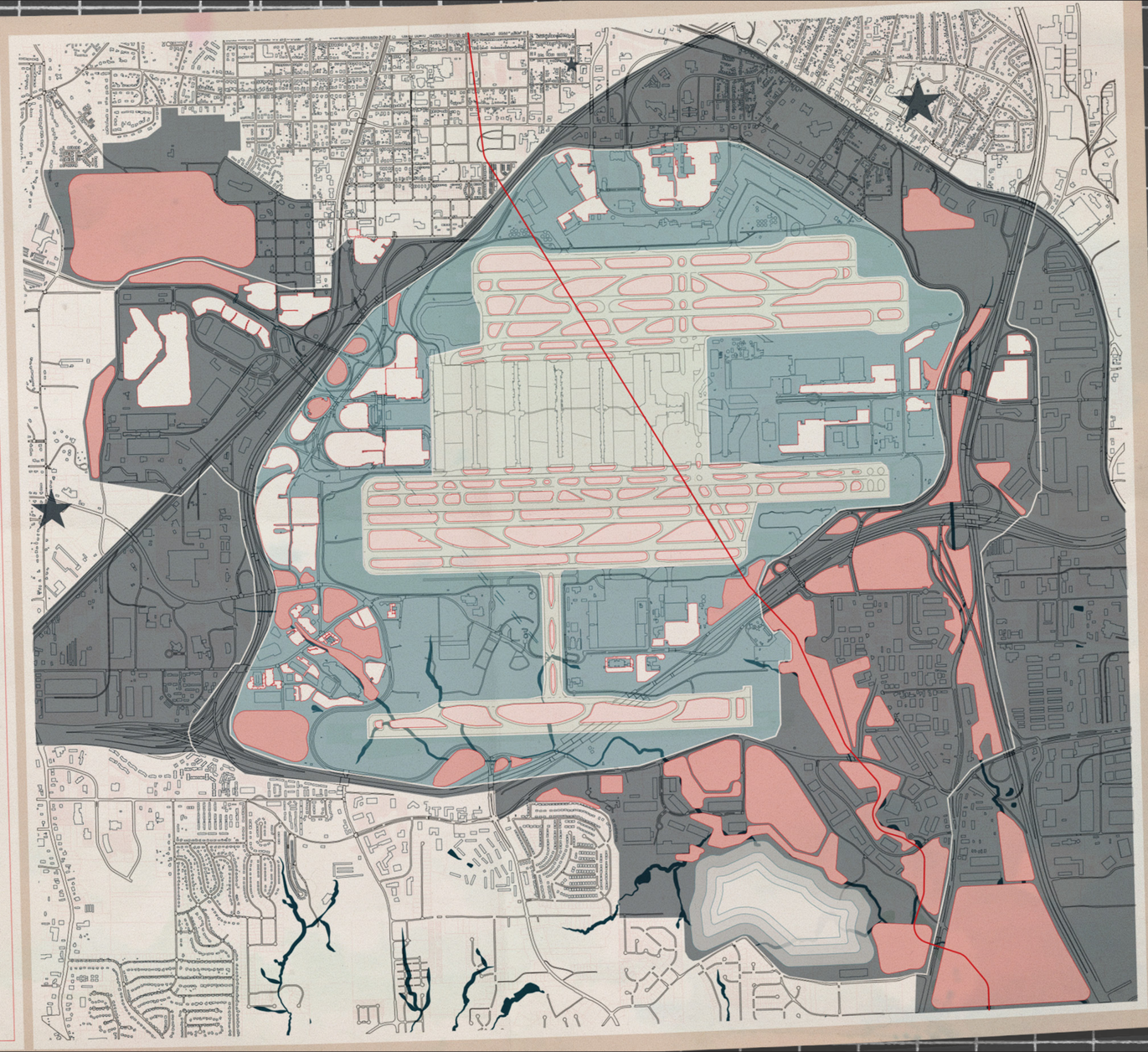
Zone 3 begins at the major roadways surrounding the airport and includes areas with high opportunity not only for landscape and water quality improvements, but for human connection to the Flint River. This includes a major industrial corridor southeast of the airport and a significant stretch of the river as it flows through this area.



LEGEND

- Zone 1: Limited
- Zone 2: Adjacent
- Zone 3: Maximal
- Existing parks
- Forest
- Phytoremediation plots
- Planted parking
- Treatment Corridor
- Quarry Park
- Rivers and streams
- Parcels
- Roads
- Train tracks
- Buildings

ATLANTA AIRPORT BIODIVERSITY ACTION PLAN



Int. J. Environ. Res. Public Health 2019, 16, 1261

International Journal of
Environmental Research
and Public Health

Article

Phytoremediation of Heavy Metal-Con by Switchgrass: A Comparative Study Different Composts and Coir Fiber on Remediation, Plant Productivity, and Nutrient Leaching

Paliza Shrestha [1,*], **Korkmaz Bellitürk** [2] **and Josef H. Görres** [1]

1 Plant and Soil Sciences Department, The University of Vermont, Burlingto
jgorres@uvm.edu
2 Faculty of Agriculture, Department of Soil Science and Plant Nutrition, Tek
Tekirdağ 59030, Turkey; kbelliturk@hotmail.com
* Correspondence: pshresth@uvm.edu

Received: 10 March 2019; Accepted: 3 April 2019; Published: 9 April 2019

Abstract: We investigated the effects of organic amendments (thermop and coconut coir) on the bioavailability of trace heavy metals of Zn heavy metal-spiked soils under laboratory conditions. To test switchg potential crop for phytoremediation of heavy metal from soil, we inves of organic amendments promoted switchgrass growth, and consequentl is a valuable soil amendment that supplies nutrients for pla is beneficial for phytoremediation. Howev leaching, which has adver of the diff

one 1 focuses on ecological improvements in the
Atlanta airport's most restricted areas – the places
immediately surrounding the runway.

For the ground treatment, activated carbon filtration systems will be installed on the runways to filter per- and polyfluoroalkyl substances or PFAs out of the runoff. The cleansed water will then move into the switchgrass fields between the runway. This plant's extensive root system has been shown to absorb PFAs and heavy metals such as lead and cadmium from soils. Frequent compost soil amendments will aid the switch grass field in removing these contaminants (Shrestha et. al, 2019). Long grasses deter flocking birds. witchgrass has small seeds. Mowing during the fruiting season will prevent reproduction. owing three times a year will stop he rapid nutrient-cycling ypical of turf lawns.

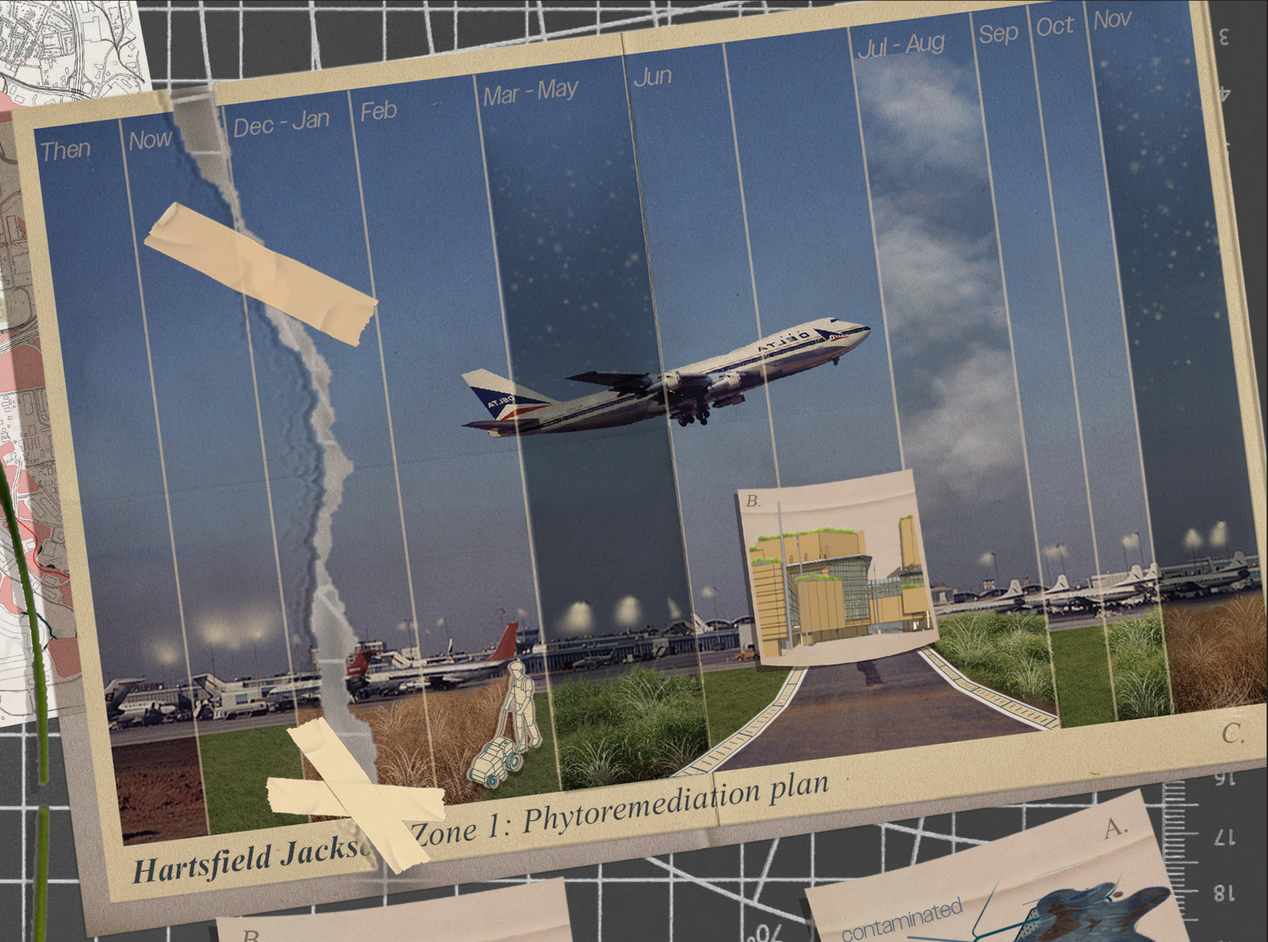
HARTSFIELD JACKSON
ATLANTA

On top of the ground treatment, extensive green roofs of mostly low-fertility long grasses will be installed on applicable buildings. Lights will be pointed downwards to minimize light pollution.

A. Drain with activated carbon filters

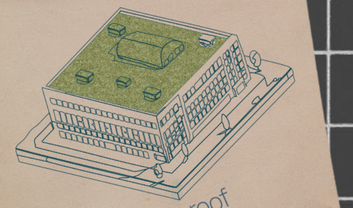
B. Green roof interventions

C. Switch Grass planting + maintenance

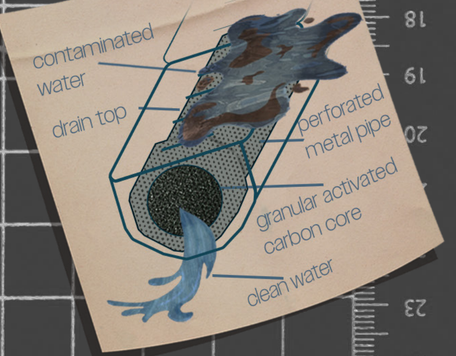


Hartsfield Jackso Zone 1: Phytoremediation plan

B.



A.



2035 - Ten year old micro forest

2028 - Last year of required weeding maintenance

2025 - Planting the micro forest

2023 - Current Conditions

Table 1. Pollutant removal rates in buffer zones.

Buffer Vegetation	Buffer Width (Meters)	Total Percent Mass Total Suspended Solids Removal	Total Percent Mass Phosphorus Removal	Total Percent Mass Nitrogen Removal	Total Percent Mass Nitrate as Nitrogen Removal	References
Grass	0–5	--	--	--	48	Jaynes and Isenhart, 2019
Grass	5–10	75–95	55–78	25–80	50–62	Schmitt et. al., 1999 Lee et al., 2000 Lee et al., 2003
Grass	10–20	88–93	72–83	40–52	75	Schmitt et al., 1999 Jaynes and Isenhart, 2019
Grass	20–30	--	--	--	39–84	Jaynes and Isenhart, 2019
Grass/woody	10–20	85–97	72–94	40–91	85	Schmitt et al., 1999 Lee et al., 2000 Lee et al., 2003
Forested	10–20	--	--	--	97	Schoonover et al., 2005

2085 - Climax forest

Mini-Forest
REVOLUTION

Using the Miyawaki Method to Rapidly Rewild the World

HANNAH LEWIS

Foreword by PAUL HAWKEN

Stay COOL at the Atlanta Airport

When you're navigating a parking lot, the heat can be unbearable. That's why we're excited about our new green infrastructure efforts. Shade by your car is always a welcome relief. But did you know shade at the airport can cool temperatures and help reduce the urban heat island effect in surrounding areas as well? That's why we've integrated shade trees into our parking areas.

We've also installed permeable pavement and bioswales, natural landscapes that capture and filter stormwater, in our parking lots. The arrows in the middle image show the flow of stormwater into the bioretention areas and infiltration into the groundwater table. These features not only manage runoff effectively but also promote biodiversity and enhance the aesthetics of the area.

So, next time you park, enjoy the benefits of a cooler, greener lot that helps our environment

Putting the "PARK" in airport PARKING

When you're parked at the Atlanta Hartsfield-Jackson Airport, you deserve more than just a spot for your car. That's why we're excited to introduce upgraded parking areas complete with shade trees, efficient bioswales, and permeable pavement—designed with your comfort in mind. These enhancements create a more pleasant environment, manage stormwater and keep your vehicle cool while you're away. So, next time you're heading to the airport, choose our revitalized parking areas at the Park-Ride lot or the economy lots for a greener, more enjoyable experience!

HARTSFIELD JACKS

Wow!

SHADE TREES AND BIOSWALES AT THE

ATLANTA Airport

IT'S AN ECO SERVICE

Field Notes

Date: 10/29/2055

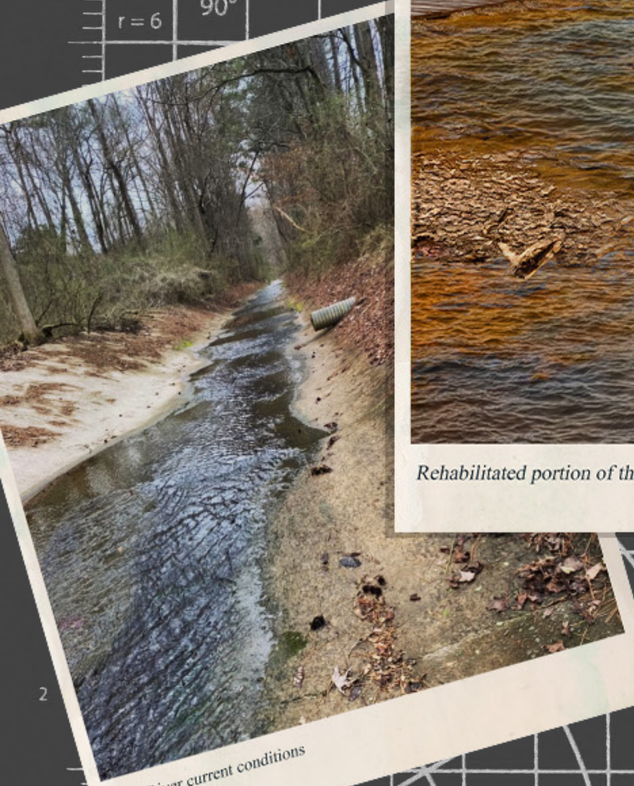
The Miyawaki forest project has shown remarkable progress over the past three decades. Cooler microclimates have successfully been established, with air temperature measurements indicating a reduction of approximately 5°C (10°F) in forested areas compared to their surrounding environments. This temperature modulation is a significant indicator of the project's effectiveness in enhancing local microclimate conditions.

We continue to monitor the water quality in regions where riparian buffers have been implemented using the Miyawaki method. Preliminary results are exceedingly positive: water samples exhibit significantly reduced suspended solids and nutrient loads compared to levels recorded as recently as 2020. Notably, we are observing a resurgence of macroinvertebrate populations, with filter feeders in the waterways making a

able recovery.

the green infrastructure installed in the parking substantial success. As public proved dramatically, there is a Nonetheless, these tively, infiltrating

Rehabilitated portion of the Flint River



Flint River current conditions

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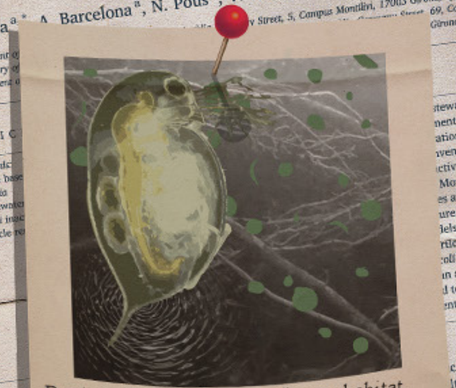
Disinfection and particle removal by a nature-based *Daphnia* filtration system for wastewater treatment

T. Serra [a], A. Barcelona [a], N. Pous [b], V. Salvadó [c], J. Colomer [a]



Daphnia thriving in more diverse habitat, and filtering the Flint River.

Vulcan Quarry in its new form as a stormwater retention park