WBNERR
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# Cape Cod Urine Trouble

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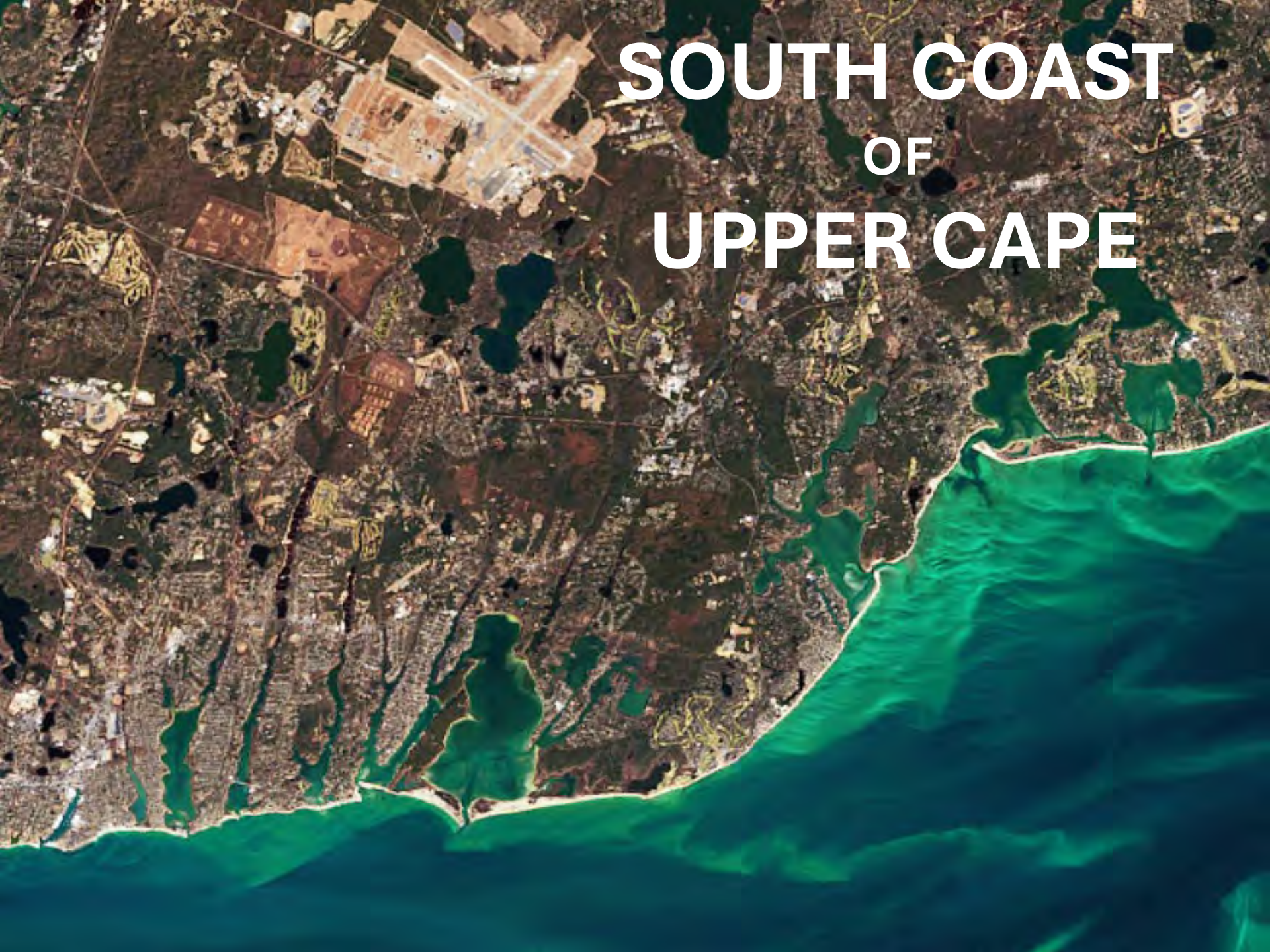
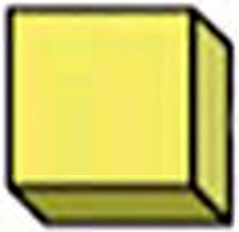
The Green Center

# Cape Cod Urine Trouble


SOUTH COAST
OF
UPPER CAPE

## One person's yearly volume of urine

URINE
120 gallons

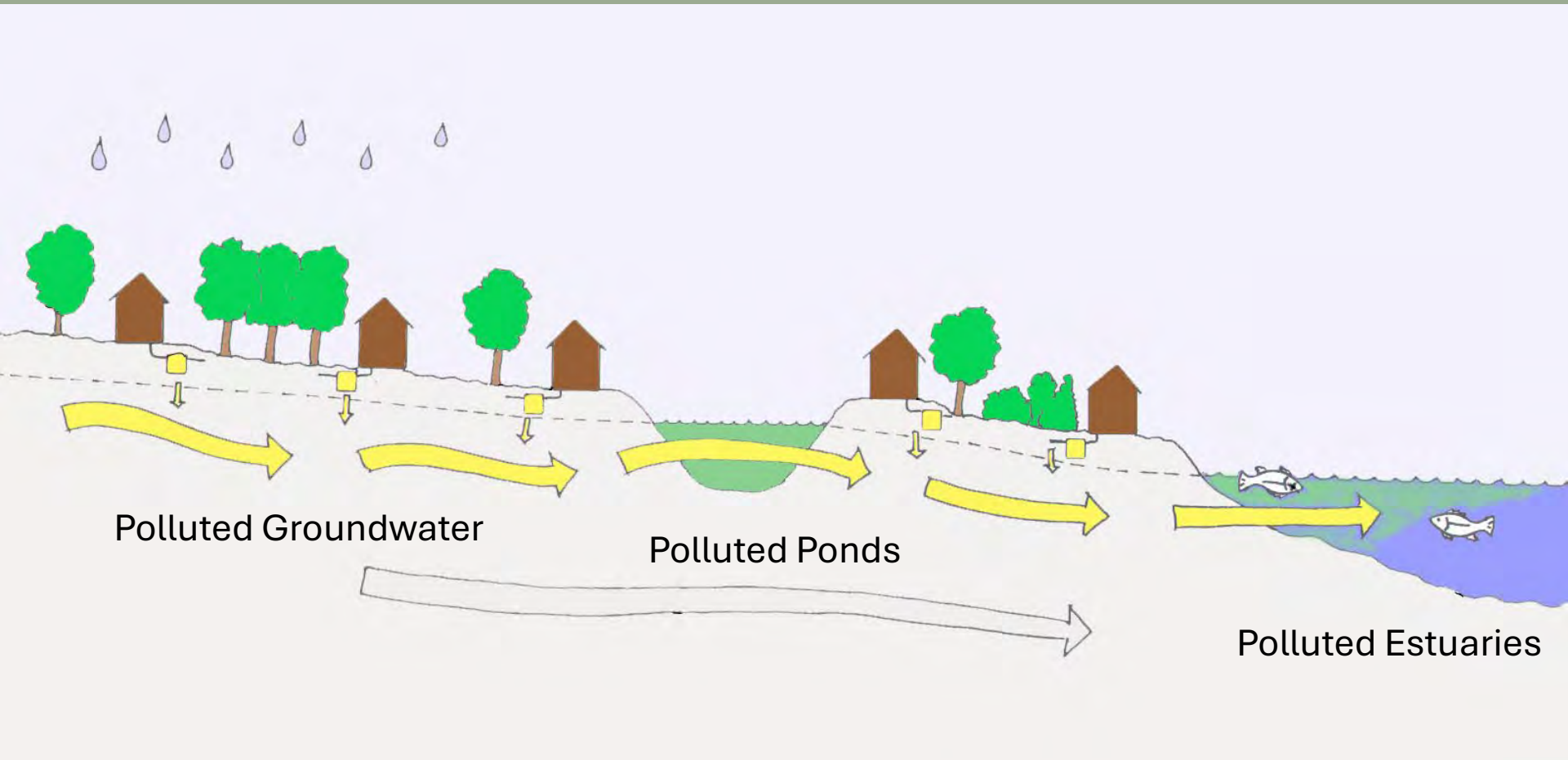


8 lbs nitrogen
0.75 lbs phosphorus

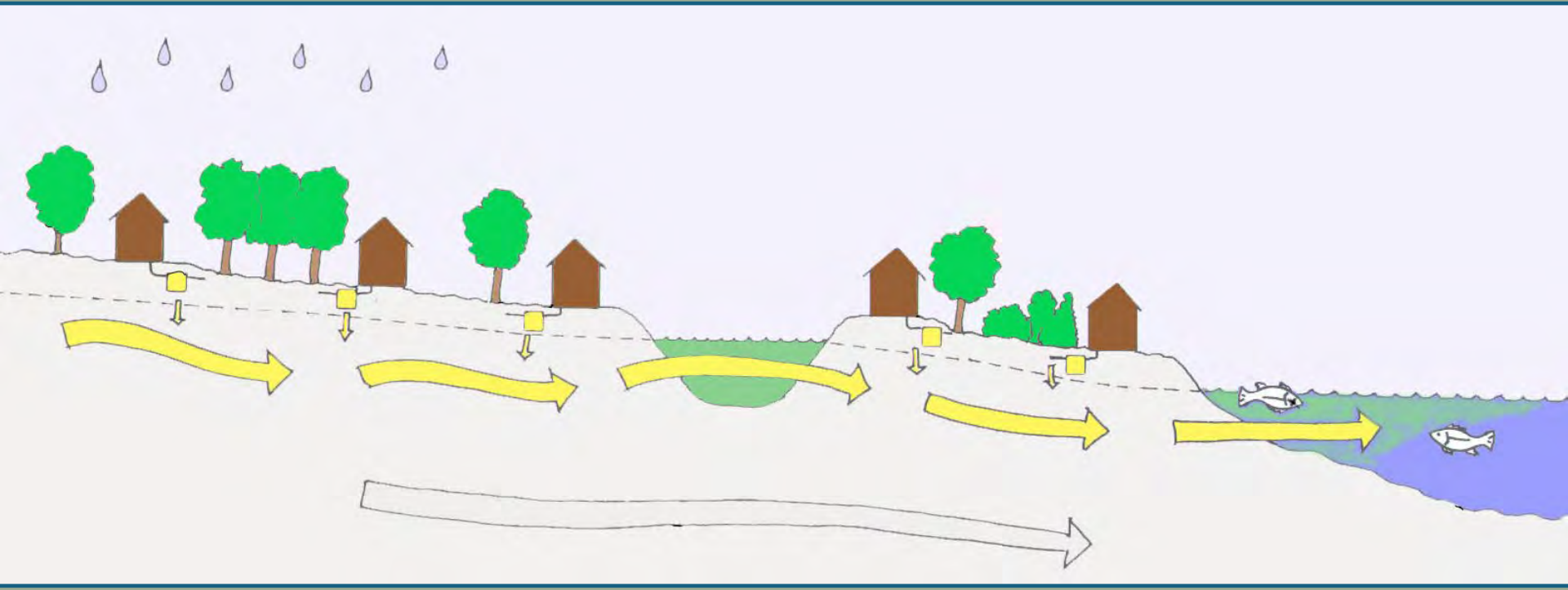
# URINE

**Contains 80% of the nitrogen in the waste stream but is only 1% of the volume of the waste stream**

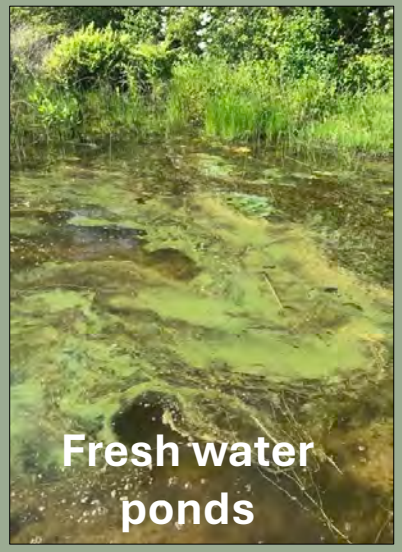
# Urine Pollution of a Watershed

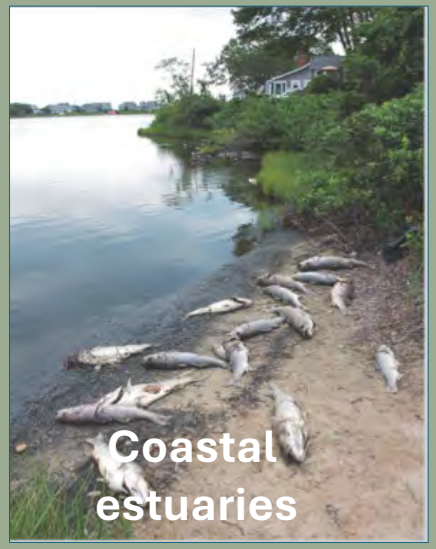



**Urine from septic tanks moves with groundwater through fresh ponds to the coastal estuaries**



## Causing toxic algae blooms, fish kills and red tide

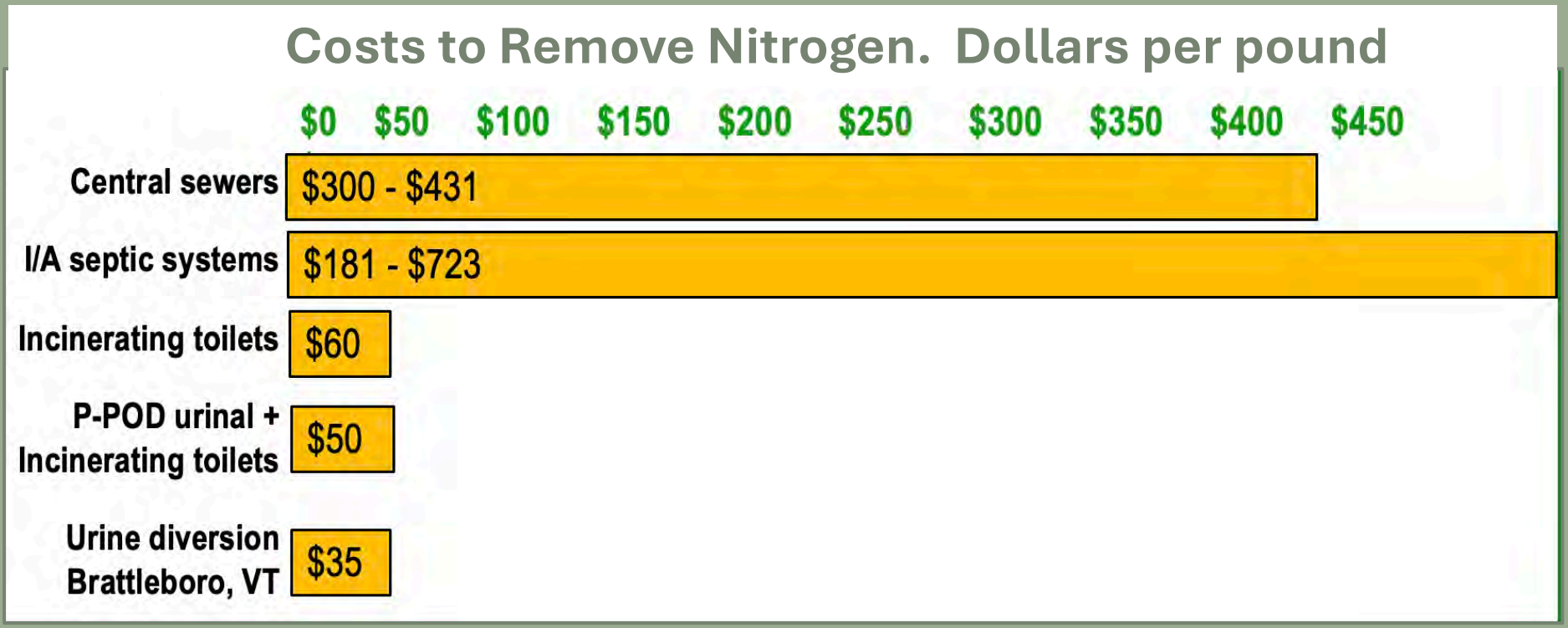



# Removing nitrogen with sewers or I/A septic systems is hugely expensive

**One person's urine contributes 8 lbs of nitrogen/year**

One person's urine nitrogen cost about $2400 per year to remove with sewers or I/A's.



# Removing nitrogen with sewers or I/A septic **systems wastes everything including fresh water**

2000 gallons per person per year
to flush 15 gallons of feces

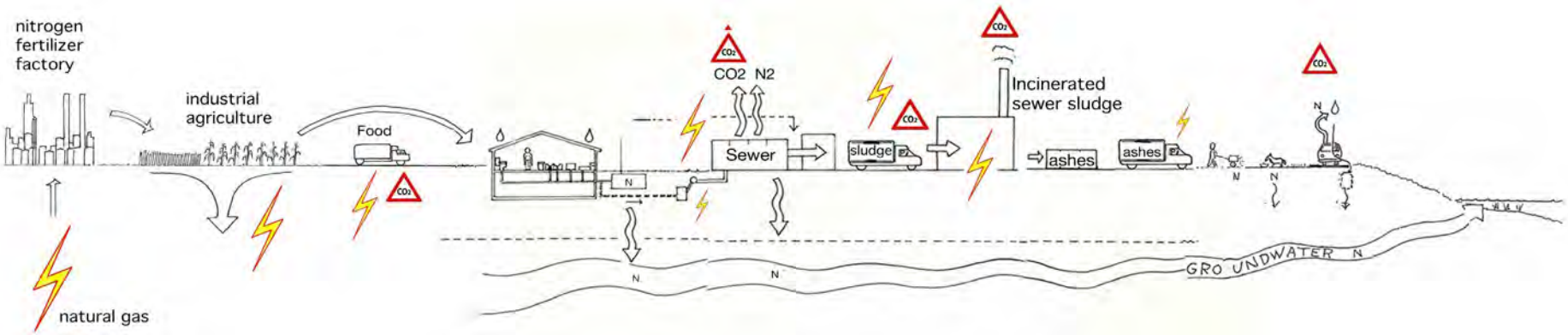
4000 gallons per person per year
to flush 120 gallons of urine

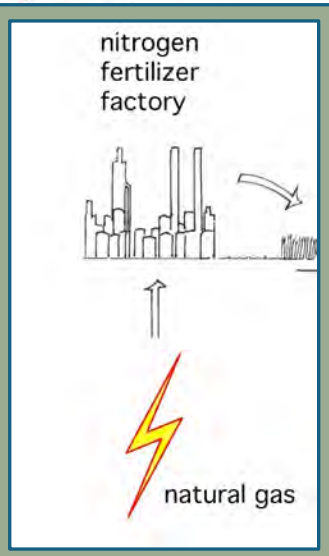
6000 gallons per person
per year greywater
(showers, laundry, cooking etc.)

6000 gallons of flush water is mixed with 6000 gallons of greywater to produce 12,000 gallons of wastewater per person per year.

**Waterless urinals save 4000 gallons per person per year.**
**Waterless composting toilets save 6000 gallons per person per year.**

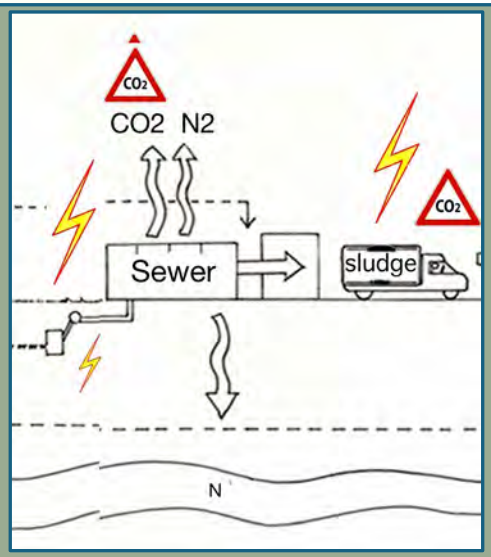
# Removing nitrogen with sewers or I/A septic systems wastes everything and and contributes emissions to climate change - CO2, Methane, Nitrous Oxide




Emissions are produced making nitrogen fertilizer and mining minerals

Emissions are produced during construction, O&M and treatment processes



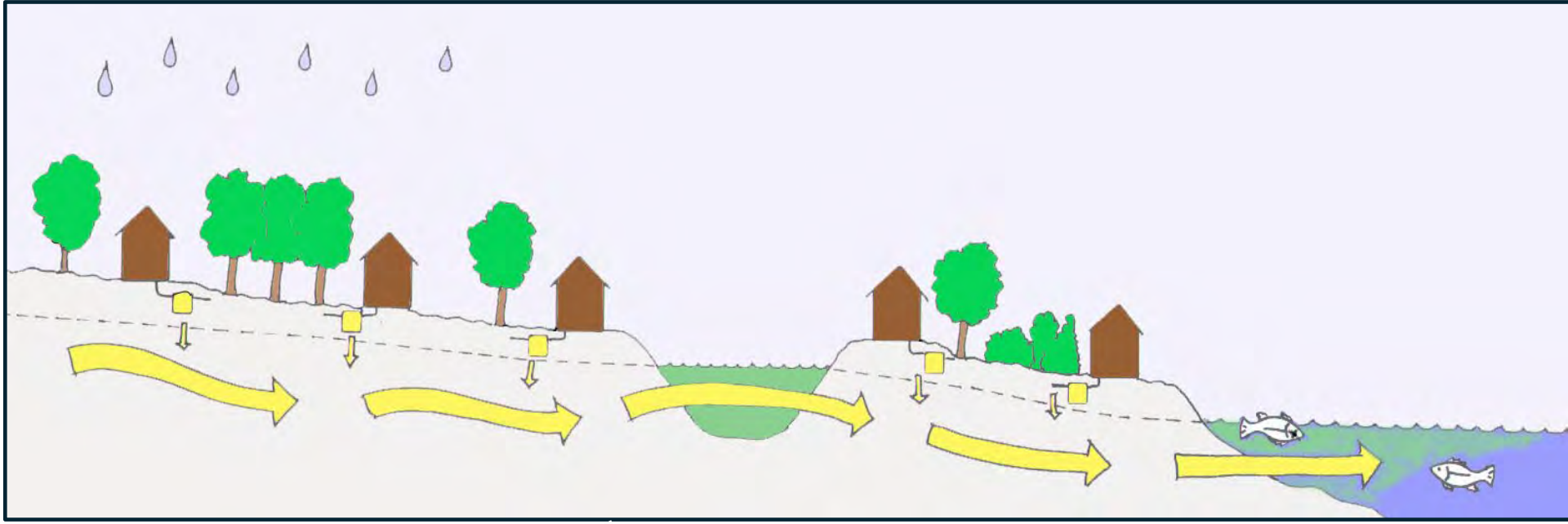
# Removing nitrogen with sewers or I/A septic **systems wastes all nutrient resources**

They gas off most of the nitrogen.
The rest of the nitrogen and ALL others mineral resources are lost, disposed back into the environment, often in other watersheds.


Falmouth Sewer Plant


Innovative, Alternative Septic System

**Sewers and I/A septic systems do not “clean the water”**



Watershed planning should focus on the cause,

not on ONE symptom in ONE place

# The Cause Is The Nitrogen In The Urine

Contains 80% of the nitrogen in the waste stream but is only 1% of the volume of the waste stream

**Watershed plans that waste everything *and* pollute the air, land and water are environmentally and economically unsustainable**

**MassDEP regulations for reducing nitrogen are based on 22-year-old studies, data and estimates**

Since then, nutrient levels from homes have increased, water temperatures have increased, the ecology of the estuaries have collapsed, and the sea level is rising.

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**To make 20-year watershed plans, based on obsolete data and technology is misdirected and irrational**

And there is no evidence that current methods and approach will restore water quality.

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**New approaches and comprehensive solutions are needed**

# Divert Urine!

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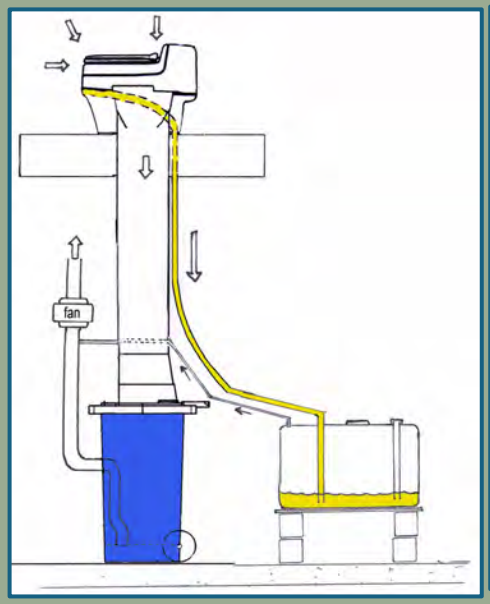
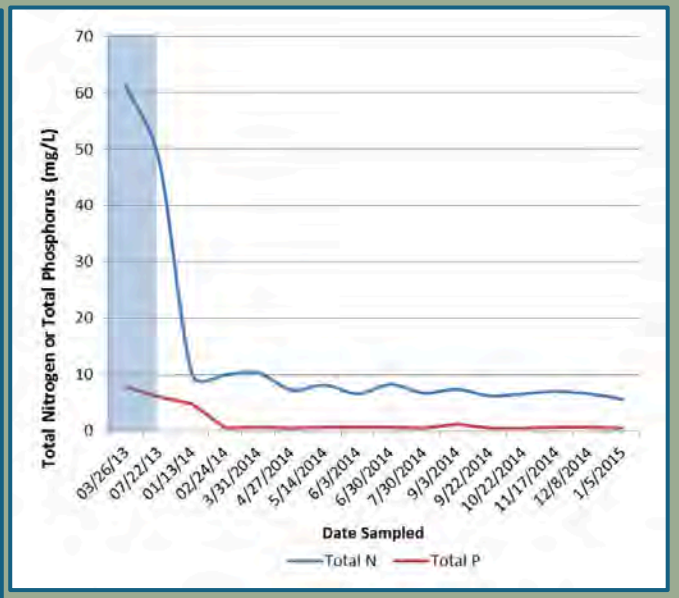
Keep it out of the waste stream

# Urine Diversion in a Watershed

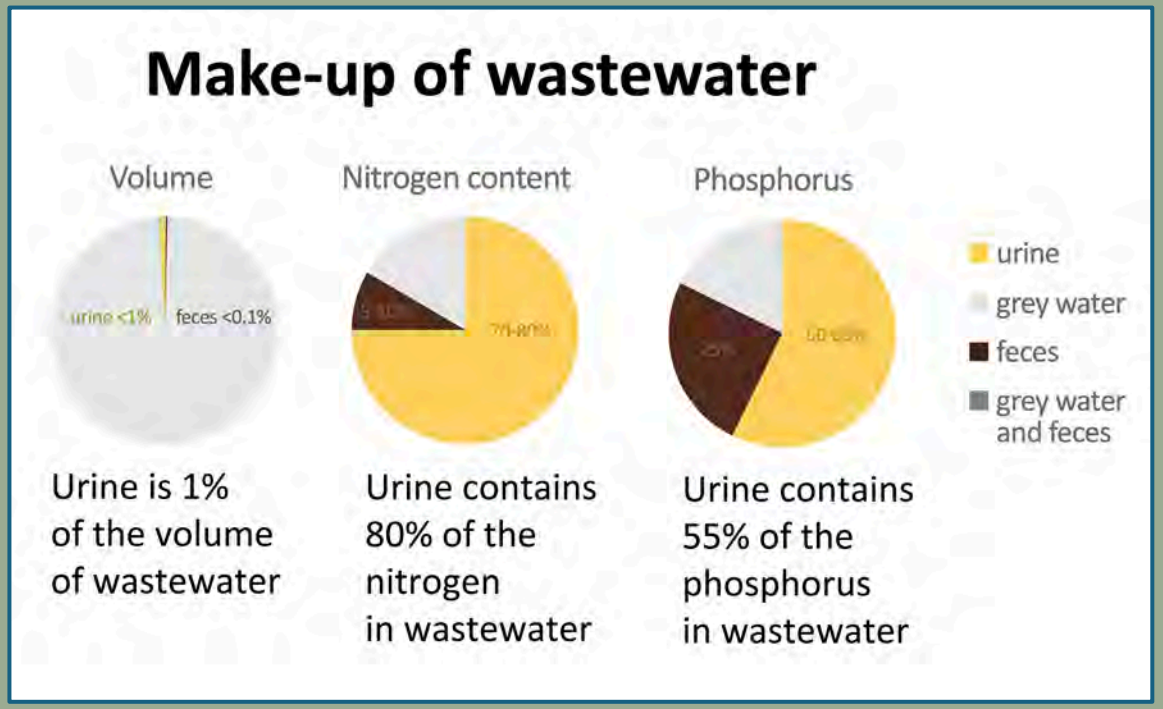
# Will Improve Water Quality in the Entire Watershed

**Composting toilets reduce nitrogen by 90% and phosphorus by 99%**




**Urine Diversion can reduce nitrogen by 80% and phosphorus by 55%**



# What is the difference between

# Urine Diversion and PeeCycling?

# Urine Diversion is keeping urine out of the waste stream

-- divert, collect and dispose of urine

-- put the urine into compost toilet

-- incinerate the urine in an incinerating toilet

# PeeCycling collects, treats and reclaims urine

# for agricultural fertilizer

# Where do the nutrients in the urine come from?

# From 460 MILLION lbs of food trucked onto the Cape each year

**98% of the nutrients in the food we eat, we excrete**


# In addition, 6 MILLION lbs of fertilizers are trucked onto the Cape each year, most for lawns and ornamentals.

**All these nutrients end up in our ponds and coastal waters!!**

# Actions to take now

# to improve the Cape's water quality

# ACTIONS

## Immediately Use

- a wide range of UD fixtures
- urine infrastructure
- recycled urine nutrients to replace synthetic fertilizers

## Provide Financial Incentives

For Urine Diversion

# What are some Urine Diverting Fixtures?

# Urine Diverting (UD) Fixtures

## Urine-Only . UD with Flush

[Installation not included]

Cubie
$80

P-POD in-wall urinal
est. $150

Seated Pee-Toilet
$275

Cinderella Pee only
$529

Separett “Pee”
$ 599

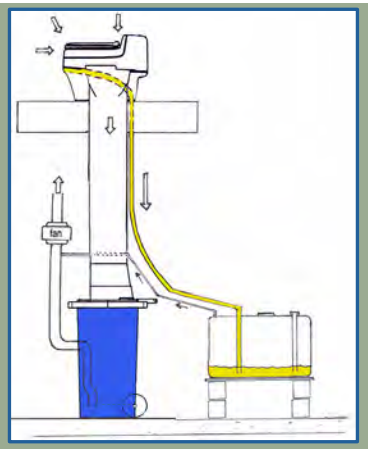
Wostman EcoFlush
$700

# Urine Diverting (UD) Fixtures

## Composting . UD Composting . Incinerating

[Installation not included]

Phoenix
$7,700-8,700



Separett/Full-Circle
$4-5000

Separett “Villa”
$989

Separett “Tiny”
$999

BioLet 55
$2255

BioLet “Mini”
$1490

Nature’s Head
$995

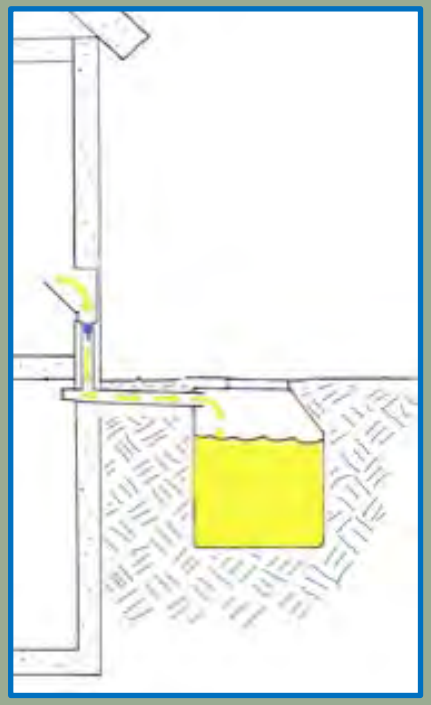
Cinderella®Freedom
$4499

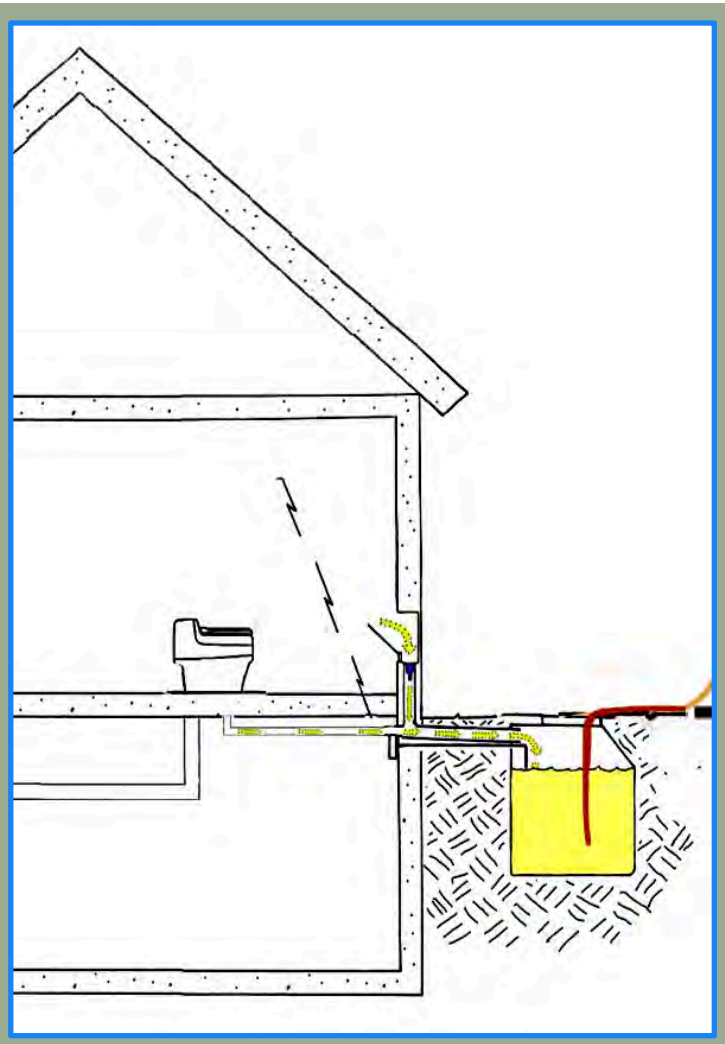
Cinderella® Travel
$4449

# What to do with the diverted urine?

# STORE IT IN TANKS

## Outside in ground or in basement





# STORAGE CONTAINERS

# USE IT AT HOME

## To Replace Synthetic Fertilizers

No treatment necessary for use in resident's own private garden
6 months storage to kill all pathogens optional

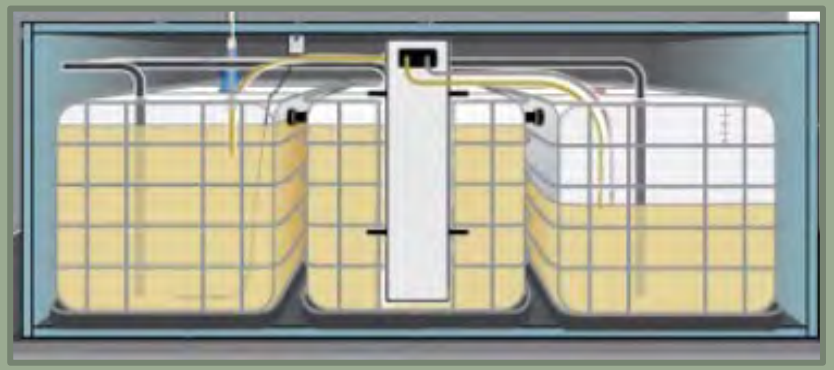
# TREAT IT

## To Destroy Pathogens and Viruses

176º F. for 90 seconds

$0.01/gallon = $1.20/pers/year

**Urine Pasteurizer**



Developed by the Rich Earth Institute https://richearthinstitute.org
Available from Brightwater Tools https://www.brightwatertools.com

# USE IT ON FARMS

## To Replace Synthetic Fertilizers

Pasteurization required for use on commercial farms

# COMPOST IT!

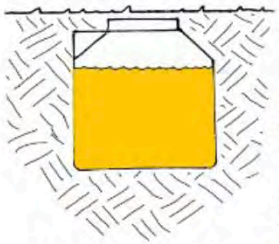
## With Organic ‘Wastes’

Ecodrum Composter

# Community-Scale Urine Infrastructure

**1 - Transport to local sewer plant for further treatment. Nutrients wasted.**
**2 - Transport to "Urine Depot". Pasteurize. Transport to farmers as Class A fertilizer**
**3 - Transport to "Ecodrum" in-vessel composter**
**- Combine with landscape & food wastes. Produce compost fertilizer**

Three Ways to Treat Collected Urine



Collected Urine

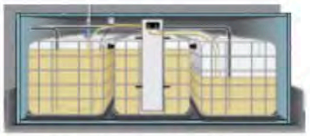
1

SEWER
Gases off most nitrogen


TRANSPORT
Nitrogen, Phosphorus, heavy metals, toxic waste in sludge

To incinerator and toxic waste dump

2



URINE DEPOT
+ pasteurizer $24,000
Cost to pasteurize urine $0.01 per gallon

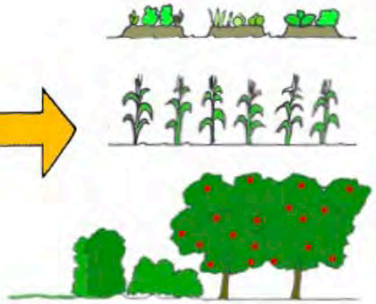

TRANSPORT
$17.-- to transport one person's annual urine volume to farms and fields up to 70 miles away

Agriculture

3

"ECODRUM" COMPOSTER
Urine is mixed with landscape, agricultural, animal and/or food wastes
Pathogens are destroyed by temperatures of 151F for 3 days

COMPOST
EPA Class A fertilizer



# Urine Infrastructure technologies are

- available now
- low tech
- reliable
- adaptable
- flexible
- environmentally beneficial
- affordable

*and*

- much less expensive than currently approved MassDEP wastewater management technologies

# Actions to take now

# to improve the Cape's water quality

# ACTIONS

## Provide incentives to homeowners for urine diversion

1. **Subsidies, grants and loans to pay for UD installation and infrastructure**

   Spending less on sewering would pay for UD incentives

2. **Exemption from requirements to hook up to sewers or I/A's**

   - If septic tank effluent is 19mg/L or less
     or
   - If all human wastes are removed from the waste stream

URINE DIVERSION

## Reduces Water Pollution

Conserves Water

Produces Fertilizers

Reduces Costs

Reduces Greenhouse Gas Emissions

Is - low tech
- reliable
- durable

# URINE DIVERSION:

**the most cost effective, environmentally sustainable, quickest way to reduce pollution in a Watershed**

**You have to act as if it were possible to radically transform the world.**

**And you have to do it all the time.**

*Angela Davis*


# Towards a more equitable, greener world with cleaner water

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