



Solar Fields and Greenfields Siting Concerns and Solutions

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Worcester Technical High School

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Shaping the Future of Your Community Program

Working in the state's fastest developing regions to provide community leaders and concerned citizens with tools and support to chart a more sustainable future

www.massaudubon.org/shapingthefuture



Responding to Climate Change

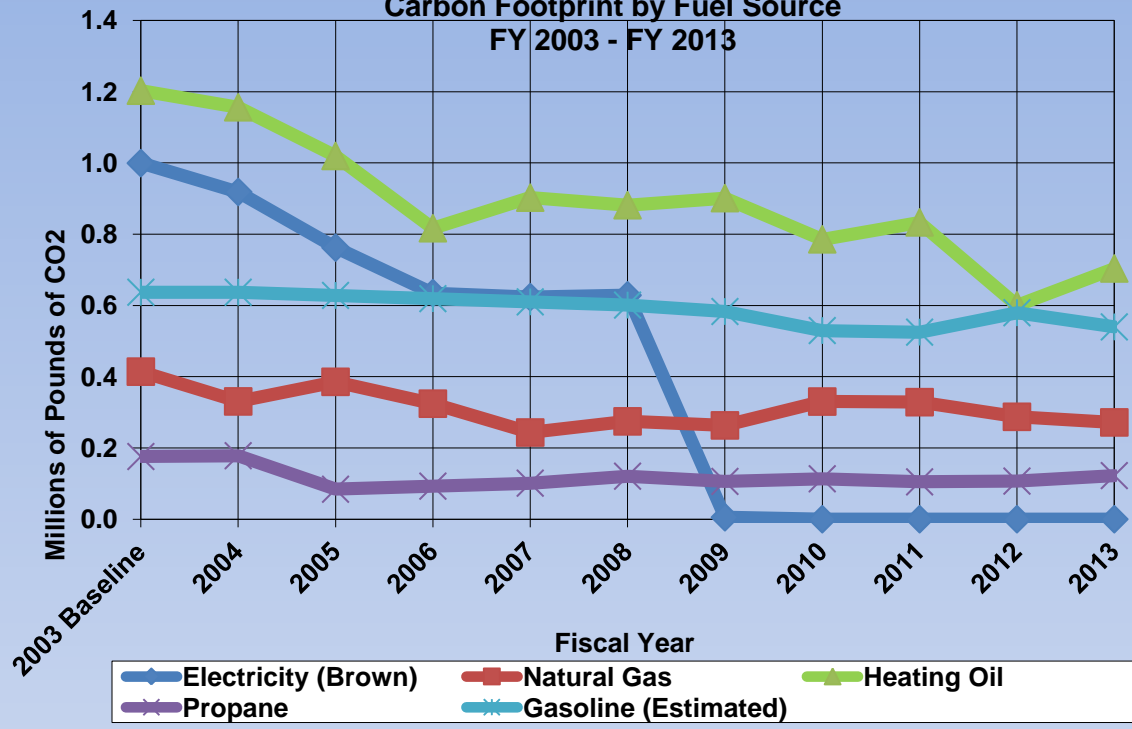
- Mitigation and Adaptation - both are important
- State laws and programs: Global Warming Solutions Act, Regional Greenhouse Gas Initiative, Green Communities Act
- Comprehensive Adaptation and Management Act (CAMP)
- Resiliency – Natural and Human Systems

Mass Audubon – Leading by Example

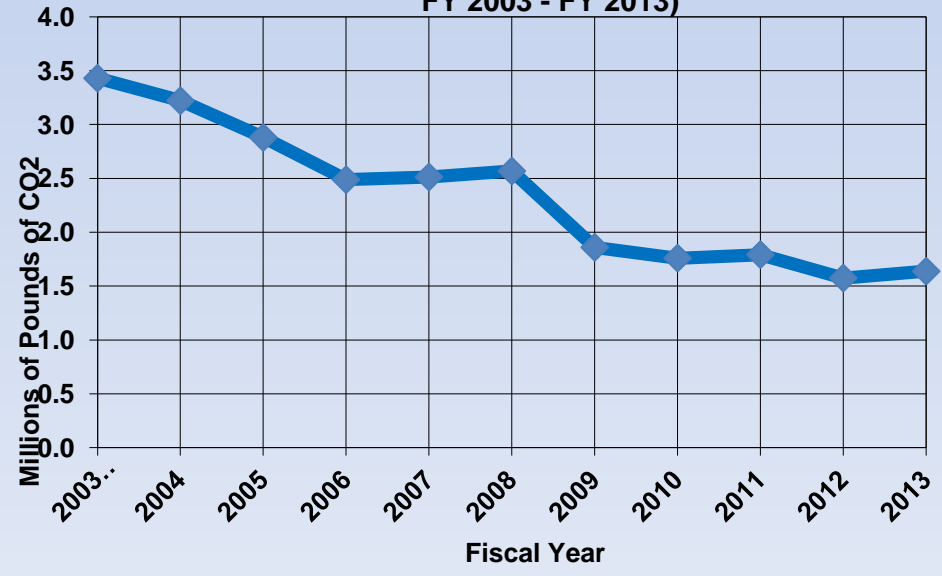
- Since 2003, Mass Audubon has reduced its annual carbon emissions from its buildings and vehicles by more than 50 percent.
- We also use these measures as educational tools to show visitors what they can do.
- Generate and purchase renewable energy
- Building and vehicle efficiency improvements
- Water conservation
- And much more (see handout)



**Mass Audubon
Carbon Footprint by Fuel Source
FY 2003 - FY 2013**



**Massachusetts Audubon Society
Overall Carbon Footprint for Buildings and Vehicles
FY 2003 - FY 2013)**



Generating Renewable Energy at Mass Audubon

- 35 PV arrays at 20 locations
- 318,000 kWh generated annually
- Solar thermal water heating at several sites
- Geothermal heating/cooling at Boston Nature Center

Green Buildings and Renewable Energy at Mass Audubon



Other Environmental Groups



Sierra Club Massachusetts
Chapter – Go Solar program
– member discounts

The Trustees of Reservations – 5 PV
and 1 solar thermal array. More
planned.

Your Land Trust?



Renewable Energy Development

- All forms of energy production have environmental impacts.
- We need to rapidly develop renewable energy sources while protecting our vital natural Green Infrastructure through appropriate siting and other conditions.
- Conserve nature's defenses (e.g. forests, wetlands, buffer zones)

Adaptation

- ADAPTATION means **increasing resiliency** and **reducing vulnerability** of our natural and built systems, and better preparing our response capabilities



Massachusetts
**CLIMATE CHANGE ADAPTATION
REPORT**
September 2011



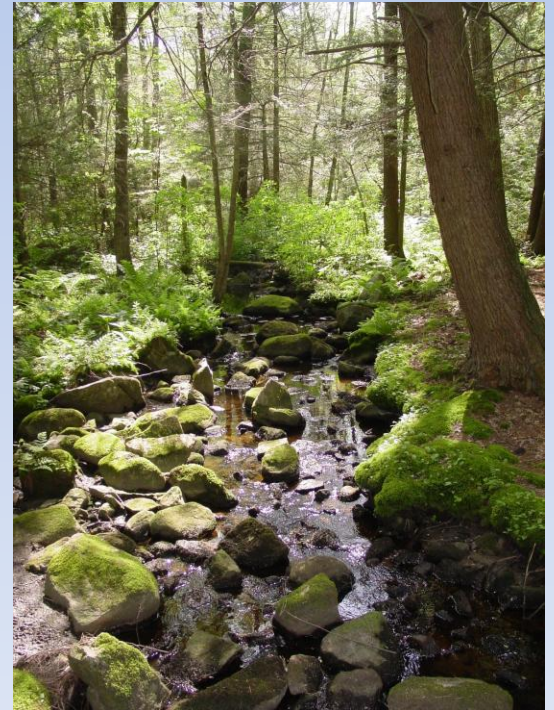
*Submitted by the
Executive Office of Energy and Environmental Affairs
and the
Adaptation Advisory Committee*



Landscape Context for Resiliency

Ecological Resiliency: *ability of a natural system to return to a stable state following a disturbance*

- Intact habitats are most resilient to many threats and stresses
- Interconnection is vital for adaption and migration



Natural Lands Roles in Mitigation and Adaptation

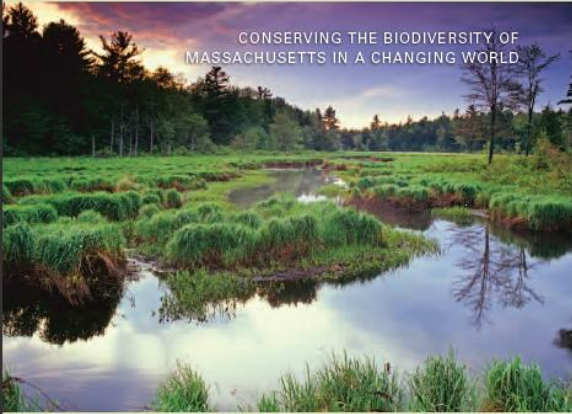
- Massachusetts' forests are sequestering 12% of our annual carbon emissions. An acre of forest holds 85 tons of carbon
- Wetlands are also major carbon sinks
- Natural landscapes absorb rainfall during storm events, decreasing flooding, and filter the air and our drinking water.
- Trees provide shade, reduce heat islands
- Compact development and land conservation keeps forested and natural (carbon absorbing) lands intact



Landscape Planning for Ecological Resiliency

BioMap2

CONSERVING THE BIODIVERSITY OF MASSACHUSETTS IN A CHANGING WORLD



MA Department of Fish & Game | Division of Fisheries & Wildlife | Natural Heritage & Endangered Species Program | The Nature Conservancy

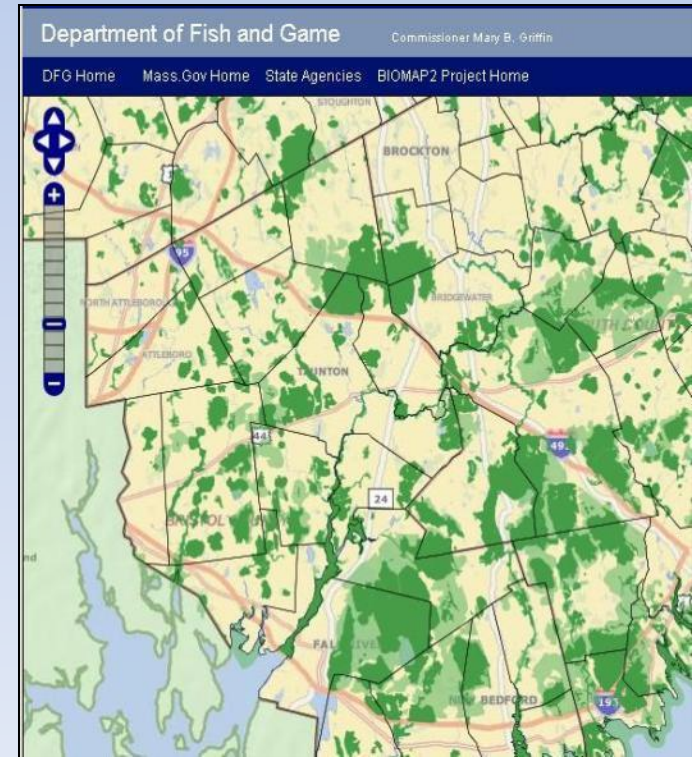
Focus land conservation on areas most critical for long-term persistence of rare and other native species, exemplary natural communities and a diversity of ecosystems

Align local plans and zoning

Look beyond parcel and municipal boundaries

Protect the biodiversity of MA in the context of projected effects of climate change.

Core Habitat
Critical Natural Landscape



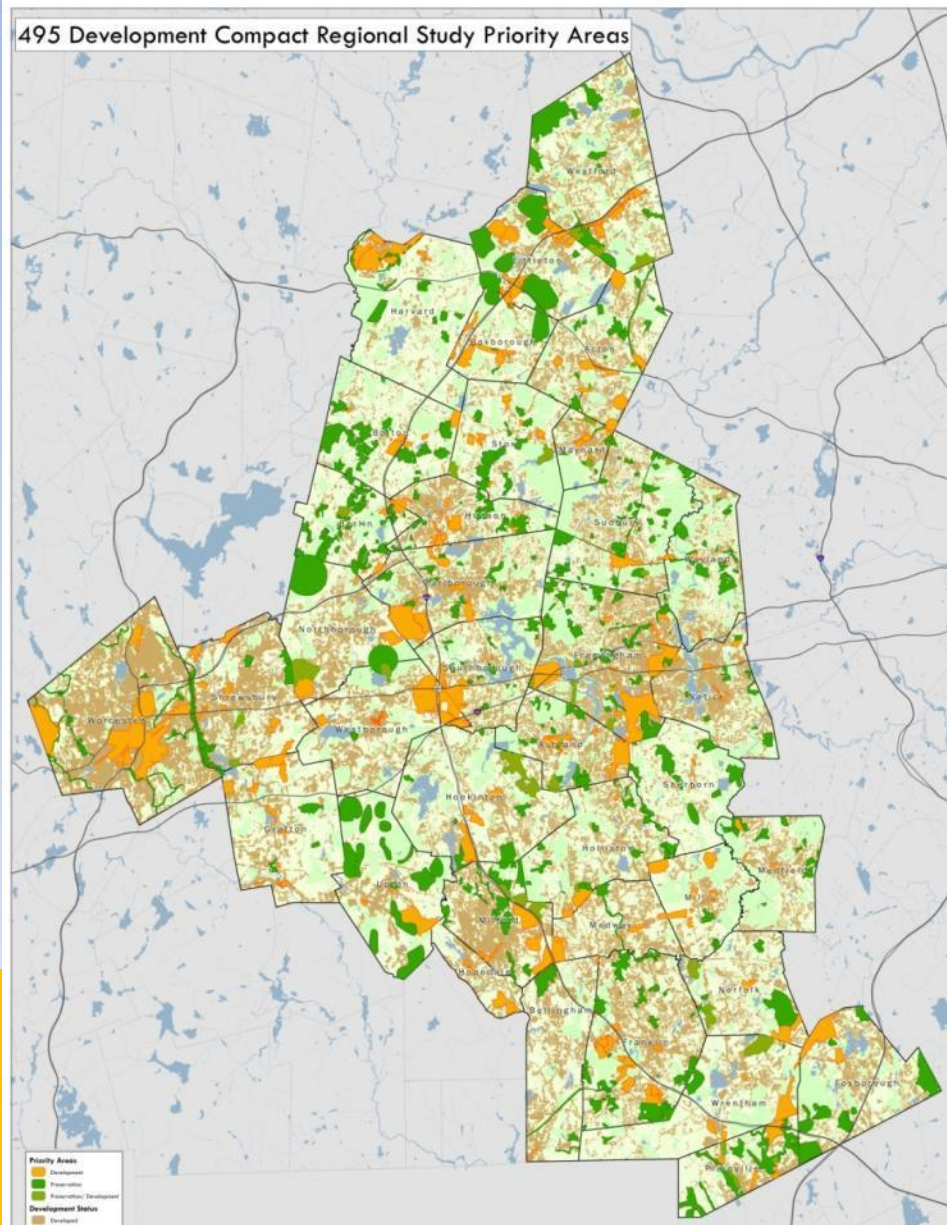
Planning Ahead for Growth and Development

Prioritize Protection:
Important habitat and
Green Infrastructure

Prioritize Development:
Concentrate near infrastructure
and away from important natural
resources

Regional Plans – Toolkit for Implementing

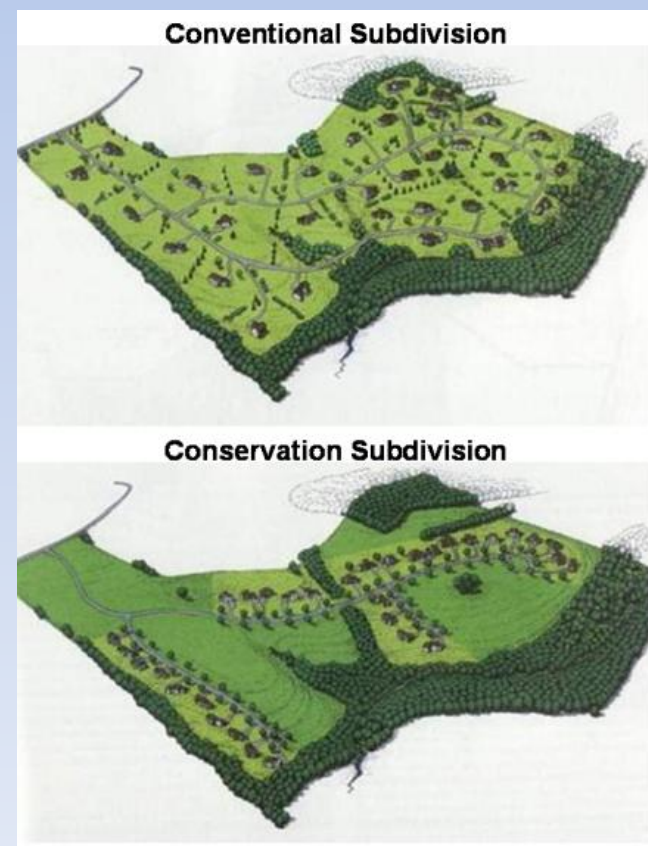
- Priority Protection Areas
- Priority Development Areas



Open Space or Conservation Zoning

Reduce Sprawl & Protect Natural Green Infrastructure

- Lower infrastructure costs – less roads, stormwater management
- Reduced clearing and grading
- Protect water supplies
- Prevent flood damage, protect wetland buffers and floodplains
- Protect forests and farmlands
- Provide open space and trails for people and nature
- Support high quality of life and property values



Solar Siting in Context of Adaptation and Preserving Natural Green Infrastructure

- Rooftops, parking lot canopies, industrial and redevelopment sites
- Local zoning for solar – direct large arrays to appropriate sites
- Concerns:
 - Forests
 - Grasslands, farmlands, landfills, and other early successional habitats
 - Wetlands



2013

STATE *Of The* Birds

Massachusetts Breeding Birds: *A Closer Look*

 Mass Audubon
BIRD CONSERVATION PROGRAMS
State of the Birds



From 1971 to 2011 30% Loss of Cropland and Pasture

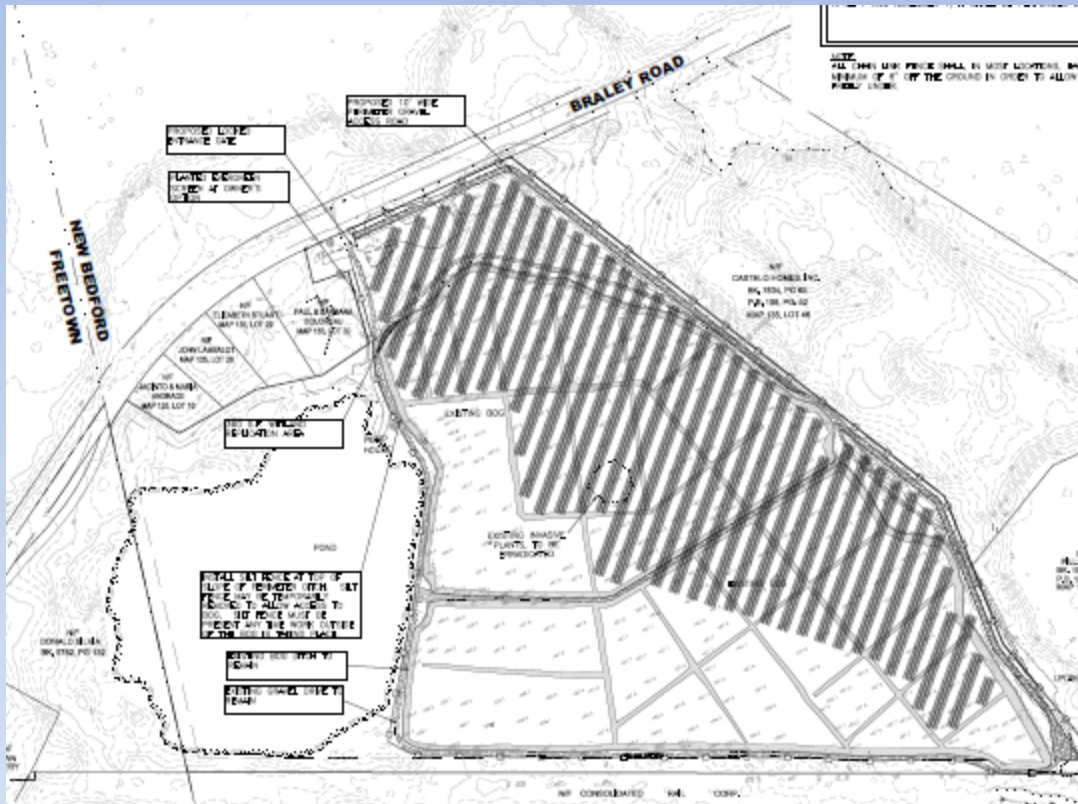
400,000 pasture/cropland acres in Mass in 1971

150,000 acres are gone by 2011 – half developed,
half reverted to forest

Large capped landfills also provide
grassland bird habitat



Braley Road, New Bedford



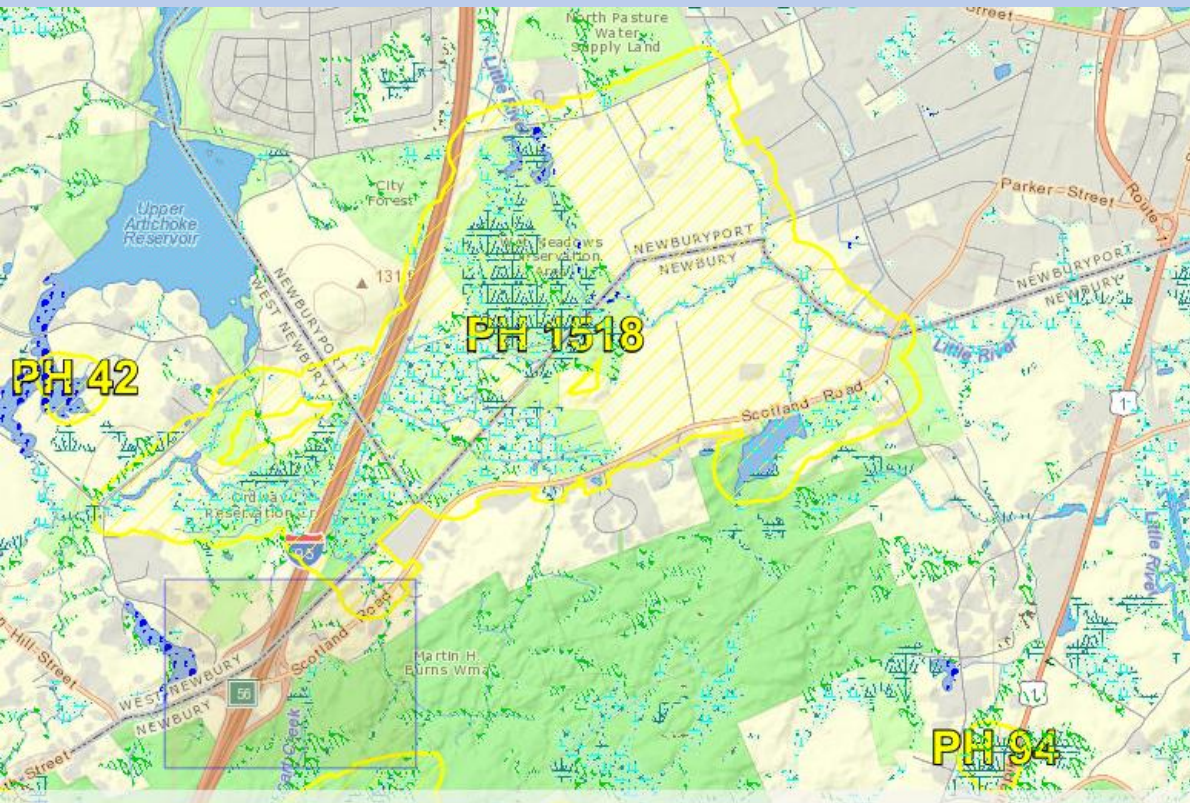
Solar Siting in Context of Adaptation and Preserving Natural Green Infrastructure

- “MassDEP discourages installation of ground-mounted solar PV systems in wetland areas, including riverfront locations. Solar projects within wetland areas are unlikely to comply with the performance standards in the Wetlands Protection Act regulations.” *Questions & Answers Ground-Mounted Solar Photovoltaic Systems, December 2012:*
<http://www.mass.gov/eea/docs/doer/renewables/solar/solar-pv-guide.pdf>

Common Pasture, Newbury

First proposal: 3 MW solar arrays covering 7 acres of vegetated, farmed wetlands. Claimed only 594 sf impact (poles and utility pad). DEP – exceeds Wetlands Protection Act performance standards; not permissible

New project: 90 greenhouses, each up to 4000 sf, with solar arrays on top. Normal improvement of “land in agricultural use” under Wetlands Protection Act?



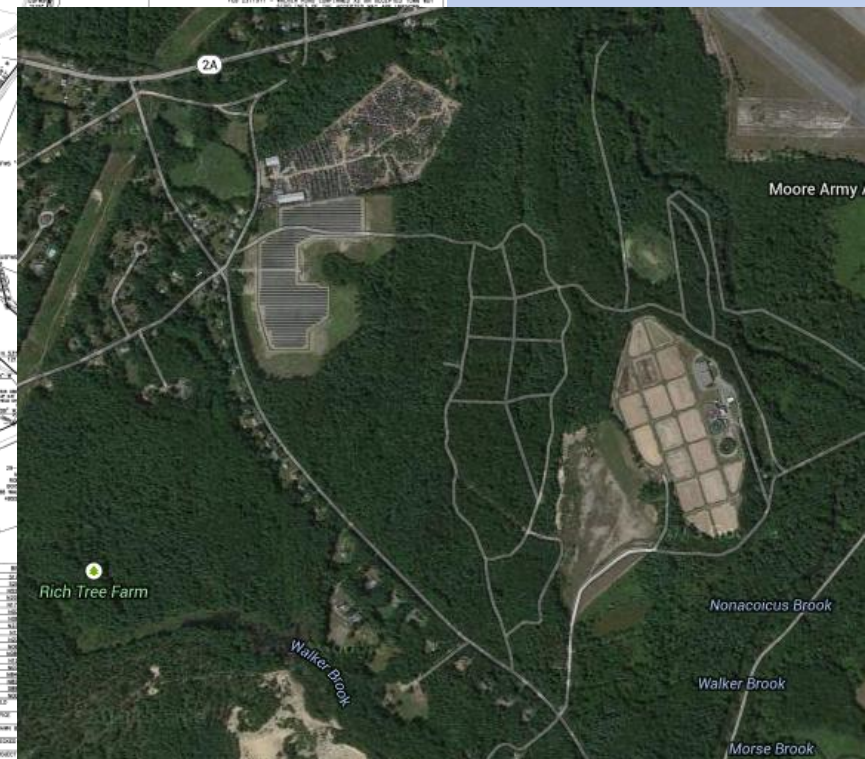
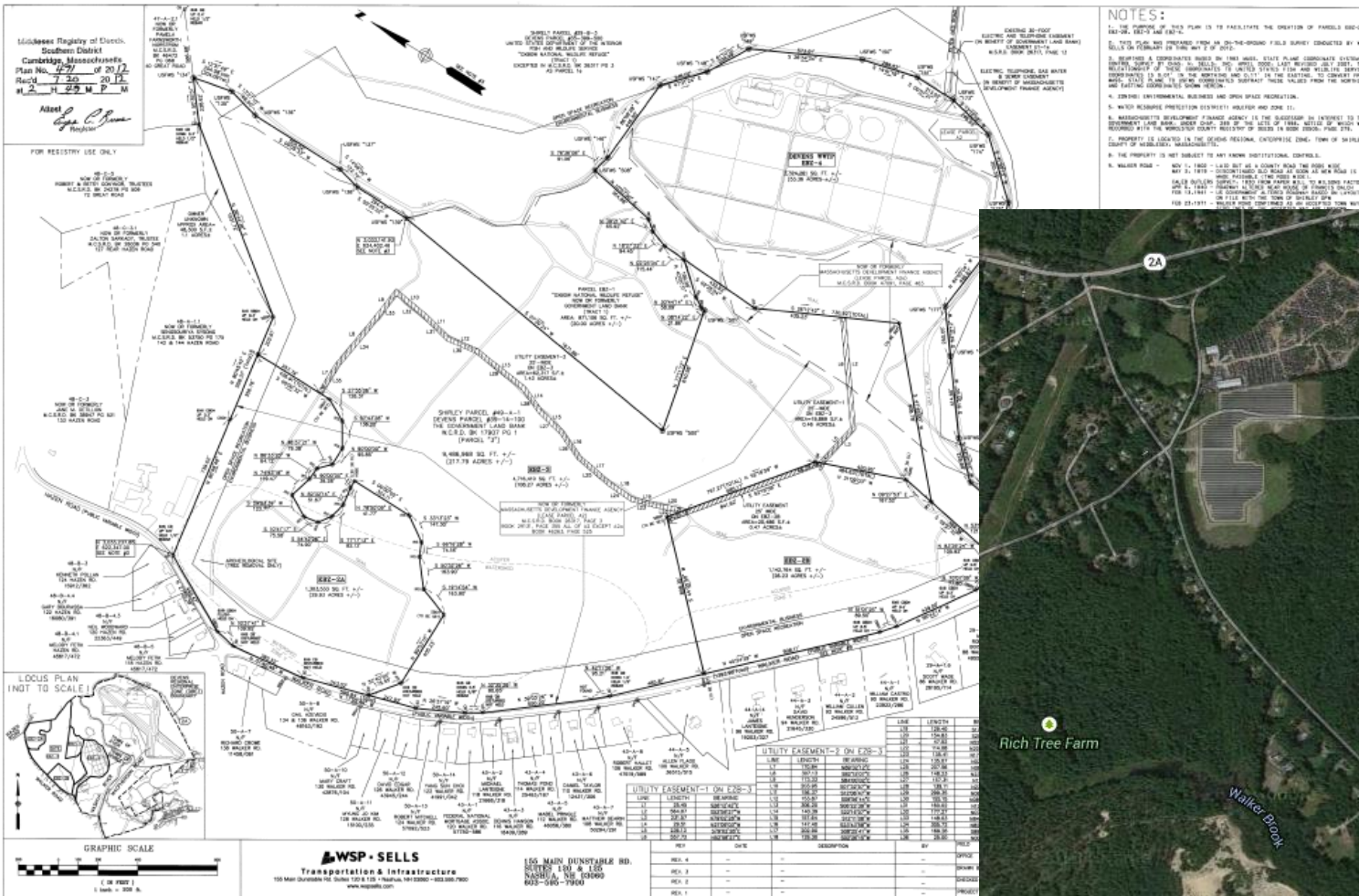
- Farmland since 1636
- One of the largest wet meadows in MA
- 132 species of birds including grassland birds, hawks and owls, songbirds, and waterbirds (snipe, herons, egrets, ducks and geese, coots and rails, sandpipers).

Devens Environmental Business Zone

Zoned Light Industrial

108 acres protected – to DFW

Vernal pools, rare species – Blue Spotted Salamander, Blanding's Turtle





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