# GIV AND GO TO 2040

- GO TO 2040 includes goals of conservation, open space access, and regional ecological connectivity

  - Conserve 400,000 acres of open space

  - Achieve 10 acres of open space per 1,000 people for 70% of the region

  - Establish 1,348 miles of greenways

- Achieving these targets requires a better understanding of the condition and geographic distribution of our natural resources

# WHAT IS THE GIV?

The GIV is a spatial data tool developed through a collaborative consensus-based process of Chicago Wilderness that:

- Identifies conservation and restoration priority areas

- Characterizes green infrastructure resources

    - Landscape types (forests, prairies, wetlands, waterbodies)

    - Unfragmented ecosystems

    - Connective corridors
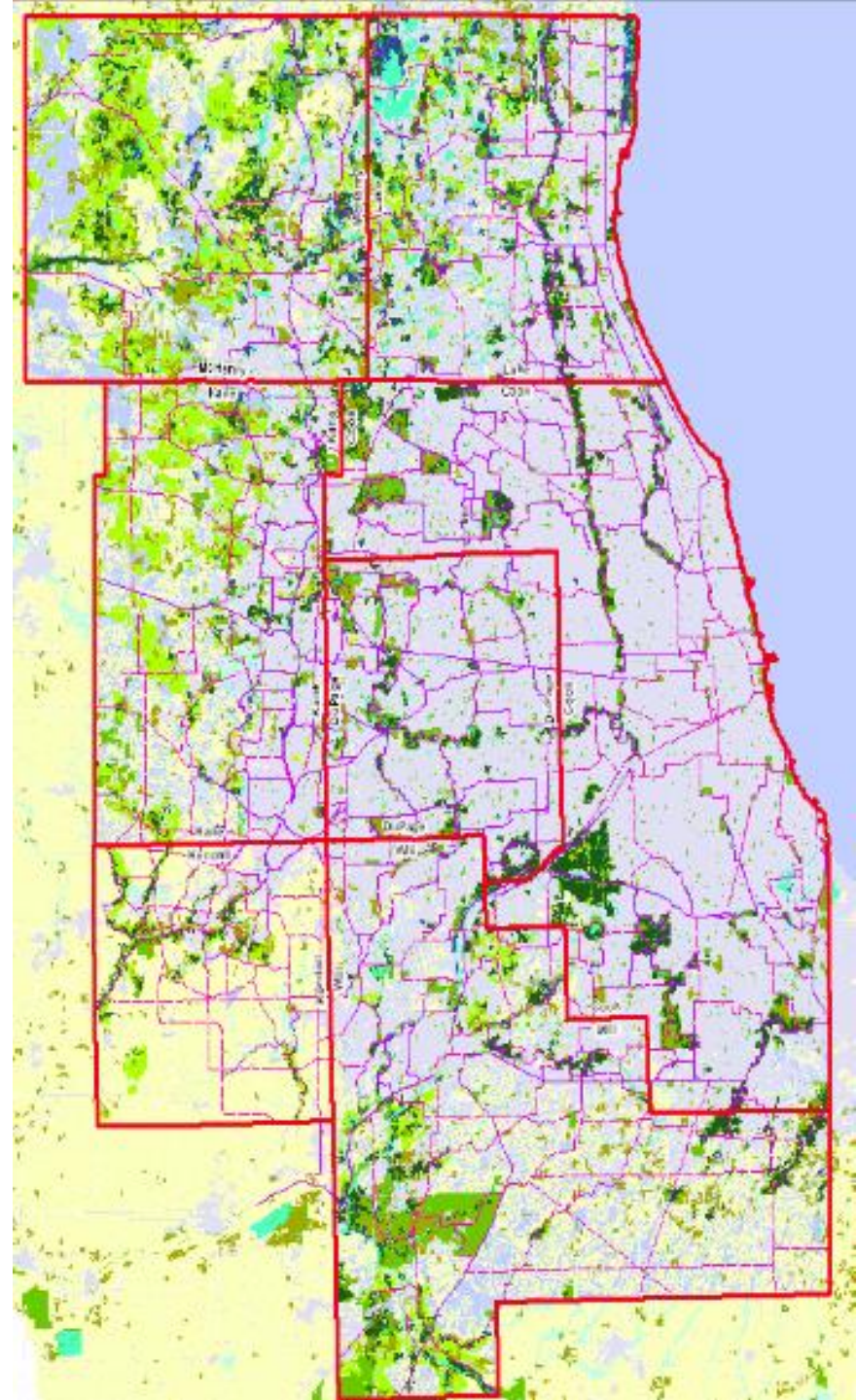
# ECOSYSTEM SERVICE STUDY GOALS

- Quantify contributions of green infrastructure to regional economy and quality of life

- Understand economic value of different ecosystem types

- Inform planning, conservation, and restoration decisions for diverse communities and partners

# WHAT ARE ECOSYSTEM SERVICES?
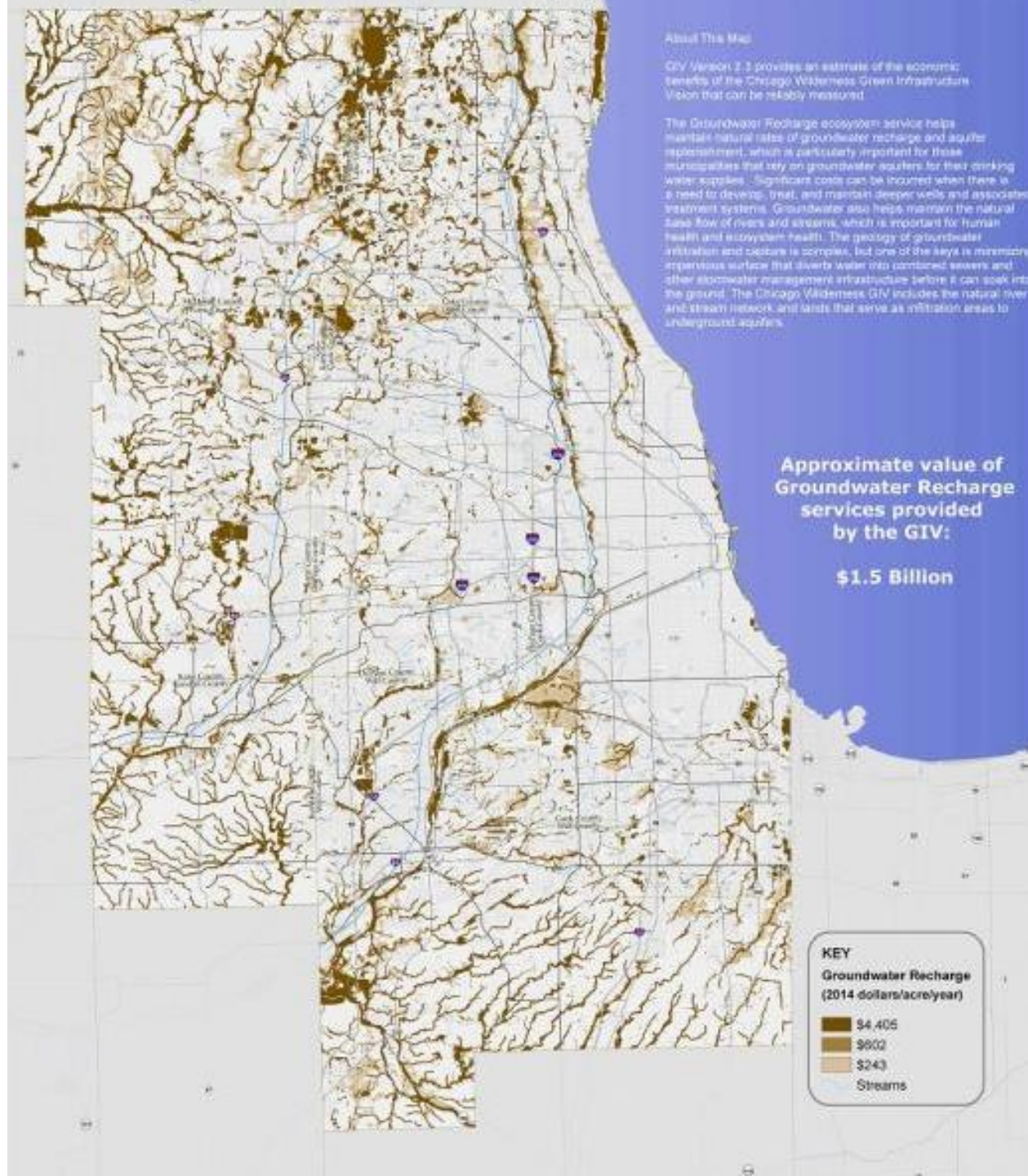
| | |
|---|---|
| Products | Paper, crops, fish and game, drinking water |
| Regulating Services | Flood protection, pest control, filtering water |
| Supporting | Oxygen production, soil formation, habitat provision |
| Cultural experiences | Spiritual, educational, scientific, or aesthetic value |

Adapted from 2010 Ecological Footprint Atlas

# VALUE OF
# FLOOD
# CONTROL

Green infrastructure provides
**$4.2 billion per year**
of flood control to the region.

Most effective ecosystems:
**Wetlands & streams**

An acre of wetlands can
typically store 1-1.5 million
gallons of floodwater.

Not building in floodplains
could save an average
$900/acre/year in flood
damages.



About this Map

GIV Version 2.3 provides an estimate of the economic benefits of the Chicago Wilderness Green Infrastructure Vision that can be reliably measured.

The Water Flow Regulation ecosystem service helps maintain water flow stability and protect human infrastructure against flooding. One way the GIV provides flood control and water flow regulation is through reductions in peak discharges of stormwater flows. Maintaining green infrastructure helps ensure that water can infiltrate in the soil and recharge the groundwater rather than enter the combined sewer and stormwater systems. This can help reduce flood damage to community infrastructure and damage to natural hydrology that could result in a loss of native riparian vegetation and loss of wildlife habitat. Fortunately, the GIV contains nearly all of the natural interconnected wetlands and riparian zones that provide this ecosystem service. Natural systems cannot manage all of the flood control needs of communities, but protection of existing green infrastructure can help avoid the problem getting worse in locations where the GIV absorbs flood waters before entering engineered flood control infrastructure.

**Approximate value of
services provided
by the GIV:**

**$4.2 Billion**

**KEY**

**Flood Control**
2014 dollars/acre/year
- $37,026
- $22,014
- $16,011
- $6,502
- $1,602
- Streams

# VALUE OF
# GROUNDWATER RECHARGE

Green infrastructure provides
**$1.5 billion per year**
of groundwater recharge to the region.

Most effective ecosystems:
**Natural floodplain**

Forested wetlands overlying permeable soil can release up to 100,000 gallons per acre per day of groundwater.
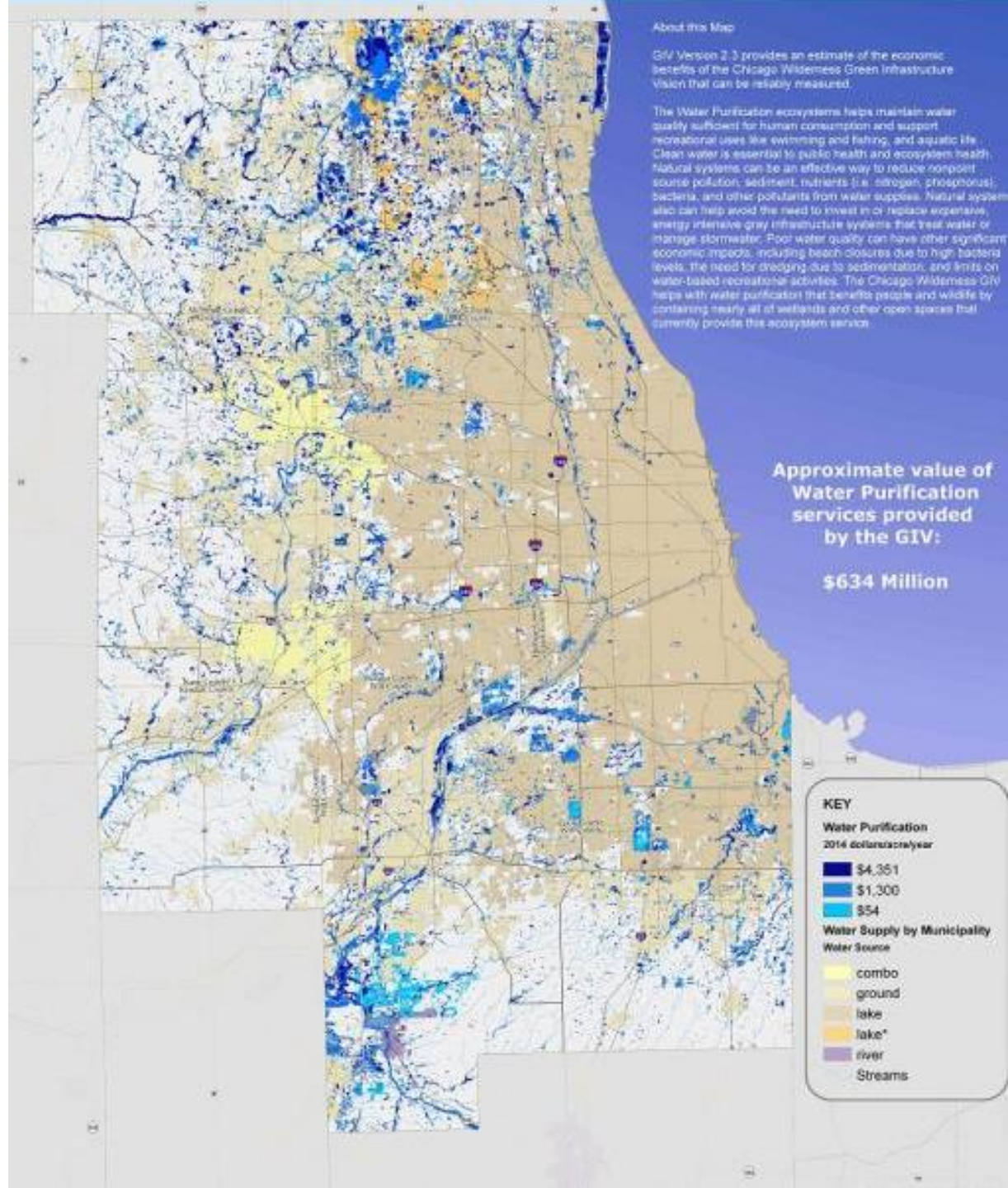


**Approximate value of Groundwater Recharge services provided by the GIV:**

**$1.5 Billion**

KEY
Groundwater Recharge
(2014 dollars/acre/year)

- $4,405
- $802
- $243
- Streams

# VALUE OF
# WATER
# PURIFICATION

Green infrastructure provides
**$634 million per year**
of water purification to the
region.

Most effective ecosystems:
**Wetlands**

The cost of restoring and
operating wetlands to
remove nitrogen and
phosphorus can be 50-70%
less than the cost of
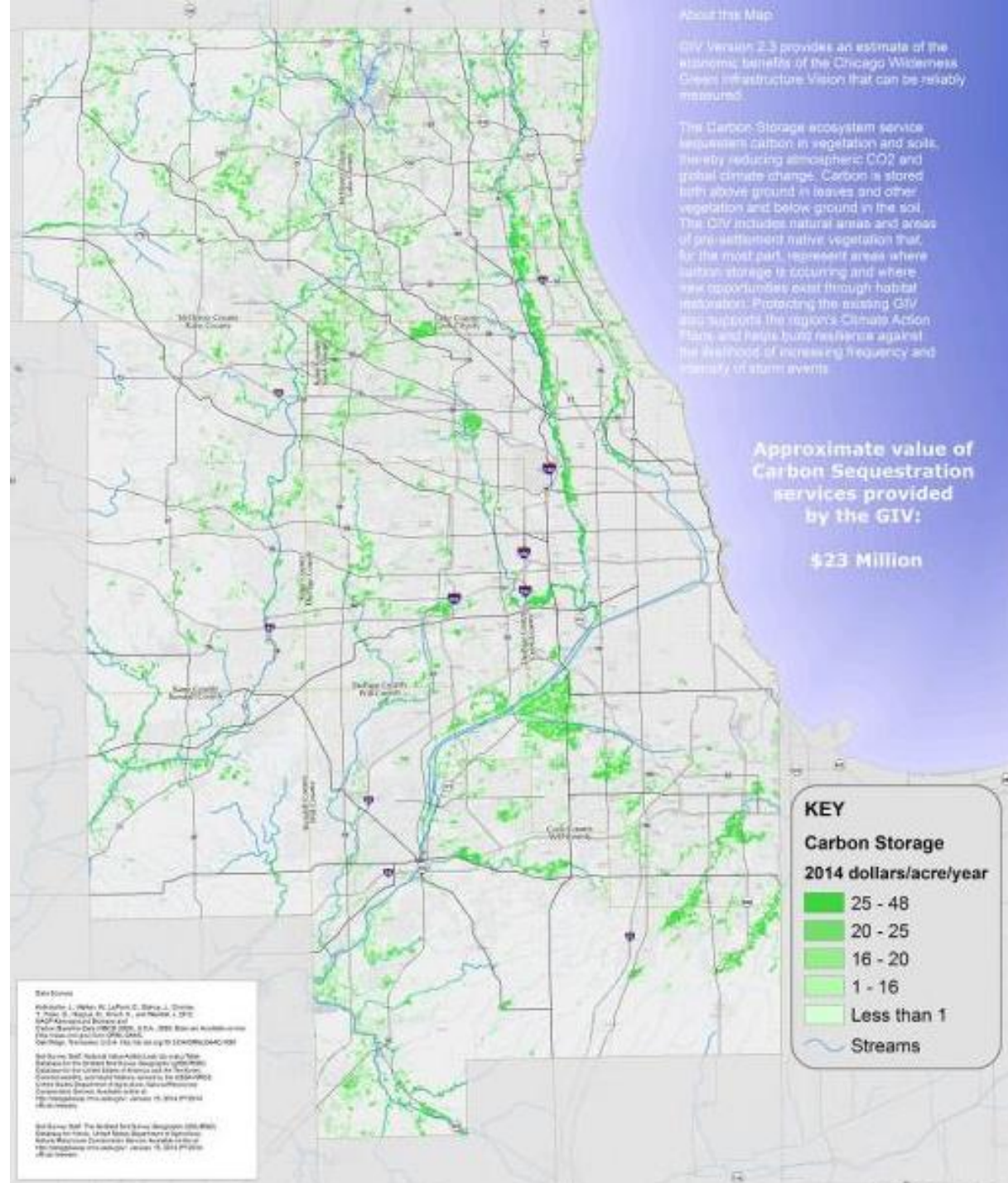constructing and operating
engineered wastewater
treatment systems.



About this Map

GIV Version 2.3 provides an estimate of the economic
benefits of the Chicago Wilderness Green Infrastructure
Vision that can be reliably measured.

The Water Purification ecosystems helps maintain water
quality sufficient for human consumption and support
recreational uses like swimming and fishing, and aquatic life.
Clean water is essential to public health and ecosystem health.
Natural systems can be an effective way to reduce nonpoint
source pollution; sediment, nutrients (i.e. nitrogen, phosphorus),
bacteria, and other pollutants from water supplies. Natural systems
also can help avoid the need to invest in or replace expensive,
energy intensive gray infrastructure systems that treat water or
manage stormwater. Poor water quality can have other significant
economic impacts, including beach closures due to high bacteria
levels, the need for dredging due to sedimentation, and limits on
water-based recreational activities. The Chicago Wilderness GIV
helps with water purification that benefits people and wildlife by
containing nearly all of wetlands and other open spaces that
currently provide this ecosystem service.

Approximate value of
Water Purification
services provided
by the GIV:

$634 Million

KEY

Water Purification
2014 dollars/acre/year

$4,351
$1,300
$54

Water Supply by Municipality
Water Source

combo
ground
lake
lake*
river
Streams

# VALUE OF
# CARBON
# STORAGE

Green infrastructure provides
**$23 million per year**
of carbon storage to the
region.

Most effective ecosystems:
**Forests/woodlands**

A large tree can remove over
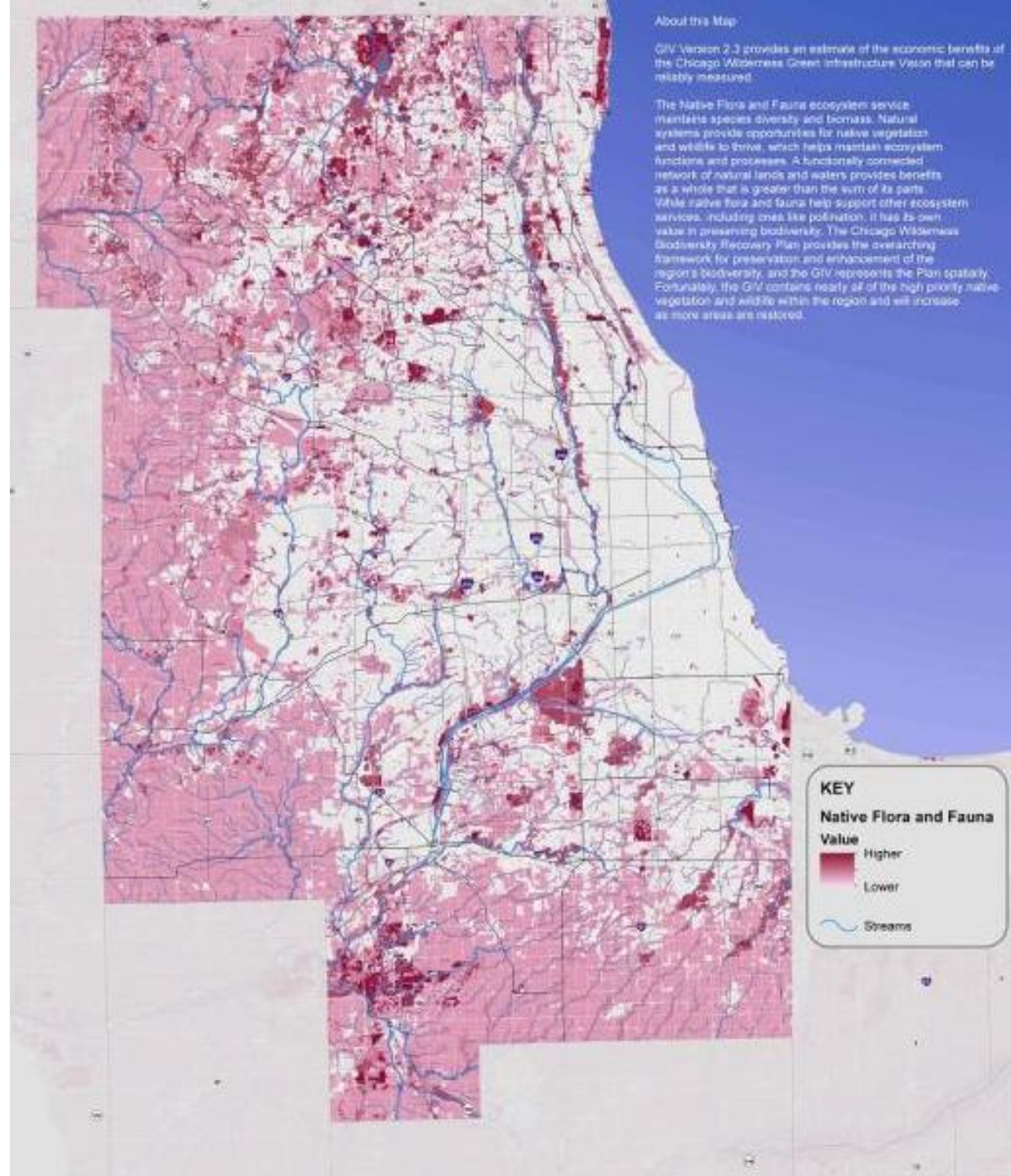1,000 pounds per year of
$CO_2$ from the atmosphere.



Approximate value of
Carbon Sequestration
services provided
by the GIV:

**$23 Million**

**KEY**

Carbon Storage
2014 dollars/acre/year

- 25 - 48
- 20 - 25
- 16 - 20
- 1 - 16
- Less than 1
- Streams

# VALUE OF
# NATIVE FLORA AND FAUNA

Measured in relative value due to limited data.

Most effective ecosystems:
Protected habitats
such as those in the Illinois National Areas Inventory

Diverse ecosystems are more likely to contain species tolerant to disturbances like flooding, drought, or pests.



About this Map

GIV Version 2.3 provides an estimate of the economic benefits of the Chicago Wilderness Green Infrastructure Vision that can be reliably measured.

The Native Flora and Fauna ecosystem service maintains species diversity and biomass. Natural systems provide opportunities for native vegetation and wildlife to thrive, which helps maintain ecosystem functions and processes. A functionally connected network of natural lands and waters provides benefits as a whole that is greater than the sum of its parts. While native flora and fauna help support other ecosystem services, including ones like pollination, it has its own value in preserving biodiversity. The Chicago Wilderness Biodiversity Recovery Plan provides the overarching framework for preservation and enhancement of the region's biodiversity, and the GIV represents the Plan spatially. Fortunately, the GIV contains nearly all of the high priority native vegetation and wildlife within the region and will increase as more areas are restored.

KEY

Native Flora and Fauna Value

Higher

Lower

Streams

# VALUE OF
# RECREATION
# AND
# ECOTOURISM



In 2011, Illinois residents and non-residents spent $3.8 billion per year on wildlife-associated recreation. They also spent 13.3 million days and $973 million fishing in Illinois (excluding Lake Michigan).
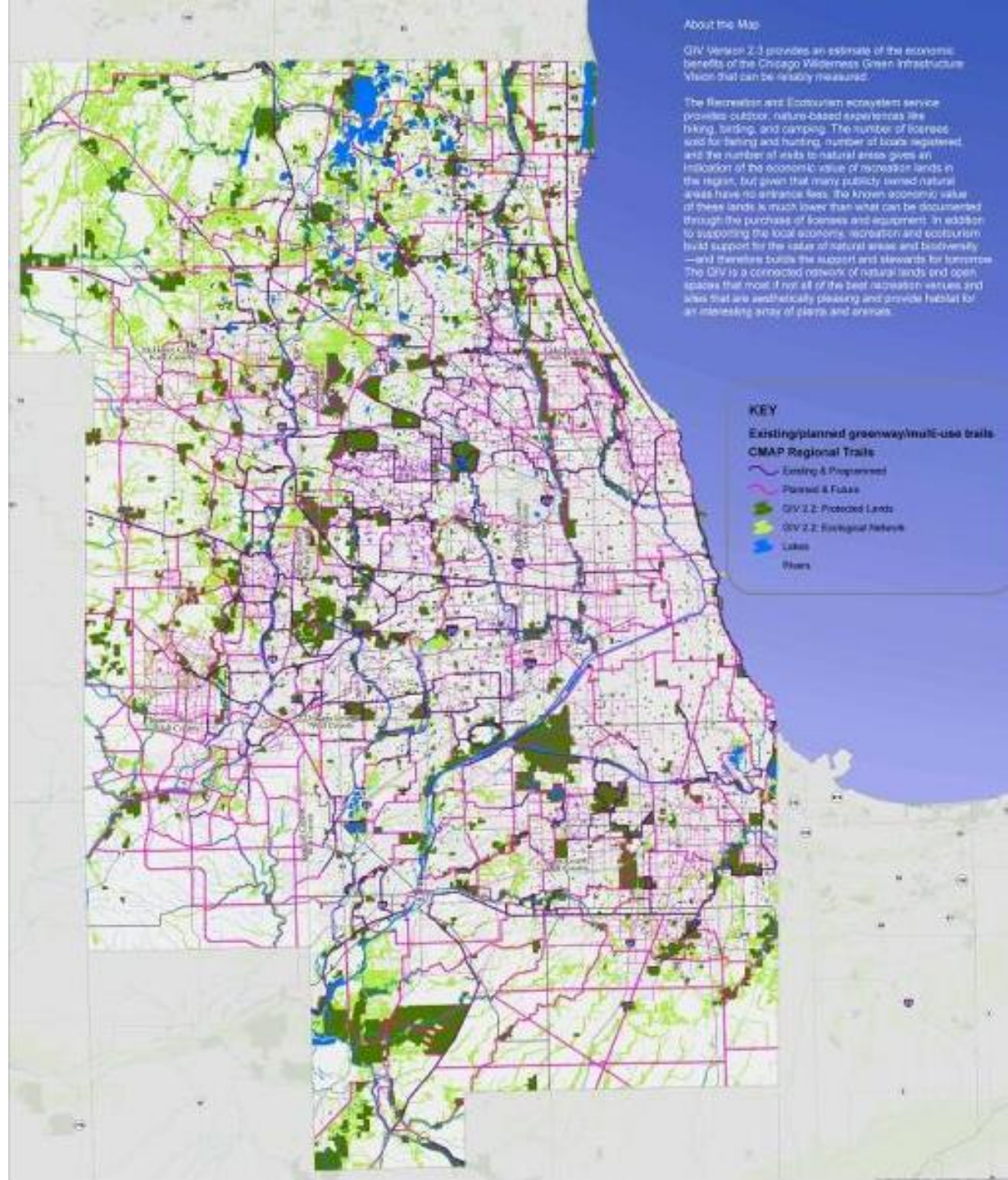
# VALUE OF TOTAL ECOSYSTEM SERVICES STUDIED

Natural ecosystems contribute well over **$6.4 billion per year** of economic value to the 7-county CMAP region— although this is an underestimate.
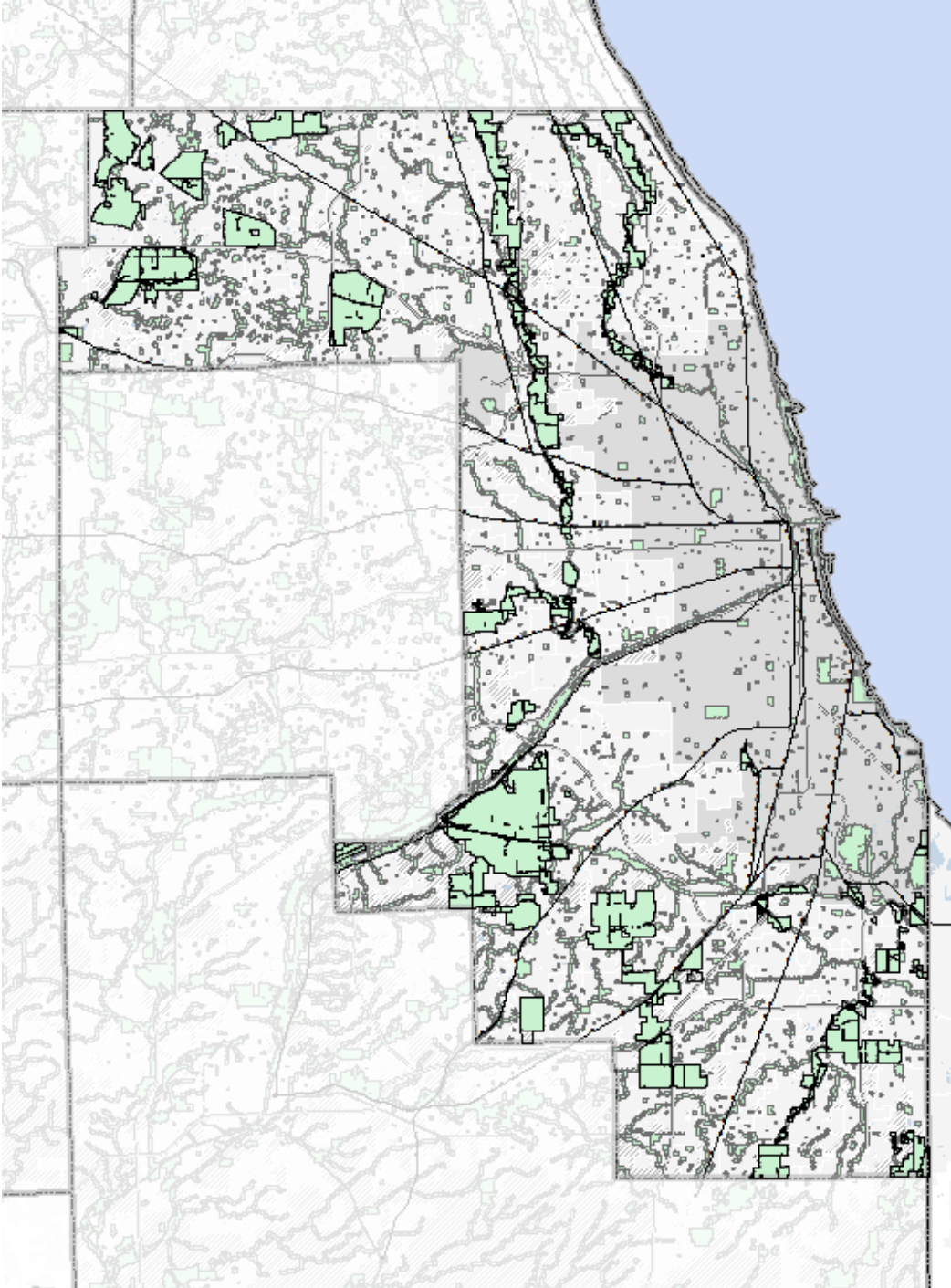
2013 real GRP of the Chicago MSA: $551 billion.



About this Map

GIV Version 2.3 provides an estimate of the economic benefits of the Chicago Wilderness Green Infrastructure Vision that can be reliably measured.

This map represents the combined economic value of four ecosystem services: Water Flow Regulation /Flood Control, Water Purification, Groundwater Recharge, and Carbon Storage. These four services along conservatively contribute more than $6 billion per year in economic value to the 7-county CMAP region. (In comparison, the GDP of the Chicago Metropolitan Statistical Area (which mostly overlaps the 7 counties) was $586 billion in 2013.) And this may undercount the total value since this estimate is only from ecosystem services that could be reliably measured, and this total does not include any of the economic activity supported by the region's recreation and ecotourism infrastructure.

**Approximate value of combined ecosystem services**

**$6.4 Billion**

**KEY**
**Combined Services**
**2014 dollars/acre/year**

- 11,458 - 46,931
- 4,866 - 11,457
- 1,414 - 4,865
- 55 - 1,413
- 5 - 54
- Streams

# NEXT STEPS

- Incorporate ecosystem service valuation data into local planning projects and land use decisions

- Evaluate potential impact of capital projects and/or inform compensatory wetland mitigation banking

- Inform strategic conservation and restoration investments

# GIV 2.3 DATA

# GIV 2.2 HUB LAYERS

# GIV 2.3 LAYER FILES



Selected Ecosystem Services Aggregate Value
2014 Dollars/Acre/Year

- $>0 - $10
- $10 - $1,500
- $1,500 - $4,500
- $4,500 - $11,250
- $11,250 - $49,155
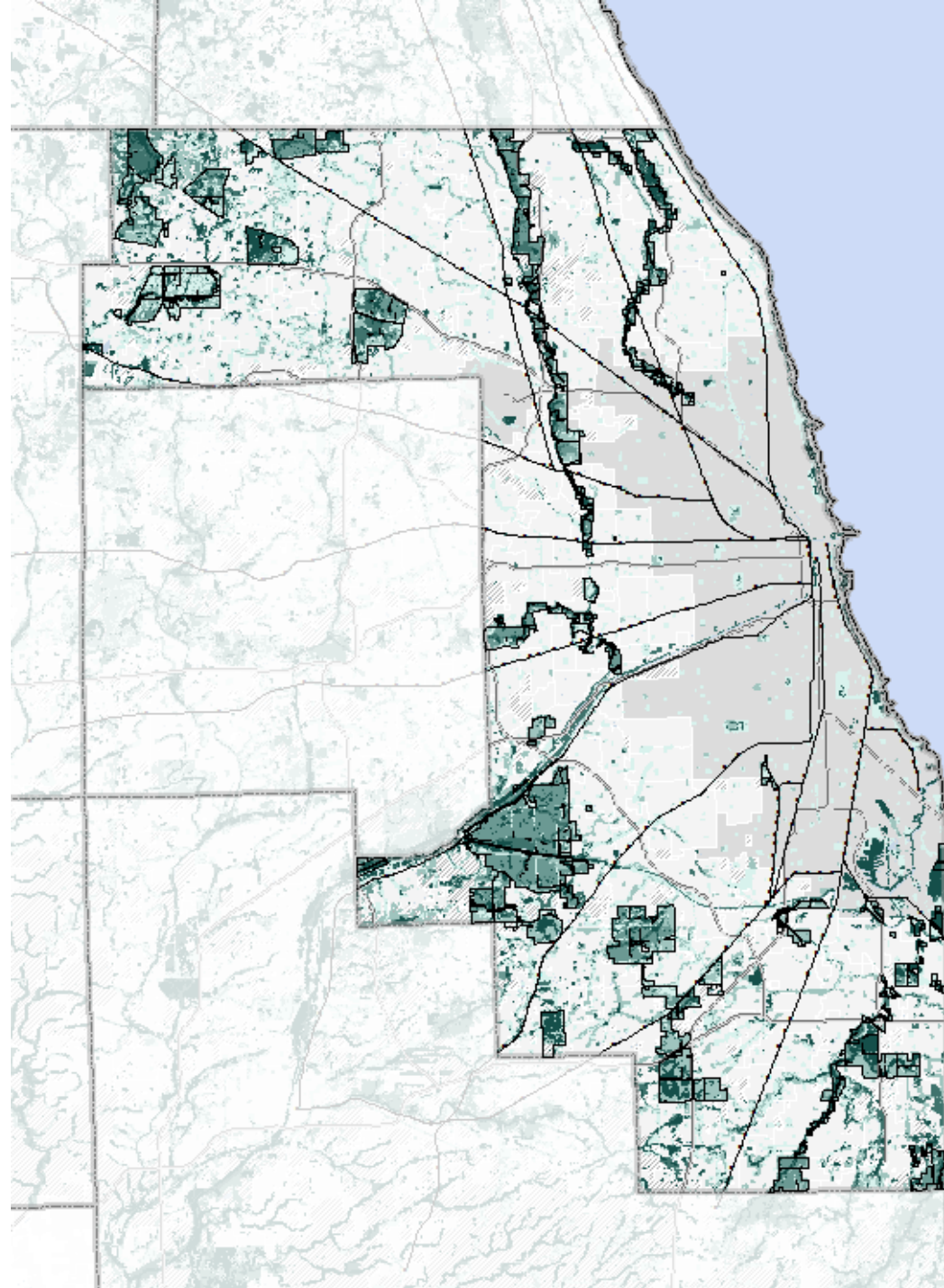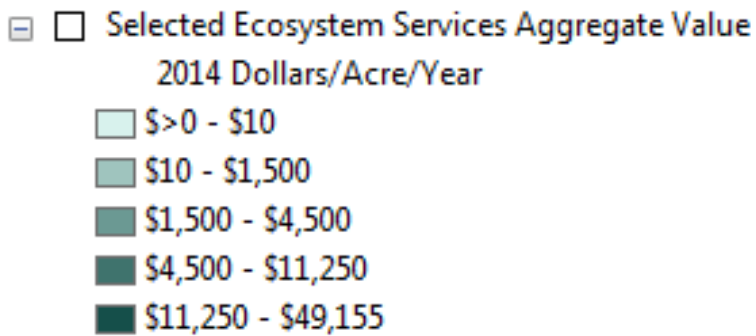
# GIV 2.3 CORE LAYERS



☐ ☑ Core Landscapes
        Selected Landscape Types
    🟦 Core lakes and streams (stream layer 3)
    🟩 Core wetlands (wetland 4a, 4b, 5)
    🟨 Core prairies/savannas (pgs 1,2)
    🟩 Core woodland/forest (forest 3a, 3b, 4)
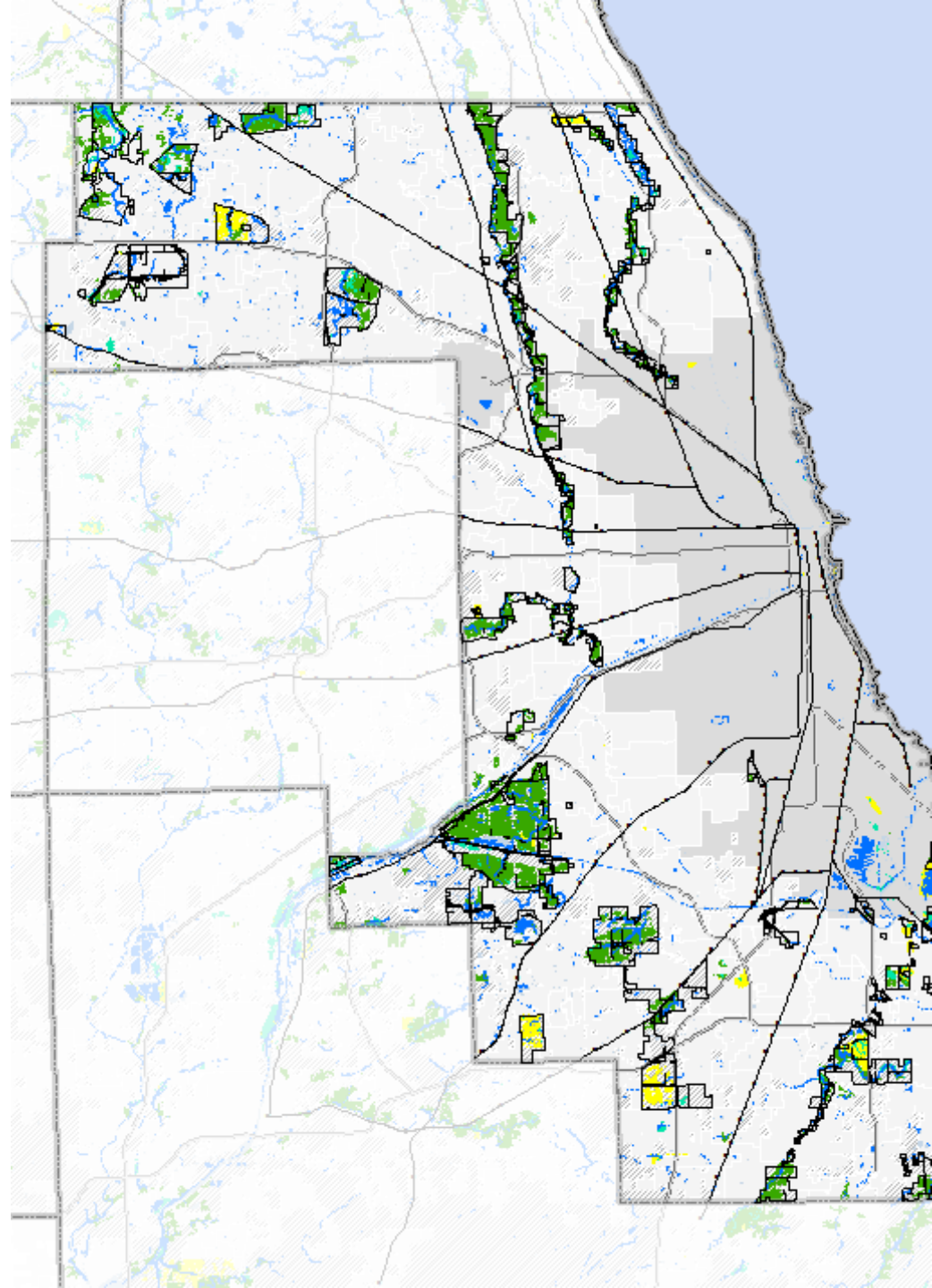
# GIV 2.3 SUMMARY TOOL
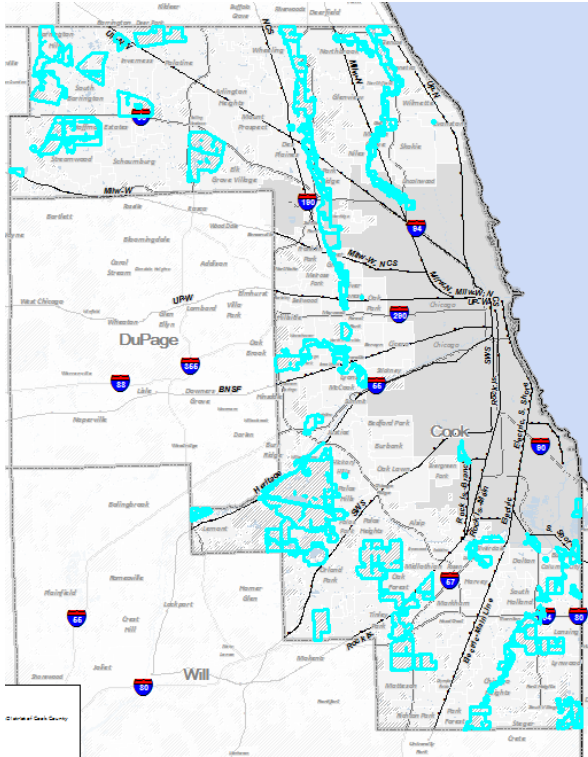


1. Select a feature class
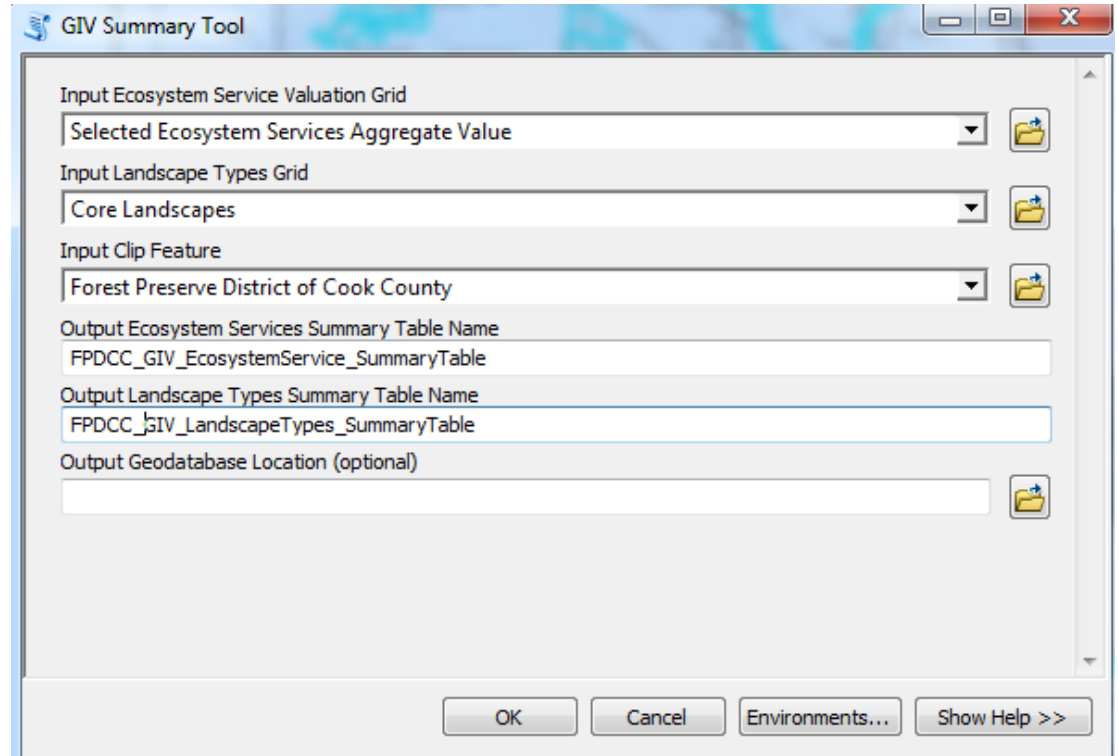


2. Run the GIV Summary Tool

# GIV 2.3 SUMMARY TOOL OUTPUTS

## Ecosystem Service Summary Table

Table

FPDCC_GIV_EcosystemService_SummaryTable

| OBJECTID * | type | FloodControl | GroundwaterRecharge | WaterPurification | CarbonStorage | AggregateServices |
|---|---|---|---|---|---|---|
| 1 | Dollar Value | 323029800 | 87861540 | 58079030 | 841920 | 469812300 |
| 2 | Percent Regional | 7.69 | 5.75 | 9.32 | 7.31 | 7.38 |
| 3 | Percent Study Area | 68.76 | 18.7 | 12.36 | 0.18 | 100 |

1 ▸ ▸| (0 out of 3 Selected)

FPDCC_GIV_EcosystemService_SummaryTable

## Landscape Type Summary Table

Table

FPDCC_GIV_LandscapeTypes_SummaryTable

| OBJECTID * | type | core_woodland_forest | core_prairie_grassland | core_wetlands | core_lakes_streams | giv_ecological_networks | giv_protected_lands | giv_composite |
|---|---|---|---|---|---|---|---|---|
| 1 | Acreage | 27407.73 | 4453.24 | 5880.13 | 8574.44 | 48378.7 | 66894.41 | 67198.65 |
| 2 | Percent Regional | 23.97 | 19.68 | 9.61 | 7.87 | 8.81 | 20.66 | 8.25 |
| 3 | Percent Study Area | 40.49 | 6.58 | 8.69 | 12.67 | 71.48 | 98.83 | 99.28 |

1 ▸ ▸| (0 out of 3 Selected)

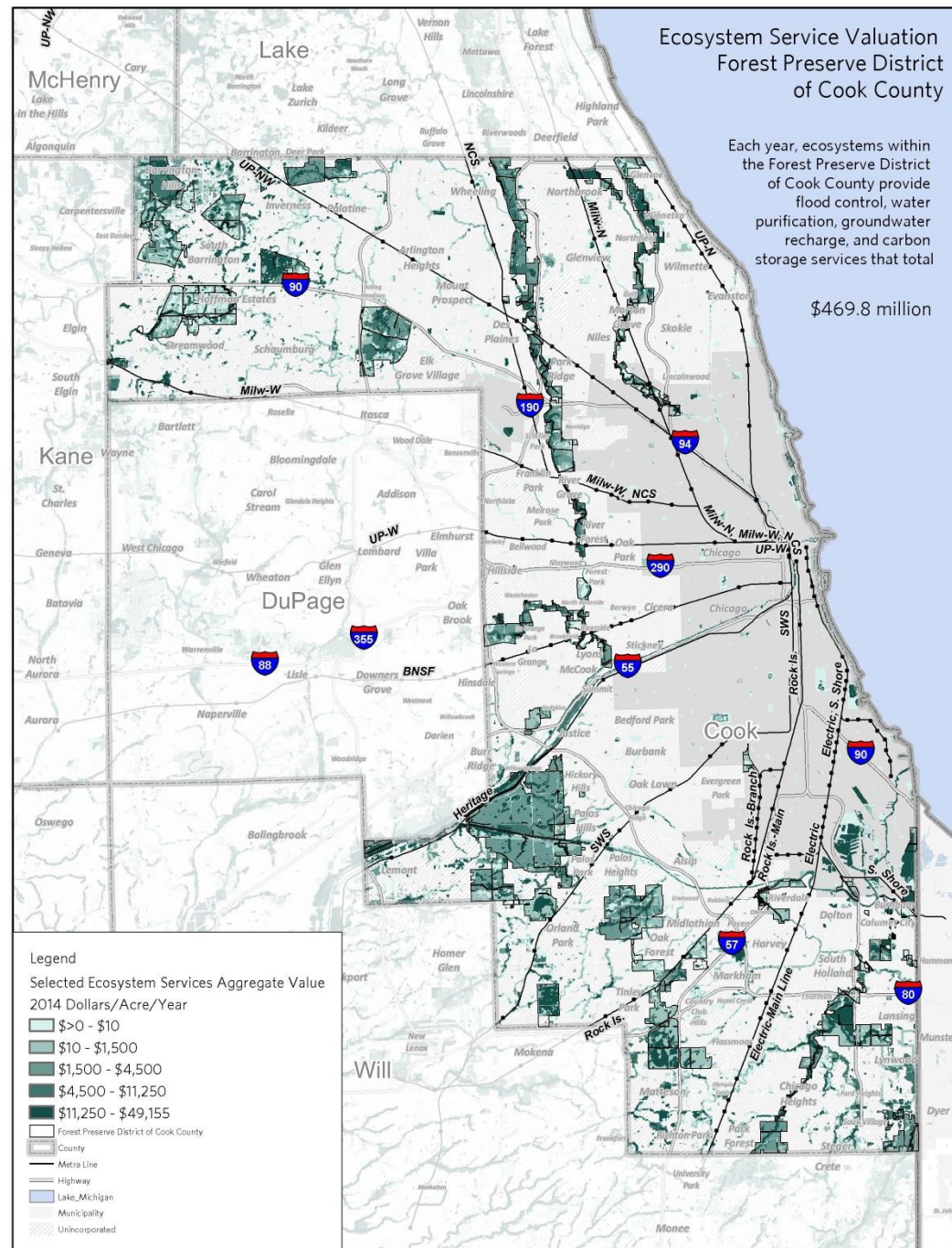FPDCC_GIV_LandscapeTypes_SummaryTable

# GIV 2.3 SUMMARY TOOL OUTPUTS

## Forest Preserve District of Cook County Ecosystem Service Valuation

| Ecosystem Service | Dollar value | |
|---|---|---|
| Flood Control | $323,029,800 | |
| Groundwater Recharge | $87,861,500 | |
| Water Purification | $5,807,900 | |
| Carbon Storage | $841,900 | |
| Aggregate Services | $469,812,300 | |

| Landscape Type | Acres | % Study area |
|---|---|---|
| Core woodland/forest | 27,407.73 | 40.49% |
| Core prairie/grassland | 4,453.24 | 6.58% |
| Core wetlands | 5,880.13 | 8.69% |
| Core lakes/streams | 8,574.44 | 12.67% |
| GIV Composite | 67,198.65 | 99.28% |



Ecosystem Service Valuation
Forest Preserve District of Cook County

Each year, ecosystems within the Forest Preserve District of Cook County provide flood control, water purification, groundwater recharge, and carbon storage services that total

$469.8 million

Legend
Selected Ecosystem Services Aggregate Value
2014 Dollars/Acre/Year
- $>0 - $10
- $10 - $1,500
- $1,500 - $4,500
- $4,500 - $11,250
- $11,250 - $49,155
- Forest Preserve District of Cook County
- County
- Metra Line
- Highway
- Lake_Michigan
- Municipality
- Unincorporated

# ECOSYSTEM SERVICE VALUATION STUDY
## PRODUCTS AND DATA

- CMAP Data Sharing Hub:
  https://datahub.cmap.illinois.gov/group/green-infrastructure-vision

- Final Report

- Appendices
  - Literature Review
  - Project Steering Committee List
  - Public Workshop Materials
  - GIS data user's guide

- GIS Data
  - Layer files with valuation grid
  - Core layers