

McWater's Park Permaculture Gardeners

Permaculture Design Workshop
and Charrette

Site Assessment

Components of a Site Assessment

- Climate
- Land form
- Water
- Access and circulation
- Vegetation (will save for last)
- Animal life
- Microclimates
- Buildings and infrastructure
- Zones of use
- Soil – fertility and history
- Aesthetics and experience of place

Consider these in degrees of permanence

Climate

Climate

Plant hardiness zone - see the Arbor Day Foundation

<https://shop.arborday.org/nursery-zones>

Annual precipitation - see the National Weather Service Climate Report

<https://www.weather.gov/aly/climate>

<http://www.nrcc.cornell.edu/regional/climatenorms/climatenorms.html>

Seasonal distribution of precipitation

<https://www.weather.gov/wrh/Climate?wfo=aly>

Wind – strength and prevailing direction, storm direction

<https://www.nrcs.usda.gov/wps/portal/wcc/home/climateSupport/windRoseResources/>

First fall frost and last spring frost

<https://www.almanac.com/gardening/frostdates>

Extreme weather potential (hurricanes, tornadoes, drought, flooding, etc)

Climate change

<https://www.arborday.org/media/mapchanges.cfm>

<https://www.ncei.noaa.gov//news/noaa-delivers-new-us-climate-normals>

Climate for North Bennington

Plant hardiness zone –

Zone 5-6 per the Arbor Day website

Record temperatures: high of 104 (1911) and a low of – 28 (1971), last years range 92 to -7

Determines plant survival when combined with snow cover etc.

Annual precipitation –

Typically 40" a year, 2021 was 45" total.

Max 57" 1871, Min 21.5 1964

Wind -

Rare wind from the east – mostly south and west, some from the north, strongest winds come from the west.

See wind rose

Seasonal distribution of precipitation –

All year round – typically ranging from 2.5 to 5" a month

Frost -

Light frost in spring – predicted for 2022 – May 17th

Last light frost in fall – predicted for 2022 – September 27

Frost free days = 132

Often determines fruit production in terms of blossom loss and time for maturation

Extreme weather potential (hurricanes, tornadoes, drought, flooding etc.)

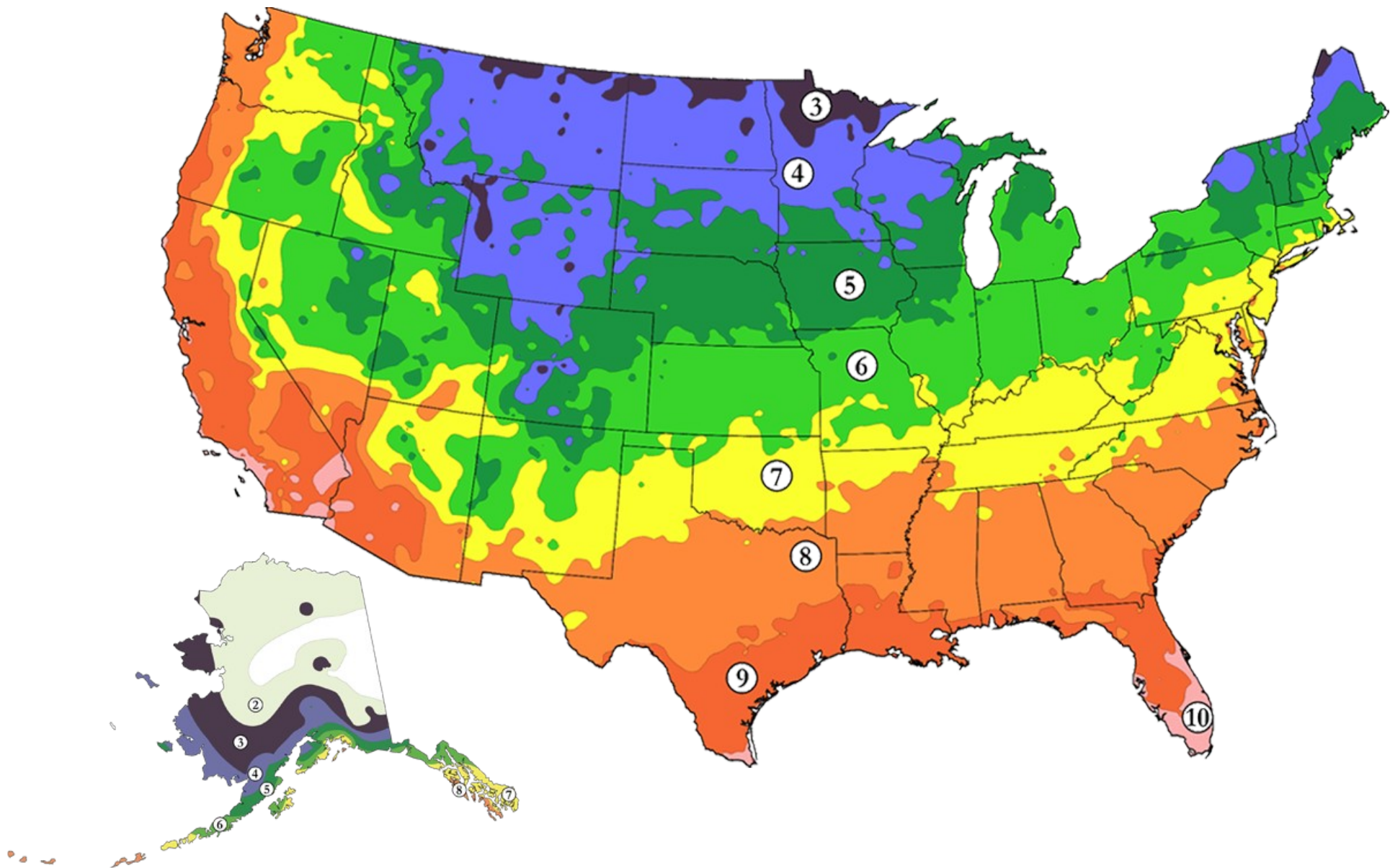
We live in an area thankfully free of frequent extreme weather.

We know that the park is at risk for flooding: The entire park was under water during Hurricane Irene.

Climate change

We are less effected than many in terms of precipitations and rain fall.

It is harder to quantify the extremes in temperature fluctuation.



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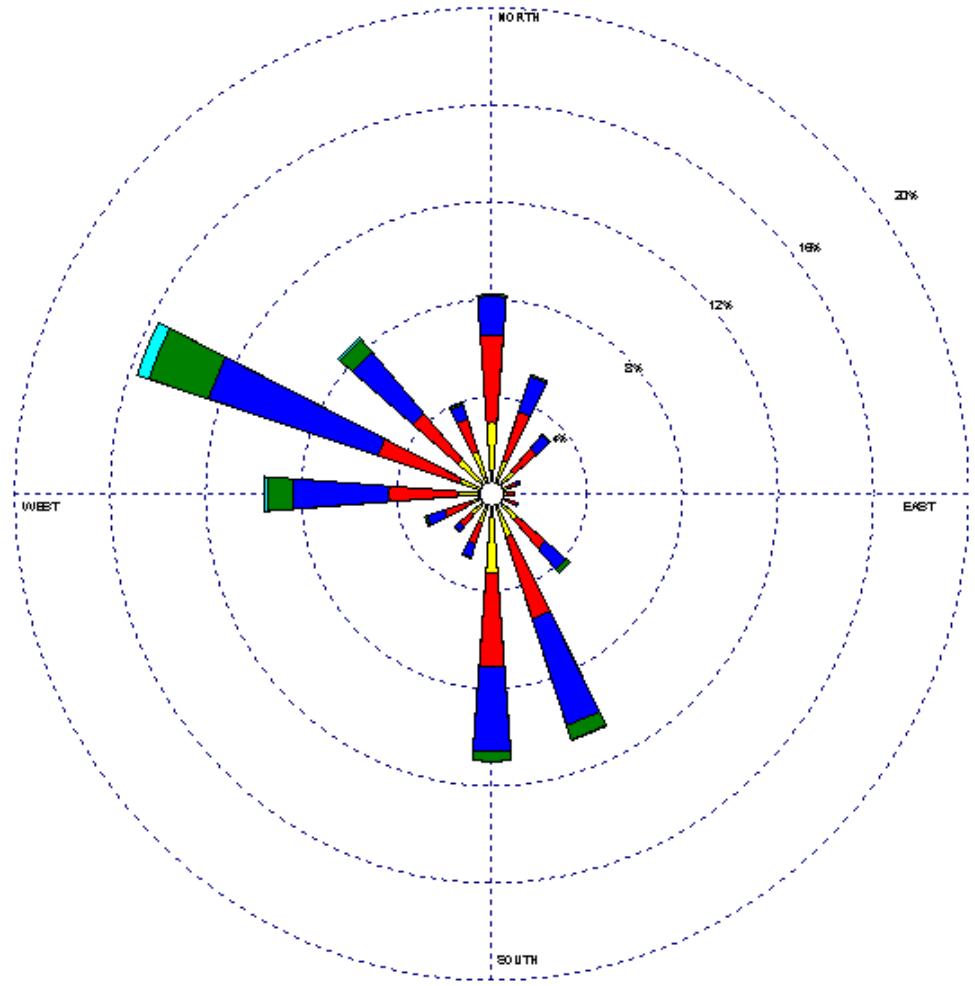
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WIND ROSE PLOT
 Station #14735 - ALBANY/COUNTY ARPT, NY



Wind Speed (m/s) 	MODELER 	DATE 11/1/2002	COMPANY NAME
	DISPLAY Wind Speed	UNIT m/s	COMMENTS
	AVG. WIND SPEED 5.08 m/s	CALM WINDS 8.40%	
	ORIENTATION Direction (blowing from)	PLOT YEAR-DATE-TIME 1961 Apr 1 - Apr 30 Midnight - 11 PM	PROJECT/PLOT NO.

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Climate change

We have not been as affected as many areas in terms of precipitation and temperatures.

Harder to quantify the extreme changes we experience in temperature.



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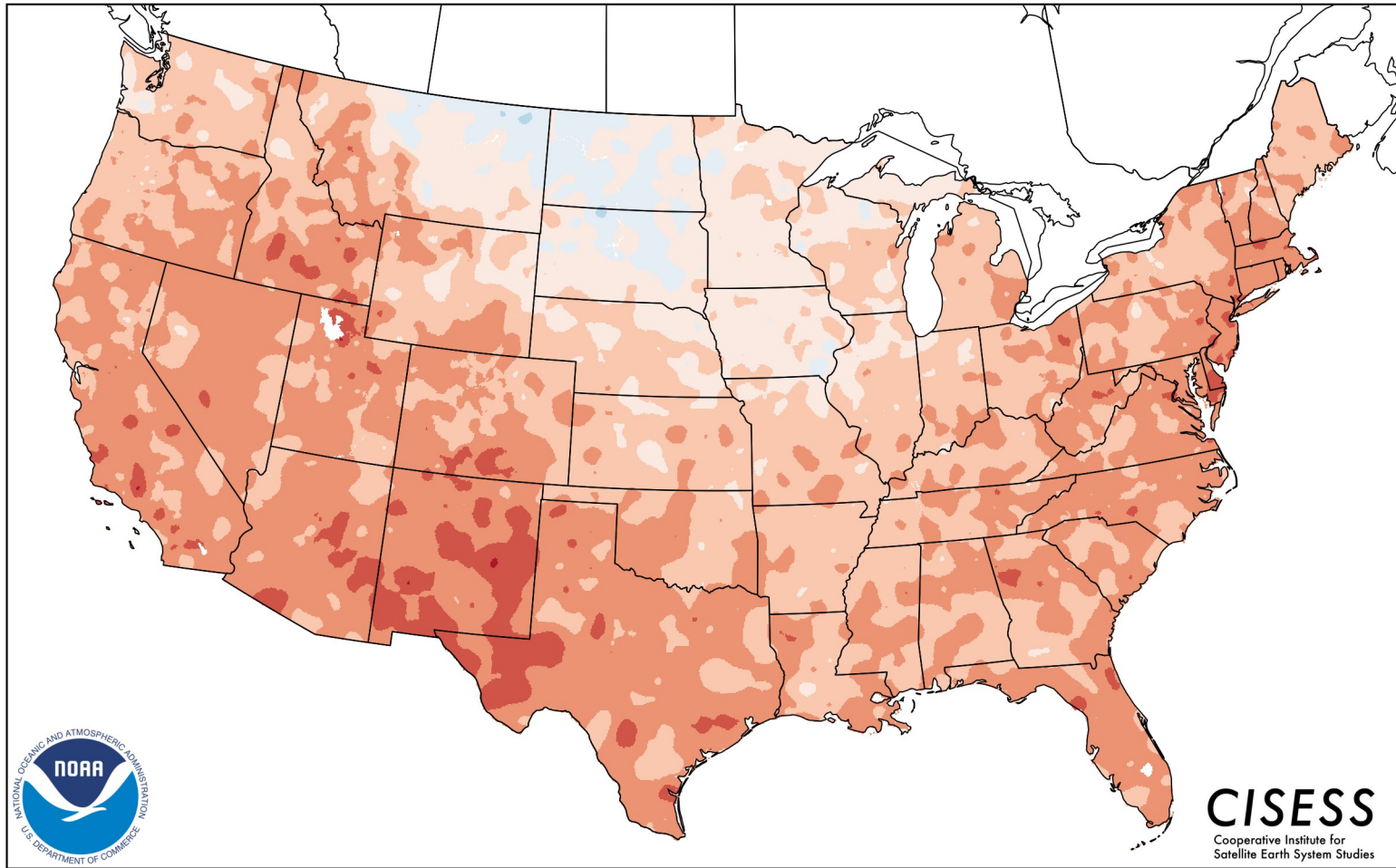
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Annual Mean Temperature Change



CISESS
Cooperative Institute for
Satellite Earth System Studies

-1.0

-0.5

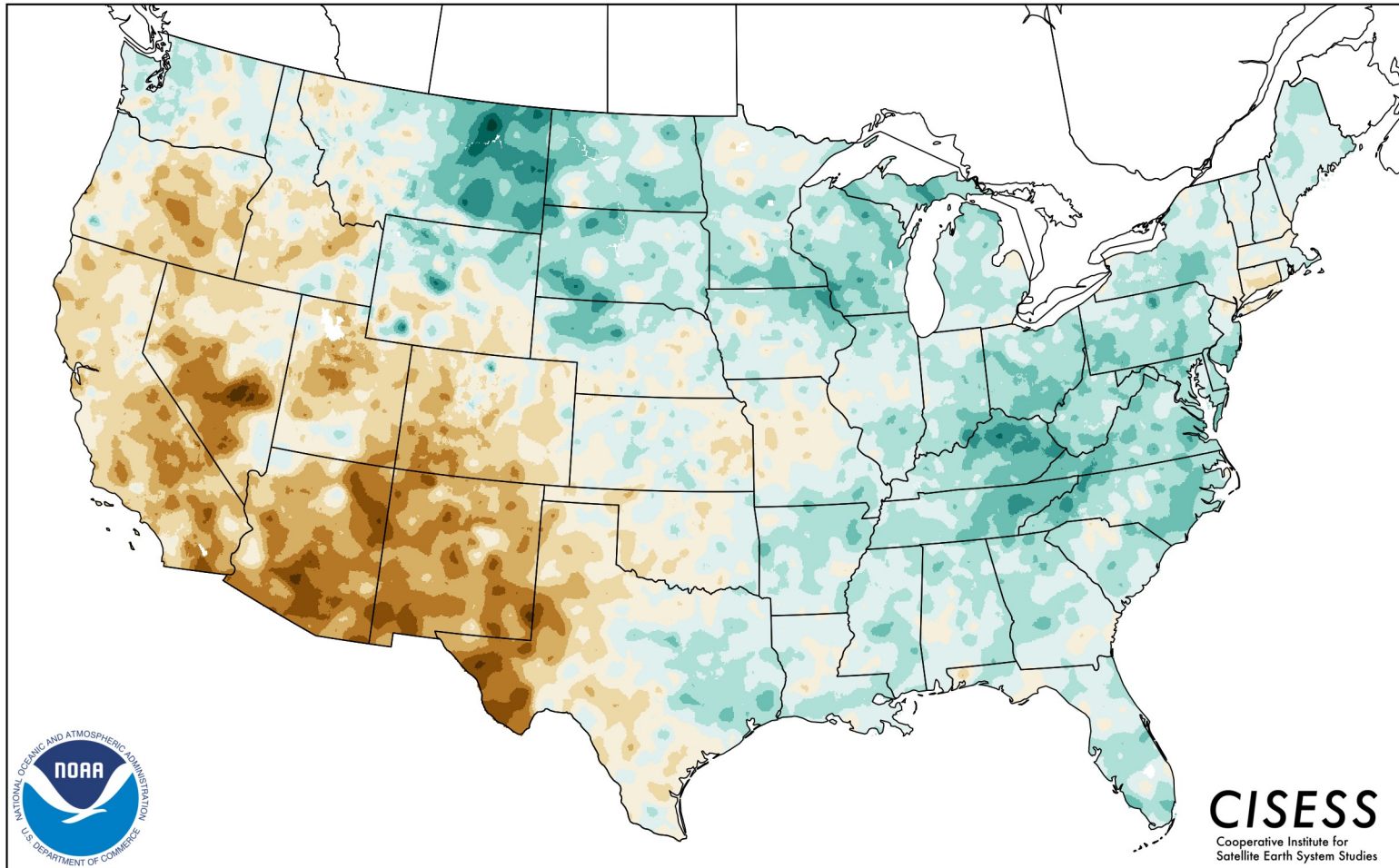
0.0

0.5

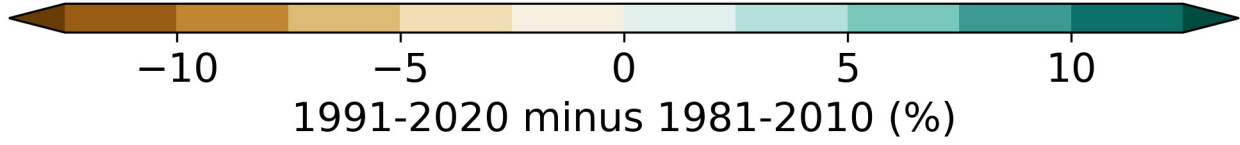
1.0

1991-2020 minus 1981-2010 (°F)

Annual Precipitation Change



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Land Form

Landform

Slope

Topographic position – where on the landscape, ie in a valley or the top of a hill etc

Bedrock geology

Superficial geology

Depth to hard pan, bedrock

Local elevation

Global elevation

Landform

Slope – largely flat with a bank up to the road along the north and a drop down to the river along the south

Topographic position – gently river valley

Bedrock geology - limestone

Superficial geology – see soil reports,
Tired compacted farm land on flood plain
The field is poorly drained w/ pH 7.3
The bank is very well drained
Cation exchange 0-6.2

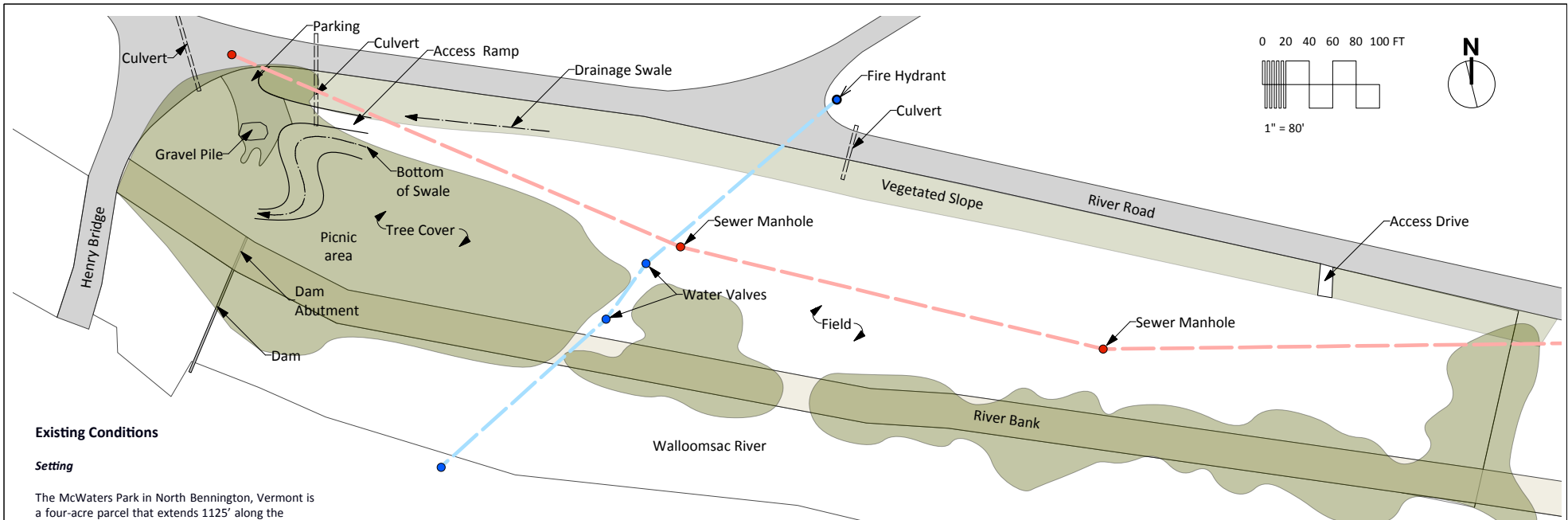
Depth to hard pan, bedrock – thought to be over 80"

Depth to water table 16-18"

Seasonally had surface water, can flood in the spring

Local elevation

Global elevation



Existing Conditions

Setting

The McWaters Park in North Bennington, Vermont is a four-acre parcel that extends 1125' along the Walloomsac River to the south and River Road to the north. The Henry Bridge, a historic covered bridge, lies directly to the southwest. Prior to being made a park, the land was primarily used as agricultural land. Adjacent properties are mostly residential and wooded.

Topography

Three levels characterize the topography of the site. From River Road, the land slopes down steeply to the south where it becomes flat, although not level. The south edge of the park slopes more gently to the Walloomsac. Towards the southwest end of the park, the land is closer to the level of the road; a deep bowl dominates the westernmost end of the park. The northern slope has large quantities of stone. The entire park lies within the 100-year flood zone and is partially in the floodway.

Soils

The Natural Resources Conservation Service identifies the soil as 85% Pootatuck fine sandy loam, which typically forms in floodplains. The depth is more than 80" to a restrictive feature. The depth to the water table is 16-30". Soil reaction ranges between 4.5 and 7.3 pH. The cation exchange capacity ranges between 0 and 6.2 meq/100g.

Three soil tests by the University of Vermont reveals the soil as
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 2) a well drained sand with a pH of 7.1 from the riverbank
 3) a moderately well drained loam with a pH of 7.0 from the grassy upper area

Field observations suggest that much of the soil is heavily compacted.

Vegetation

The vegetation on the park falls into 4 characteristic types. 1) The center of the property forms the dominant vegetation. It is a mown area of grasses and other low-growing plants. 2) The riverbank is characterized by a variety of water-loving plants, including black willow, sumac, red-twig dogwood, butternut, box elder, cherry, wild grape, and the invasive exotics honeysuckle, *Rosa rugosa*, and Japanese knotweed. 3) A small grove of cottonwoods and a few other trees dominates the west end of the park. The eastern end also has some trees and small shrubs. 4) Along the bank from the road, opportunistic plants dominate, including colt's foot, bedstraw, *Rosa rugosa*, and raspberries.

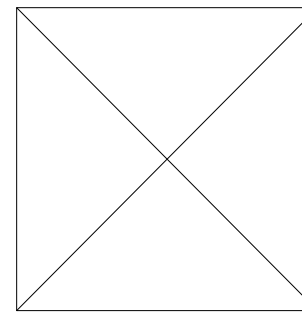
Climate and Microclimate

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Built Environment

The built environment includes a partially completed parking area to the northwest and a picnic area southeast of that under the cottonwoods. A sizeable drainage swale divides the two areas. A narrow earthen ramp permits mowing vehicles to access the mown area from the parking lot. Another drainage swale runs east to west north of the ramp. A second and steeper earthen ramp permits access near the northeastern end of the park. Several culverts pass under the road and permit water to enter the property from the north. Below the surface, a sewer line runs from the northeastern end of the park, through the center, and to the northwest. Two manholes access the sewer line. Running through the middle of the park from north to south is a water line with a fire hydrant across the road and two water valves on the property.

Drawing based on aerial imagery from 4/7/2009, accessed from Google Earth on 1/16/2012, drawing by Ned Wood, and approximate site measurements. Not a legal survey. For demonstration purposes only. All measurements should be ground-truthed prior to installation.



1 Acre

LASOFF LANDSCAPE DESIGN
 Nicholas T. Lasoff
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**Edible Forest Garden
 McWaters Park
 North Bennington, Vermont**

Existing Conditions | 1 of 2

Date: 3/20/12

Water

Water

Existing Sources – location, quality, dependability and sustainability

Watershed and flow patterns

Potential for pollution

Flooding and ponding

Potential future sources

Water lines, septic, well location

Erosion – existing and potential

Water

Existing Sources – location, quality, dependability and sustainability:
The river

Watershed and flow patterns
Culverts with seasonal drainage from the hillside to the north

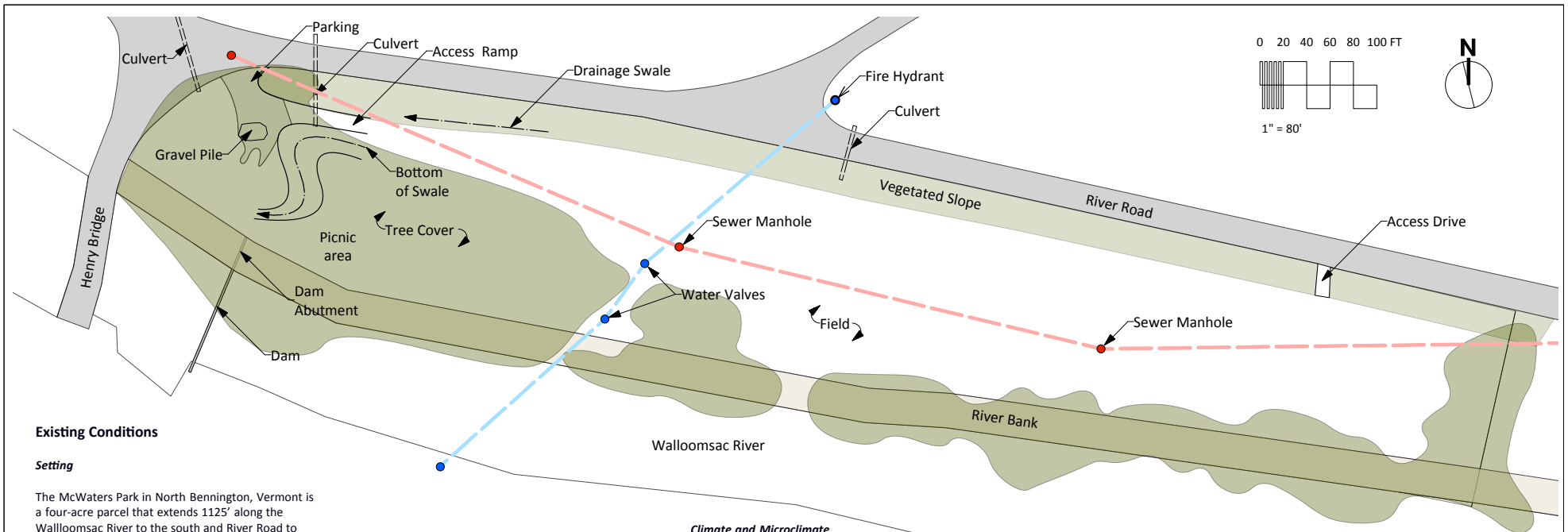
Potential for pollution -
Flow off the road with salt etc

Flooding and ponding
Culvert floods with spring rain on frozen ground
Flooding from river is rare

Potential future sources
Attempted a well but not deep enough
Bring from home in jugs
This has been a big problem in plant establishment

Water lines, septic, well location
See map

Erosion – existing and potential
Erosion has occurred off the road bank



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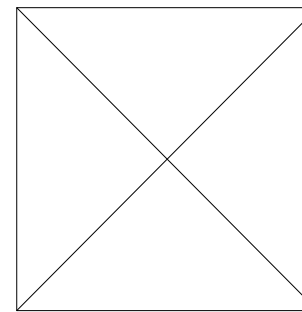
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Existing Conditions | 1 of 2

Date: 3/20/12

Access and Circulation

Access and Circulation

Activity nodes:

as desired in goals

as needed to support circulation, work

Access needed for desired functions as driven by goals

For example:

public sitting area

private sitting areas

signs

buildings

accommodating visitors

accommodating other work or activities that might be
occurring in the same area

integration with living space and needs – access to
firewood, compost pile etc

Circulation:

paths for people

handicapped access

paths for carts

roads for cars, emergency vehicles

access for earth moving

sense of safety

(Consider impact on funding)

Storage areas:

mulch, compost, brush, other additives

plants - nursery, green house

tools, carts

water

The Mission of the McWaters Park Permaculture Gardeners:

To design, plant and maintain an Edible Forest Garden that inspires our community to grow its own food.

Goals:

To create a permaculture demonstration site

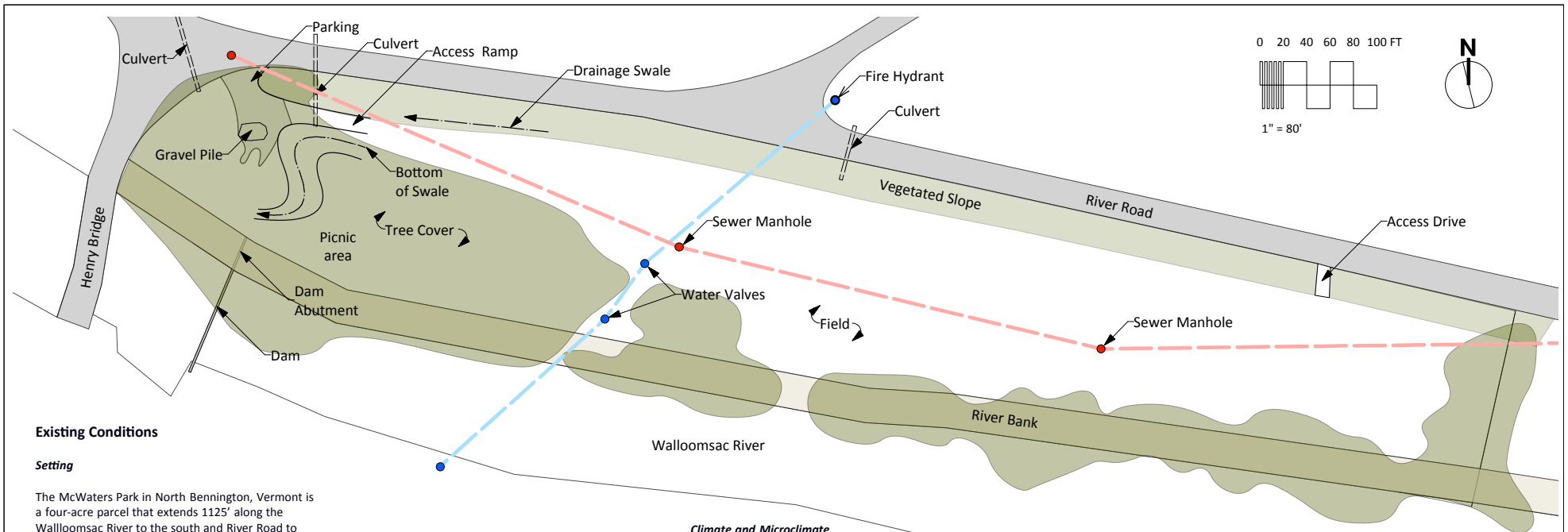
To provide educational resources

To produce food for the community

To support the site's river side ecosystem

To work with other others using the park

What does this direct us to consider?



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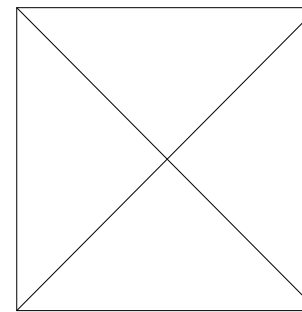
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Micro-Climates

Micro-climates

Created by

- slope
- sun and shade
- air drainage
- soil moisture
- wind



Buildings and Infrastructure

Buildings and Infrastructure

Buildings

Pavement

Drivable surfaces

Power lines

Spigots

Septic

Well (existing and potential)

Underground pipes

Fences and gates

At the park:

Sewer line with manhole

Water line with valves

Power lines

Access drive st east end

Parking area and gates access from west end

We have added stairs, sign and a well cover for dry well

Zones of Use

Zoning regulations -

Use restrictions based on being in flood plane – nothing that would persist in the river

Ownership and permissions and protections from your gardening

Granted to us by the Village of North Bennington

We have a formal agreement that probably should be updated

Property lines and setbacks

There is a road right of way and access to the underground infrastructure

Well protection

Use history – wild, farm, regrowth, farm, and now recreation

Zones of Use

Zoning regulations

Ownership and permissions and protections from your gardening
Property lines and setbacks

Well protection

Use history

Accessibility and intimacy – Consider a map of zones that define distribution of personal time and attention (You can do things to manipulate your behavior like planting annual veg crops around a new tree.)

Zone 0 – home/work

Zone 1 – visited daily – on the path of daily activities –
intensive daily management possible

Zone 2 – visited frequently – easy to go there – weekly
management

Zone 3 – visited occasionally – have to plan time to be there
– monthly management

Zone 4 – rarely visited – considerable effort– things
requiring only seasonal to yearly attention

Zone 5 – wild and un-managed



Illustration: Felix Müller (www.zukunft-selbermachen.de) Licence: CC-BY-SA 4.0

McWaters Park is in our zone 3-4

Zone 3: visited occasionally – have to plan time to be there – monthly management

Zone 4: rarely visited – considerable effort – things requiring only seasonal to yearly attention

Soil Fertility

Soil Fertility and Management

Soil zones – a map of different soil types

Soil Types:

Texture

Structure

Consistency

Drainage

Fertility

Management history

Toxins (previous use, lead, salt)

Mulch and organic material – observation and cation exchange

McWaters Park Soil Data

https://northbenningtonedibleforest.weebly.com/uploads/9/8/5/6/9856690/soil_report._from_kiethpdf.pdf

<https://northbenningtonedibleforest.weebly.com/uploads/9/8/5/6/9856690/soiltests.pdf>

We started with:

Tired compacted farm land on flood plain

The field is poorly drained silt w/ pH 7.3

The bank is very well drained fill over rip-rap with pH of 7

Cation exchange 0-6.2

- low in organic matter

- low capacity to store nutrients

We should consider re-testing.

Aesthetics and Experience of Place

Aesthetic and Experience of Place

Out door rooms

Arrival/Entry

View lines and corridors

Visual integration

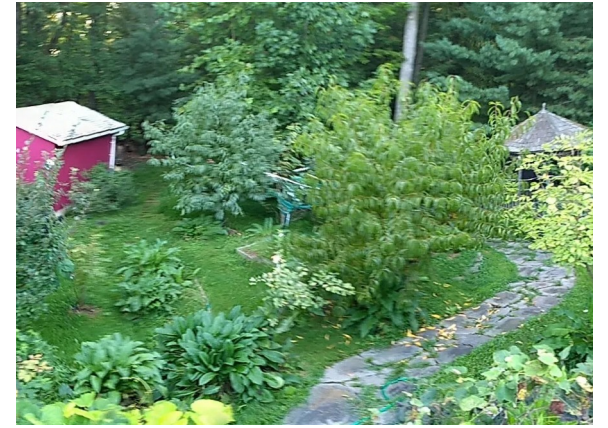
Public and private

Sense of place (expression and connection)

Existing overall feeling, quality and experience

Required aesthetic maintenance – weeding, mowing etc

Perspective of desired visitors and audience



Out door rooms

picnic area, between fruit guilds, beyond the
kidney bed

Arrival/Entry

road via stairs or from parking area
(need to add to sign at parking area to attract folks)

View lines and corridors

from the road
from the parking area
from the bottom of the stairs

Visual integration -

sign and stairs in between the fruit beds
repetition of circles

Public and private – privacy by distance

Sense of place (expression and connection)

Existing overall feeling, quality and experience

Required aesthetic maintenance

weeding, edging, mowing etc

Perspective of desired visitors and audience –
educational mission

Vegetation and Wildlife

Vegetation and Wildlife

Existing plants:

wild

planted

native

invasive (present and near by)

Ecosystem architecture (field, lawn, woods, hedge row etc)

Habitat types (food, water, shelter)

Existing animals

domestic

wild

Ecosystem architecture (field, lawn, woods, hedge row etc)

- road bank
- field
- hedge row
- river bank

Habitat types (food, water, shelter)

- park visitors
- suburban wild life
- riverside wild life corridor

Existing animals

domestic –

dogs – walked and loose

cats – feral and from neighboring homes

wild -

deer

woodchucks

rabbits

bear

bird

small rodents

Let's generate some plant lists