New York State Wetland Condition Assessment

Level 2 Rapid Assessment Method
NYRAM Version 4.2

User's Manual and Data Sheets

Developed By New York Natural Heritage Program

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NYRAM Field Manual

Project scope

Method development

The New York Rapid Assessment Method (NYRAM) provides users with a relatively quick procedure for assessing the quality and condition of New York State (NYS) wetlands. Methods presented here are part of a three-tiered sampling approach (Level 1, 2, 3); similar methods have been employed by federal and state agencies in an effort to develop environmental monitoring protocols (Faber-Langendoen et al. 2012, PA DEP 2014, Jacobs 2010). For Level 1, the New York Natural Heritage Program (NYNHP) developed a statewide Landscape Condition Assessment (LCA) model that cumulatively depicts key anthropogenic stressors across the NYS landscape at a 30 x 30-m resolution. Rapid assessment methods (RAM) developed for Level 2 classify and catalog anthropogenic stressors using basic quantitative air photo interpretation and qualitative field surveys. NYRAM field methods employ a stressor checklist that was modeled after established RAM procedures developed for Mid-Atlantic States (PA DEP 2014, Jacobs 2010). At the finest scale of measurement, Level 3 relevé sampling protocols modified from those developed by Peet et al. (1998) captured vegetation structure and floristic biodiversity. Level 1 and Level 3 data were used to refine and support the Level 2 RAM presented here.

NYRAM incorporates onscreen (Part A) and field (Part B) components that broadly assess hydrology, fragmentation, vegetation composition, and water quality. The field stressor checklist encompasses a broad range of potential stressors that may influence natural wetland structure (e.g., plant species composition) and function (e.g., ground water recharge, nutrient cycling), while providing flexibility for practitioners to document unique stressors present at their assessment site.

This rapid assessment method will continue to be refined as we expand our wetland assessment dataset. Updated NYRAM versions will be posted on the New York Natural Heritage website (www.nynhp.org). Please consider sharing your NYRAM data with NYNHP to help build our understanding of wetland condition in NYS.

Development of NYRAM

When developing this method, we aimed for it to be relatively quick, repeatable, and applicable to wetlands throughout NYS (Feldmann 2013, Feldmann and Spencer 2015). Most of the 54 survey sites used to calibrate NYRAM fell within the Lower Hudson River and Susquehanna River watersheds; a few additional points were located in the Adirondack Park. Non-tidal palustrine wetlands were our target system so stressors unique to lacustrine, tidal, brackish, or estuarine environments are not addressed (e.g., tidal flow restrictions). Using NYRAM on non-target wetland systems is not recommended as appropriate stressors have not been identified and evaluated during the development of this protocol.

Sampling effort

Part A: The onscreen portion of this method assesses the 500 m Landscape Buffer around the target Sample Area (see figure below). This step may be conducted using ArcGIS, Google Earth, or other air photo sources. Depending on landscape complexity and observer experience, Part A may be completed within 15-60 minutes. See the next section for tips and an example of this method.

Part B: The field portion of this method covers up to 6.15 ha (15.2 ac), including the Sample Area and surrounding 100-m radius Field Buffer that surrounds the Sample Area (i.e., 140-m out from the center point). Once at the Sample Area, a two-person team may complete the field stressor checklist in approximately 1 hour. However, sites that are difficult to traverse, such as shrub swamps or semipermanently flooded areas may take ≥1.5 hours to complete.

Overview of the NYRAM sampling design

This Level 2 rapid assessment method was designed to be suitable for a range of project needs from site assessment to establishing a reference baseline. Depending on project objectives, wetland site selection may be random, stratified random, or subjective. The Sample Area (SA) is the targeted area within a wetland that will be the focus of your NYRAM sampling. Standard sample designs focus around a 0.5 ha SA, but nonstandard layouts may vary in shape and range in size from 0.1 to 0.5 ha. The Landscape Buffer, a 500-m area surrounding the SA, is assessed in Part A of NYRAM through basic air photo interpretation. The field survey assesses stressors within the SA, and surrounding 100-m Field Buffer (Part B; Figure 1).

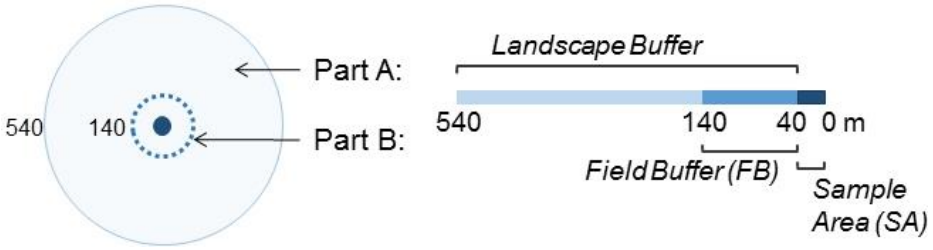

Figure 1: Schematic of the standard Level 2 rapid assessment survey design, which includes an onscreen evaluation of the Landscape Buffer (Part A), and a field survey assessing wetland quality (Part B). The standard SA is a 40-m radius plot 0.5 ha (1.24 ac), but non-standard SAs range in size (0.1-0.5 ha) and shape.

Site vetting and establishment

Sample Area

Prior to field work, try to establish an appropriate Sample Area (SA) via aerial or satellite imagery software such as ArcGIS, Google Earth (earth.google.com), Google Earth Pro (includes advanced functions, GIS file import: (http://www.google.com/earth/download/gep/agree.html), or via online maps (e.g., Bing Maps: bing.com/maps/). Interactive mappers produced by the U.S. Environmental Protection Agency (EPA), U.S. Geologic Survey (USGS), U.S. Department of Agriculture (USDA) are also useful, as outlined below on page 4.

Additional mapped data such as topography, USGS SSURGO2 soils, or National Wetlands Inventory maps should be consulted in tandem with the imagery. Confirm that you are viewing the most up-to-date imagery available to you - site conditions and land use can change drastically over short periods. Work through the following steps to pre-screen SAs relative to your research objectives.

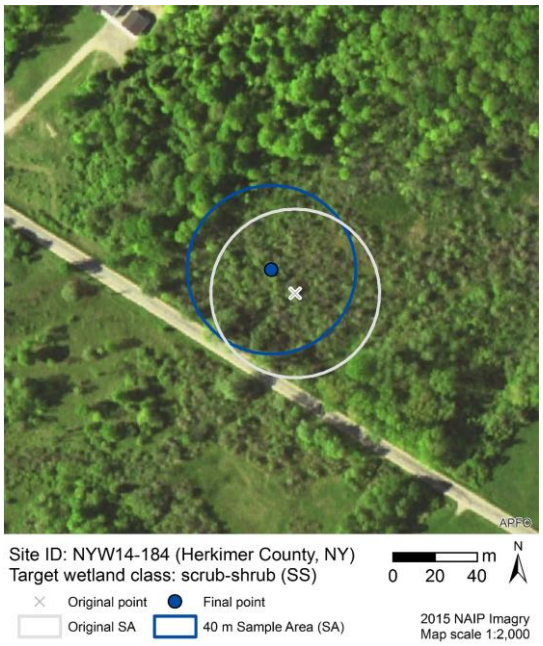

Figure 2: Sample Area around original random point included a road and some forested area (>10% non-target), so the point was moved ~15 m northwest.

1) Depending on project goals, point placement may be determined randomly, on a target wetland assemblage class (*sensu* Cowardin et al. 1979), or subjectively. The SA will encompass this point, ideally with the point in the center of the SA. If the SA is *subjective*, points may be moved to any location yielding a SA that meets the minimum sampleable criteria outlined below (i.e., disregard the 60-m move maximum discussed below).

2) Remote assessment of potential SA

Sample Area composition

≤10% of the *total* SA may include water ≥1 m deep; standing water or soft substrates that are unsafe to sample effectively; or upland systems; and if applicable, ≤10% of a non-target wetland assemblage class. **If these criteria are not met**, try moving the point ≤60 m (e.g., Figure 2).

SA size & shape

Standard SA: accommodates a 40-m radius plot 0.5 ha (5,025 m^2 ≈ 1.24 ac), while maintaining the above composition criteria.

Non-standard SA: if a standard SA is unworkable (e.g., small wetlands, riparian systems), alternative SA shapes and sizes (0.5-0.1 ha ≈ 0.25-1.24 ac) may be employed.

Example: Due to a railroad and non-target scrub-shrub vegetation, the example site in Figure 3 does **not** meet the standard SA criteria for size or as shape. Instead, a 20 m x 50-m rectangular non-standard SA was employed.

Accessibility

Ownership – determine ownership using tax parcel or other government records. Private and public landowners/proprietors must grant you access to visit their property for each field-sampling event.

Physical obstructions – sketch an access route to the target wetland. Determine if non-wadeable water bodies >1 m deep or another physical obstruction would prevent you from reaching and sampling the SA within a reasonable timeframe.

3) If the SA does not meet the criteria outlined above and you are using random point placement, try moving the point within 60 m of its *original* location. If moving the point does not address the issue, try selecting another random point within the wetland polygon. [Still can't establish an SA? It may be time to move on to a different wetland.]

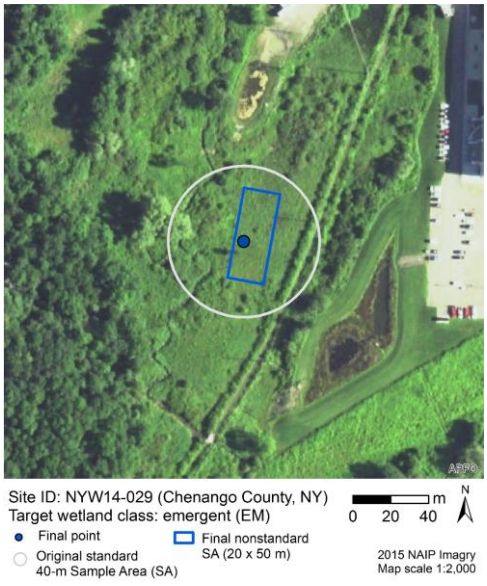

Figure 3: The original SA was <90% emergent, the target class for this survey, so a smaller nonstandard SA was established (0.1 ha).

Digital resources for the field (Part B)

After the above criteria have been confirmed, save/print locator maps for each site. Include the 40-m SA (or non-standard SA polygon), as well as the 100-m radius Field Buffer (FB) that surrounds the SA (i.e., 140-m out from the center point). For example, the non-standard SA shown in Figure 3 would have a 100-m rectangular FB around the 20 m x 50 m SA (i.e., FB perimeter = 120 m x 150 m rectangle).

Additional helpful data to include with the map: site ID, target wetland boundary, topography, soils, tax parcel data, and site owner/manager contact information. If using a handheld digital device in the

field, load the digital layers onto the device (e.g., point files, and SA polygon layers). Print the NYRAM 4.2 field datasheets or load an electronic version onto your field tablet. If completing Part A prior to the field survey (Part B), bringing a copy of the form with you to the field for orientation.

Part A: Onscreen assessment example

This step should be conducted prior to the field assessment in Part B except when the SA is likely to be moved in the field. If the point will likely be moved, Part A should be completed *following* the field survey. Viewing the aerial photography in advance helps in identify potential stressors or ambiguous features that may be on the edge of the FB (e.g., an abandoned ditch), in difficult to access areas, or are otherwise likely to be overlooked in the field.

Materials & resources

Aerial imagery - required

Use the most recent imagery that is available via ArcGIS, Google Earth, Bing Maps, or one of the interactive mappers listed below.

US EPA, "MyWATERS": http://watersgeo.epa.gov/mwm/

Relevant content: base maps (satellite imagery from Bing Maps, topography, street maps); water quality status/permitting; rivers and streams (National Hydrography Dataset, NHD), and wetland data (National Wetlands Inventory, NWI).

USGS National Map Viewer: http://viewer.nationalmap.gov/viewer/

Relevant content: base maps (satellite, orthoimagery, topography), elevation contours, NHD including flow direction, National Land Cover Database (NLCD), protected areas (status, type, owner/manager), and wetland data (NWI). All of the data layers accessible here may be exported and viewed in ArcGIS or Google Earth.

Additional spatial data – optional

Wetland, hydrography, and soils:

NWI data published by US Fish & Wildlife Service (USFWS) - Interactive mapper, GIS & Google Earth data downloads: http://www.fws.gov/wetlands/

EPA WATERS data, Google Earth download - Includes NHDPlus surface water features, water quality feature: http://www.epa.gov/waterdata/viewing-waters-data-using-google-earth

USGS National Hydrography Data: http://nhd.usgs.gov/data.html

USDA soils:

Interactive mapper: http://websoilsurvey.sc. egov.usda.gov/App/HomePage.htm

GIS data: https://gdg.sc.egov.usda.gov/ or via interactive downloader: http://www.arcgis.com/home/item.html?id=4dbfecc52f1442eeb368c435251591ec

Transportation & recreation: New York State (NYS) roads, railroad (active and abandoned), trails (hiking, horse, and snowmobile) trail layers.

NYS GIS clearing house (general data source): http://gis.ny.gov/gisdata

NYS Department of Environmental Conservation (NYSDEC) State Lands Interactive Mapper: http://www.dec.ny.gov/outdoor /45478.html

NYS Google Earth file formats (.kml): http://www.dec. ny.gov/pubs/42978.html

Snowmobile trails: Private entities have made statewide snowmobile trails publicly available (e.g., JIMAPCO, Inc. http://jimapco.com/maproom/snowmobile/nys/)

Methods for determining % LULC type

Delineate areas of interest

In ArcGIS, use the geoprocessing buffer tool to create three buffers: 40 m and 540 m around the center point (e.g., Figure 4). For consistency, use these buffers for Part A even if your final SA is not a 40-m radius circle.

In Google Earth *Pro* you should be able to draw in circles with a defined radius (this is a relatively new program, released in 2015, so its functionality is evolving).

Overlay a standard grid - makes photo interpretation more efficient and repeatable

In ArcGIS, apply a measured grid overlay.

In *Layout View* of ArcGIS 10.3 go to View > Data Frame Properties > New Grid > Measured Grid > Intervals > 50 x 50 m). If viewing a 50 x 50 m grid, the Landscape Buffer contains approximately 364 full cells. Each cell is 2500 m^2 (0.62 ac). Tip: 4 cells = 1%. 18 cells = 5%.

To make a shapefile in *Data View* of ArcGIS 10.3 (shown in Figure 4), open the ArcToolbox > Cartography Tools > Data Driven Pages > Grid Index features. Use the 540-m buffer layer as your input, use 50 meters as your polygon width and height (e.g., Figure 4). [Note: depending on your computing power, this process may take 1+ hours to run if using >25 points.]

In Google Earth, you can display georeferenced grids that are distributed by private entities.

For example, the Earthpoint "UTM" grid (http://www. earthpoint .us/Grids.aspx), scales the grid relative to your viewing altitude. If using this tool, make sure to measure the cell size of your grid and adjust your calculations accordingly – methods discussed here are based on a 50 m x 50 m grid.

Additional tips

Orthoimagery help identify "actively-" and "intensively-managed" agricultural land use types (i.e., hay or lawn vs. row crops). The former appears bright green early in the growing season (or red if infrared). In contrast, land used for intensive row crops appear as smooth or finely striated dull tan/brown/grey.

Worked example: Figure 4

Part A: Land Use Land Cover (LULC)

Looking forward to LULC percent cover estimates in the field manual appendix, you will see four classes of anthropogenic LULC, plus a natural cover class.

Using Figure 4 (site ID NYW14-029), we will start with the "**Impervious Surface**" cover type, which is often easiest to identify due to its clearly defined boundaries. Approximately how many cells are filled with urban or built-up land (e.g., buildings, paved roads/parking lots, industrial, residential)? For partially filled cells, such as roads and house, visually aggregate features to produce the equivalent of a "filled" cell.

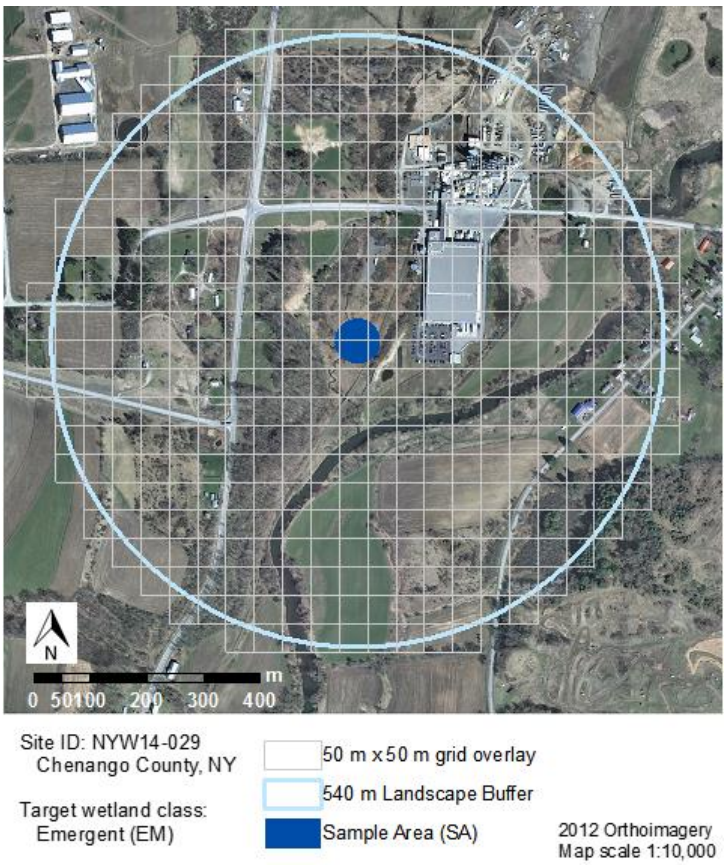

Figure 4: Part A assess the Landscape Buffer that extends 500 m from the *outer edge* of the Sample Area. An overlay grid aids percent cover estimates of LULC types.

Repeat this process for the remaining types:

"**Intensely managed**" such as golf courses, sand or gravel mining, warm season row crops (e.g., corn, soy), and pervious land/ponds associated with confined feeding animal operations (e.g., upper left corner of Figure 4). In this example, warm season cropland appears finely striated with a tan/brown or grey color; this pattern is best seen in spring air photos.

"**Actively managed**" types include lawn, hay, or winter wheat (all appear green in 20), vineyards, golf courses, railroads, and timber harvesting.

"**Lightly managed**" such as inactive cropland/old fields, pasture (compared to "active" cropland, pastures often occur near barns/buildings and has a more mottled texture), pine plantations (usually planted in uniform blocks), orchards.

The remaining cells should be "**Natural"** forests, wetlands, shrubland, surface water (excluding agricultural ponds), and/or barren land. Assuming the previous categories were correct, subtract the sum of those tallies from 364 to obtain the number of "**Natural**" cells.

Minor variations among observers is expected, as shown in Table 1, but these differences are marginal once the weighted percent cover scores are calculated and the total LULC score is obtained (see page 0 for weights and calculation). Total LULC scores produced form Table 1 averaged 17.6 (± 1.2).

Part A: fragmentation

Five fragmenting features categories are assessed and tallied. These range in magnitude from 4-lane highways to unpaved roads and trails (e.g., hiking, snowmobile, horse). Additional intermediate categories include 2-lane roads, railroads (i.e., active, abandoned, rail-to-trail), and utility line Right of Way (ROW). Continuing with the same example site (Figure 5), the Landscape Buffer includes one (1) unpaved trail (snowmobile), one (1) railroad, and five (5) continuous named roads.

Table 1: Variation among three independent observations for Land Use Land Cover (LULC) at site NYW14-029. Values are present as mean tallies ± standard error (n = 3). Tallies were based on the 50 m x 50-m grid overlay; % LULC = # / 364 *100.

LULC type	cell tally (#)	LULC (%)
Impervious	44 ± 3	12 ± 1
Intense	39 ± 3	11 ± 1
Active	79 ± 10	22 ± 3
Light	37 ± 6	10 ± 2
Natural	164 ± 0	45 ± 0

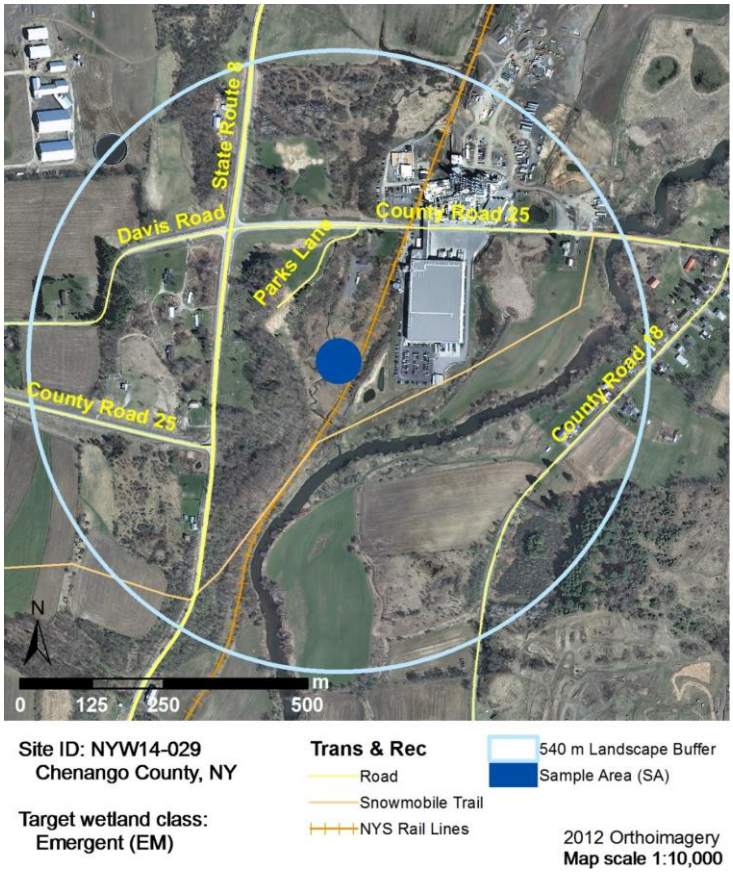

Figure 5: Fragmenting feature tally example. This site includes three categories of features: 2-lane roads, railroad, and an unpaved trail.

Works cited

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WETLAND CONDITION LEVEL 2 RAPID ASSESSMENT SCORING FORMS

New York Rapid Assessment Method (Level 2) Field Worksheets

Developed by New York Natural Heritage Program
625 Broadway, 5th Floor, Albany, NY 12233-4757 (518) 402-8935 Fax (518) 402-8925 www.nynhp.org

Part A: Onscreen rapid assessment

Area of focus for Part A is the Landscape Buffer, located 40-540 m around center point.
Note: If the sample point will likely be moved in the field, complete this portion *after* the field survey.

Site description

Observer _____ Date of onscreen assessment _____

Site name _____ Site code _____

Pub. date of the imagery: _____ Sample location was determined (*circle one*): *Randomly* *Subjectively*

Please note: Although score calculations are shown below, these may be completed after field survey or in Microsoft Excel. The % LULC column should sum to 100%, and the max Total LULC score is 40.

Land Use Land Cover (LULC)

Qualitatively assess the percent area occupied by each of the following land cover types.

GIS tip: in layout view, apply a 50 x 50 m grid to the data frame. Google Earth or GIS: use the measure polygon tool to measure type area.

	% LULC		*Type score*
Impervious surface *pavement, buildings, rock quarries*	_____	*x 4 =*	_____
Intensely managed *golf, row crops, sand/gravel mining*	_____	*x 4 =*	_____
Actively managed *lawn, timber, hay, ROW, grazing, unpaved road*	_____	*x 3 =*	_____
Lightly managed *old field, ditch, plantation, Stormwater pond*	_____	*x 2 =*	_____
Natural *forest, wetland, shrubland, water*	_____	*x 0 =*	_____
Sum type scores =	_____	*÷ 10*	
Total LULC score =	_____		

Fragmenting features

Tally the number of fragmenting features in each category found in Landscape Buffer.

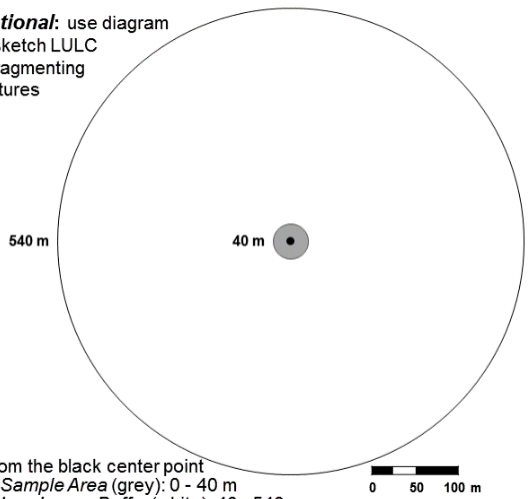
GIS tip: add New York State road, railroad, hiking & snowmobile trail layers

	Feature tally		*Feature score*
4-lane paved road *4-lanes or larger*	_____	*x 6 =*	_____
2-lane paved road	_____	*x 4 =*	_____
Railroad *Active or abandoned*	_____	*x 4 =*	_____
Utility line *Right-of-way (ROW)*	_____	*x 2 =*	_____
Unpaved road/trail *Grave/dirt road, hiking or snowmobile trail*	_____	*x 1 =*	_____
Other*:	_____	*x =*	_____

Total fragment score = _____
[sum feature scores]

**Select an equivalent multiplier: 1, 2, or 4*

Optional: use diagram to sketch LULC & fragmenting features



From the black center point
Sample Area (grey): 0 - 40 m
Landscape Buffer (white): 40 - 540 m

Part A cumulative score: _____
[LULC score + frag score]

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Part B: Wetland stressor field worksheet

Area of focus: 40-m radius Sample Area (SA) & the surrounding 100-m Field Buffer (FB)

Observers _____ Date _____

County _____ Town _____

Site name _____ Site code _____

UTM or Lat/Long: _____ / _____ Field point in the GPS? Yes No

Wetland community description

Target NWI wetland class (≥ 90% of SA): EM SS FO1 FO4

Optional: NYNHP/ Nature-Serve/ other comm. class _____

Optional: Landscape setting or Wetland origin (e.g., natural, created) _____

Basic guidelines for establishing a Sample Area (SA) in the field

Refer to the methods manual for detailed guidelines and pre-field office activities. Note: <10% of SA should contain water >1 m deep. If applicable, randomly generated points are invalidated if moved >60 m.

Standard, 0.5 ha (5,025 m^2; 1.24 acres)

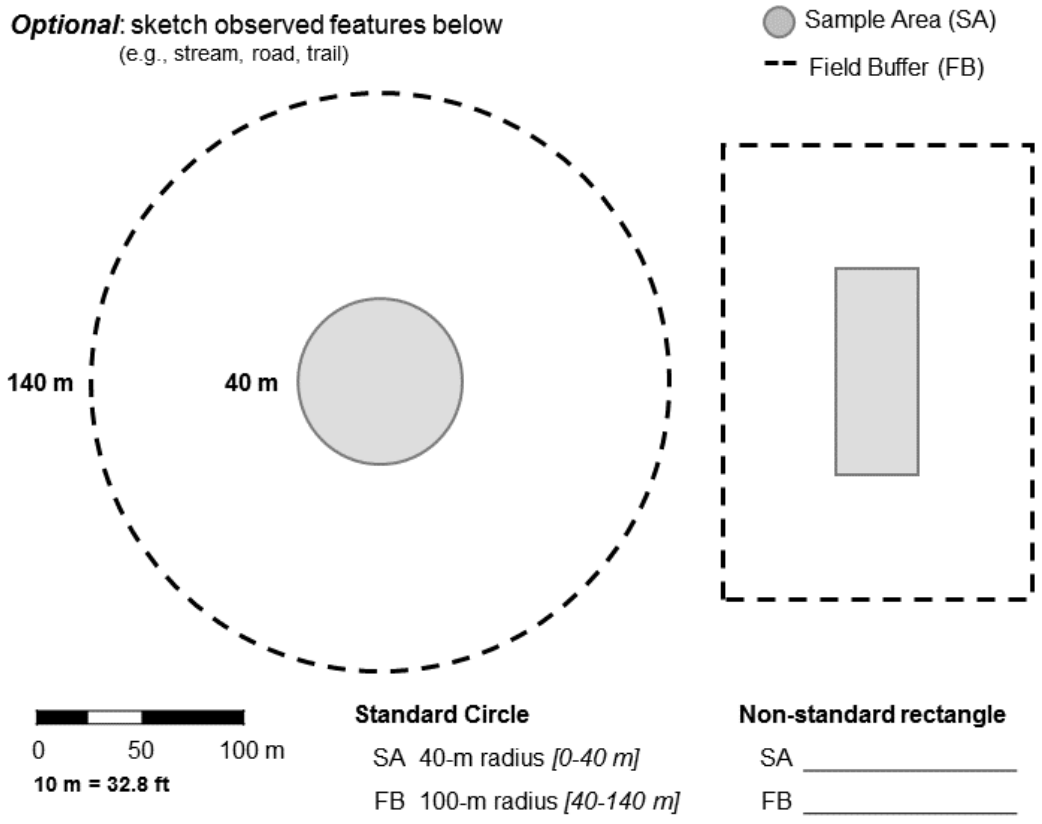
SA dimensions determined by (circle one):

☐ CIRCLE - 40-m radius tape measure visual estimate

Non-standard, 0.1-0.5 ha

☐ RECTANGLE e.g., 20 m x 50 m plot array ☐ OTHER Use space at the *end of the stressor checklist* to sketch SA shape

Optional: sketch observed features below (e.g., stream, road, trail)



Standard Circle

SA 40-m radius *[0-40 m]*

FB 100-m radius *[40-140 m]*

Non-standard rectangle

SA _____

FB _____

 Site code: _____ Date: _____

Wetland stressor checklist

Mark "X" in each applicable column if stressor is present in the Sample Area (SA), Field Buffer (FB), or absent (Abs) from both areas.

Tips: Keep an eye out for invasive species to include in the Invasive Richness Survey (pp. 7-8). Stressor sums at the bottom of each page are optional, but may be helpful when making the final checklist sum for each column.

VEGETATION ALTERATIONS

V1. Vegetation modification occurred within the past year, unless noted	SA	FB	Abs
Excessive wildlife herbivory *(e.g., deer, geese, insects)*			
Moderate/intense livestock grazing *(>25% bare soil)*			
Mowing *(low intensity lawn or hay)*			
Golf course or highly maintained turf *(NOT typical residential lawns)*			
Right-Of-Way: cleared *(brush cutting, chemical, etc. assoc. with powerlines & roads)*			
ROW, but no maintenance evident within past year			------
Logging within 2 years			
Annual agricultural row crops			
Plantation *(conversion from natural tree species, e.g., orchards, forestry)*			
V2. Invasive plant species abundance (see invasive richness list)			
Absent (circle one if applicable): SA FB Both	------	------	
Uncommon (Present, ≤ 20% cover) – List species in the invasive survey (see end)			------
Abundant (Present, > 20% cover) – List species in the invasive survey (see end)			------
V3. Other vegetation alterations *(e.g. woody debris removal)*			

HYDROPERIOD MODIFICATION

H1. General hydroperiod alterations			
Ditching, tile draining, or other dewatering methods			
Stormwater inputs *(e.g., source pipe, impervious surface/roads/parking lot)*			
Water inflow reduced by upstream structure *(dam / weir / culvert; including perpendicular road, railroad beds)*			
Water outflow reduced due to impounding structure *(see above examples)*			
H2. Stream/riverine-specific modifiers			
Artificial levee *parallel* to stream *(including parallel road, railroad beds)*			
Channelized stream: straightened, hardened, or incised			
H3. Other indicators of hydro modification *(e.g. high temperature discharge, dead/dying standing trees)*			
Sum of stressor tallies for each column on this page:			

NYRAM 4.2 - Part B Site code: _____ Date: _____

OTHER HYDRO/TOPOGRAPHIC MODIFICATIONS

T1. Development, filing, grading	SA	FB	Abs
Residential development: Low-moderate (≤2 houses/acre)			
High (>2 houses /acre)			
Commercial development *(e.g., buildings, factories, parking lots)*			
Other filling/grading activity (not road-related*; e.g., exposed soils, dredge spoils*)			
Landfill or illegal dump (*excessive garbage, trash*)			
T2. Material removal			
Artificial pond, dredging (not ditch-related)			
Mining/quarry (circle those present): sand gravel peat topsoil			
T3. Roads, railroads, trails			
Hiking or biking trail (well-established)			
Unpaved dirt/gravel road (established ATV, logging roads)			
Railroad (circle those present): active abandoned rail-to-trail			
Paved road: 2 lane			
4 lane or larger			
T4. Microtopography Soil surface variation <1 m in height (not pavement)			
Vehicle or equipment tracks: ATV, off-road motorcycles			
Skidder or plow lines			
Ruts in unpaved road (within poorly maintained *unpaved* roads)			
Livestock tracks			

SEDIMENT TRANSPORT

S1. Potential sediment stressors (within past year, unless noted)			
Active: construction (soil disturbance for development)			
plowing (agricultural planting)			
Forestry (circle if known): clear cut, even-aged management (within 2 years)			
selective tree harvesting, salvage (within 1 year)			
Livestock grazing (intensive, ground is > 50% bare)			
Sediment deposits / plumes			
Eroding banks / slopes			
S2. Other evidence of sedimentation / movement (water consistently turbid, active mine, etc. – list if present)			
_____			
_____			
Sum of stressor tallies for each column on this page:			

 Site code: _____ Date: _____

EUTROPHICATION

E1. Nutrient inputs	SA	FB	Abs
Direct discharge: agri. feedlots, manure spreading/pits, fish hatcheries			
septic/sewage treatment plant			
Adjacent to intensive annual row crops			
Adjacent to intensive pasture grazing (>50% bare soil)			
Dense/moderate algal mat formation			
E2. Other evidence of contamination or toxicity (acidic drainage, fish kills, industrial point discharge, etc. – list if present)			
Sum of stressor tallies for each column on this page:			

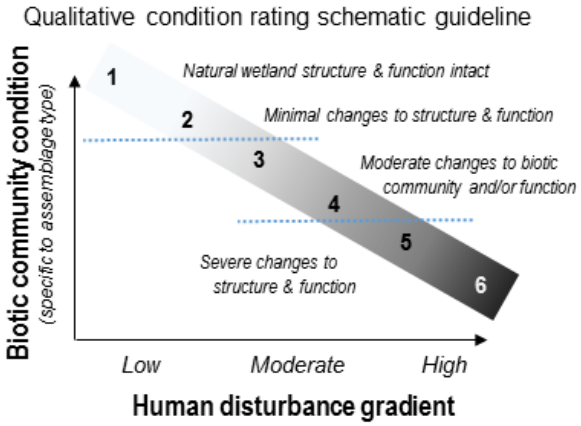
ADDITIONAL NOTES OR SKETCH OF NON-STANDARD LAYOUT

Qualitative condition rating

After completing the survey, describe overall site quality (SA + FB) as it relates to the level of human-mediated disturbance.

Circle the number that best describes the site:

Least disturbed 1 2 3 4 5 6 *Highly disturbed*



NYRAM 4.2 - Part B Site code: _____ Date: _____

Invasive & nonnative species richness survey

Check or list all invasive and nonnative species present in the Survey Area (SA) and/or Field Buffer (FB). Note that the richness value only represents the number of *unique* species observed in both the SA and FB (i.e., *do not double* count a species).

Plants

Scientific name	Common name	USDA code	SA	FB
Acer platanoides	Norway maple	ACPL		
Agrostis gigantea	Redtop	AGGI2		
Ailanthus altissima	Tree-of-heaven	AIAL		
Alnus glutinosa	European alder	ALGL2		
Alliaria petiolata	Garlic mustard	ALPE4		
Aralia elata	Japanese angelica tree	AREL8		
Artemisia vulgaris	Mugwort	ARVU		
Berberis thunbergii	Japanese barberry	BETH		
Butomus umbellatus	Flowering rush	BUUM		
Celastrus orbiculatus	Oriental bittersweet	CEOR7		
Centaurea stoebe	Spotted knapweed	CEST8		
Cichorium intybus	Chicory	CIIN		
Cirsium arvense (syn. *C. setosum, C. incanum, Serratula arvensis*)	Canada thistle	CIAR4		
Cynanchum spp.	Swallowwort (black, pale or white)	CYNAN		
Daucus carota	Queen Anne's lace	DACA6		
Dioscorea oppositifolia	Chinese yam	DIOP		
Dioscorea polystachya	Chinese yam	N/A		
Elaeagnus umbellata	Autumn olive	ELUM		
Euonymus alatus	Burning bush/Winged euonymus	EUAL13		
Frangula alnus	Glossy/smooth buckthorn	FRAL4		
Galeopsis tetrahit	Hemp-nettle	GATE2		
Glechoma hederacea	Ground ivy	GLHE2		
Glyceria maxima	Reed manna grass	GLMA3		
Heracleum mantegazzianum	Giant hogweed	HEMA17		
Hydrocharis morsus-ranae	Common frogbit	HYMO6		
Hypericum perforatum	Common St. Johnswort	HYPE		
Iris pseudacorus	Yellow iris	IRPS		
Ligustrum vulgare	European privet	LIVU		
Lonicera japonica	Japanese honeysuckle	LOJA		
Lonicera spp.	Shrub honeysuckles (nonnative)	LONIC		
Lysimachia nummularia	Creeping Jenny, moneywort	LYNU		
Lythrum salicaria	Purple loosestrife	LYSA2		
Microstegium vimineum	Japanese stiltgrass	MIVI		
Murdannia keisak	Marsh dewflower	MUKE		
	Sum of <u>unique</u> species observed on this page			

NYRAM 4.2 - Part B

Site code: _____ Date: _____

Scientific name	Common name	USDA Code	SA	FB
Myosotis scorpioides	True forget-me-not	MYSC		
Myriophyllum spicatum	Eurasian water-milfoil	MYSP2		
Persicaria hydropiper (syn. *Polygonum hydropiper)*	Water-pepper smartweed	PEHY6 (POHY)		
Persicaria perfoliata	Mile a minute	POPE10		
Phalaris arundinacea	Reed canarygrass	PHAR3		
Phragmites australis	Common reed	PHAU7		
Poa compressa	Canada bluegrass	POCO		
Poa trivialis	Rough bluegrass	POTR2		
Prunus avium	Sweet cherry	PRAV		
Ranunculus ficaria	Lesser celandine	RAFI		
Reynoutria japonica (syn. *Polygonum cuspidatum*, *Fallopia japonica*)	Japanese knotweed	REJA2 (POCU6, FAJA2)		
Rhamnus cathartica	Common buckthorn	RHCA3		
Rosa multiflora	Multiflora rose	ROMU		
Rubus phoenicolasius	Wineberry	RUPH		
Solanum dulcamara	Climbing nightshade	SODU		
Trapa natans	Water chestnut	TRNA		
Trifolium repens	White clover	TRRE3		
Tussilago farfara	Coltsfoot	TUFA		
Typha x *glauca*	Hybrid cattail	TYGL		
Verbascum thapsus	Common mullein	VETH		
Veronica officinalis	Common speedwell	VEOF2		

Animals & pathogens

Adelges tsugae	Hemlock Wooly Adelgid		
Agrilus planipennis	Emerald Ash Borer		
Anaplophora glabripennis	Asian Longhorned Beetle		
Cipangopaludina spp *aquatic snails*	Invasive Aquatic Snails		
Dendroctonus frontalis	Southern Pine Beetle		
Halyomorpha halys	Brown Marmorated Stink Bug (BMSB)		
Orconectes rusticus	Rusty Crayfish		
Lymantria dispar	Gypsy Moth (caterpillar)		

Additional species observed, but not listed above

Sum of <u>unique</u> species observed on this page _____

 Site code: _____ Date: _____

Part B *field data summary*

Summarize your data and enter values into the empty spaces below.

STRESSORS

Sum tallies in the Wetland Stressor Checklist (do *not* include invasive richness survey data here). Use the stress multiplier to calculate the Metric Score. Stressor score = sum of the metric scores.

		SA		FB		Absent
Stressor tally sum						
Stressor Multiplier (SM)	×	*8*	×	*4*	×	*0*
Metric Score	=		=		=	

Stressor score _____

INVASIVE PLANT COVER (%)

Where invasives are present, circle the number that corresponds to tallies indicated in section V2. Sum the values to obtain the invasive cover score. (Invasive score = zero if no invasive were observed in the SA or FB.)

Please note: All values below account for points earned when tallied in section V2 above. This scoring adjustment removes double-counting concerns for this metric, and in doing so, causes some values to be negative.

	SA	FB
Uncommon (≤ 20% absolute cover)	*-4*	*-2*
Abundant (>20% absolute cover)	*8*	*4*

Invasive cover score _____

INVASIVE & NONNATIVE PLANT SPECIES RICHNESS (#)

Count all unique plant, animal, & pathogen species observed in the SA & FB. If absent, write zero.

Invasive & nonnative richness _____

QUALITATIVE CONDITION RATING

Value generally describes the SA *and* the buffer, from least disturbed (1) to heavily disturbed (6) (see p. 6).

Condition rating _____

Part B cumulative score _____

Stressors score + Invasives cover score + Invasive richness + Condition score.

NYRAM Level 2 Grand Score: _____

[Part A + Part B cumulative scores]

Submit your NYRAM score to NYNHP's databank & see how your score stacks up: www.nynhp.org

Helpful Invasive Species References

Identification and General information

New York Invasive Species Information

www.nyis.info/

Website includes plants, animals and pathogens

Invasive Plants and their Native Look-Alikes: an Identification Guide for the Mid-Atlantic

www.nybg.org/files/scientists/rnaczi/Mistaken_Identity_Final.pdf

Invasive Species ID Training Modules by Midwest Invasive Species Info. Network

www.misin.msu.edu/training/

Website includes plants, animals, and pathogens.

A Field Guide to Invasive Plants or Aquatic and Wetland Habitat for Michigan

http://mnfi.anr.msu.edu/invasive-species/AquaticsFieldGuide.pdf

Prohibited and Regulated Invasive Plants of New York State

www.dec.ny.gov/docs/lands_forests_pdf/isprohibitedplants2.pdf

USDA National Invasive Species Information Center – Identification Resources

www.invasivespeciesinfo.gov/resources/identify.shtml

Website includes plants, animals, and pathogens.

Invasive species mapping

iMapInvasives

www.imapinvasives.org/

Website includes plants, animals, and pathogens – serves as the central repository for existing locations of invasive species in New York State.

Features/tools:

- Generate species lists by geographic, municipal, property, or jurisdictional boundaries.
- Contribute data from *your* field observations.
- Learn about invasive management methods.

Invasive Plant Atlas of New England (IPANE)

www.eddmaps.org/ipane/Species/