Indicators of Biodiversity Value Checklist for Rhode Island

by

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INTRODUCTION:

Conservation of "biodiversity" is a frequently expressed goal of land conservation and so methods for assessing biodiversity are an important part of initial prioritization of land acquisition as well as of ongoing conservation land monitoring For the present purposes, biodiversity is an informal label that can include the presence of rare species or rare natural communities, unusually high species richness, or unusually high habitat heterogeneity.

Two traditional methods of biodiversity assessment focus either on predicting species richness with models composed of indicators or on using taxonomic experts who either document species directly or predict their presence based on subjective, qualitative evaluation of the site. At the typical scale of local land trust activity in Rhode Island, say parcels between 10 and 100 acres, pre-existing models are not fine-scale enough, new modeling would be more expensive than actual fieldwork, and placing a sufficiently experienced naturalist in the field is expensive and time consuming even if you could find a qualified contractor. Is there another path?

Experienced naturalists sometimes react to the biodiversity potential of a site subjectively or intuitively, even before they identify or express empirical, quantitative indicators of that potential. When they visit a parcel with an experienced naturalist, the land's stewards or decision-makers often receive a substantial proportion of the total advice or insight after just a quick walk-over. The question this Biodiversity Value Checklist sets out to answer is, can the features observed by the experienced naturalist in reaching those first impressions be captured by less experienced observers with the right preparation? In application to wetland condition assessment, for example, a rapid assessment method (RAM) is sufficient when performed by less experienced persons guided by a suitably prepared and tested assessment instrument. The Rhode Island Conservation Stewardship Collaborative (RICSC), pursuant to its mission to overcome bottlenecks to better stewardship of conservation land, supported the development of a RAM to experiment with capturing at least some useful biodiversity information using a field visit by someone having less experience than a traditional expert. Can a carefully prepared biodiversity value checklist focus somewhat less skilled naturalists, including volunteers, on observing certain key features at sites in their landscape context and recording them for future reference. Such a checklist would thereby provide an assessment similar to the initial impression of a more experienced naturalist.

The objective of the method is to place parcels on a relative scale of biodiversity value using empirical, field-collected observations in a way that is easy to record without specialized knowledge or devices, in a minimal number of visits, at no particular of the year, and without reliance on analyses of surrogate variables or models of habitat potential alone.

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This checklist is being developed as a concept and threshold values are not available for indicators, at least at this point. Scales are relative and do not take into account the possibility of non-linear effects. In aggregation, the scales are qualitative and relative: the highest scores would not necessarily be taken to represent a reference condition.

It is acknowledged that the most effective conservation strategy for a particular rare species (conservation of species diversity at the state scale) may have a negative impact on species diversity generally (at the parcel scale), and vice-versa. Prioritization of conservation objectives will have to be made by the land trust in consultation with and in consideration of a wide range of factors not incorporated in the present project.

There are many examples of species range modeling and biodiversity modeling. Two consulted for this study are NatureServe's Map of Biodiversity Importance project and the High Conservation Value concept used widely by land conservationist in North America. NatureServe is creating an online compendium of habitat maps for at-risk species, called the Map of Biodiversity Importance, which can be viewed one species at a time or in combinations to identify areas of high biodiversity potential. Other published literature on conservation values assessment uses the term High Conservation Value (HCV) and is likewise based on various modelling protocols. While similar in concept, HCV assessments are more suitable for landscape scale assessments, whereas here we are contemplating assessments at parcel scale. Typically, HCV also gives substantial weight to social and cultural values that are not counted here except as they contribute to biodiversity value. Nonetheless, in this work we drew on HCV templates from several states.

The present assessment scheme is very similar in application to The Nature Conservancy's Ecological and Land Management Survey or "ELM," although ELM's are more textual and less numerical, and we used the structure of the ELM as a guide. We were also influenced by the Rhode Island Wetlands Program's Rapid Assessment Method (RIRAM), in particular in the use of a stressor checklist, itself based wetlands assessments developed in Delaware.

There is a some overlap between the information collected with this tool and information collected in the Baseline Documentation template also developed by the RICSC (Trocki and Ruhren 2014[2017]). This *Rhode Island Conservation Stewardship Collaborative Baseline Documentation and Inventory Protocol* specifies seven regimes of conservation values to be documented in a baseline study: Agricultural/Forestry, Wetlands, Water Resources, Floral & Faunal, Historical and Cultural, Educational & Recreational, and Scenic. The Indicators of Biodiversity Value Checklist deals primarily with the Floral & Faunal category in the Baseline Doc, delving a little deeper into it. The Checklist, too, records information on human uses, wetland, and water resources, and both tools capture similar basic site information. The two tools could be used on the same parcel in either order, with whichever goes second benefiting from the information already gathered by the first.

Thanks for help in development of this Checklist to Jen Beck, Tom Kutcher, Barbara Nowicki, Paul Roselli, Steve Stycos, and Catherine Weaver. It was funded by a grant from the Rhode Island Conservation Stewardship Collaborative Fund of the Rhode Island Foundation.

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Indicators of Biodiversity Value Checklist for Rhode Island

I. SURVEY INFORMATION

Name(s) of surveyor(s) _____

Others Present _____

Date Completed _____ **Time** (start/stop) _____

Weather _____

Town _____ **Plat & Lot** _____

Street Address _____

Site Name(s)/Known As _____

Is a GPS track being taken? Photos? (*how? where they can be found later?***)** _____

_____

II. WHOLE-SITE ASSESSMENT

A. Site area (*in acres***)** _____

B. Actual overall elevation above sea level (*if known*) _____ **ft**

or **Estimated elevation above sea level** (*circle)* **< 50 ft < 100 ft < 300 ft < 800 ft > 800 ft**

C. Estimated change in elevation *within* the site _____ **ft**

D. List rare species known to occur (*Consult RINHP Database; for more room attach separate sheet*)**:**

Name (*Genus species and/or common*)	RI Status	"Last Obs" Year

TOTAL NUMBER PRESENT _____

E. List the Ecological Community Classes on the Site *(Follow link to RIECC list)*

_____

_____

_____

TOTAL NUMBER PRESENT _____

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F. List any RI Wildlife Action Plan (WAP) Key Habitats present (*follow link to list*)**:**

_____

_____

TOTAL NUMBER PRESENT _____

G. Other Considerations (*Score as* **1** = *yes;* **0** = *no*)

i. Abuts one or more other conservation parcels ……...…….……. _____
ii. Connects two or more disconnected conservation parcels ……..... _____
iii. Buffers an adjacent parcel of known high biodiversity value ……..……. _____
iv. Contains a corridor feature (stream, ridge/gully, train track, powerline) ..... _____
v. Oasis, i.e. highly diff. from adjacent parcels or otherwise isolated …… _____
vi. Has a grassland/meadow >10 acres (or abutting one & totaling >15 acres) …… _____
vii. Has a closed canopy forest >10 acres (or abutting one & totaling >15 acres) …. _____

TOTAL NUMBER PRESENT _____

III. LOCALE ASSESSMENTS (*at least one is required; think about which to pick **in advance** using **aerial imagery** (e.g. RIGIS or Google Earth). Attach an image and indicate roughly where your locales are. Use a **descriptive name** to help remember each; for small features give actual Lat/Long, for large ones give Lat/Long of approx. centroid; size is meant to be approximate.)*

1: Name_____ Lat/Long_____ Size _____
2: Name_____ Lat/Long_____ Size _____
3: Name_____ Lat/Long_____ Size _____
4: Name_____ Lat/Long_____ Size _____
5: Name_____ Lat/Long_____ Size _____
6: Name_____ Lat/Long_____ Size _____

A. Ecological Community Class(es) and/or WAP Key Habitat(s) at EACH Locale

1: _____
2: _____
3: _____
4: _____
5: _____
6: _____

B. Aspect (*which way does the Locale face*)	**1**	**2**	**3**	**4**	**5**	**6**
N, NE, E, SE, S, SW, W, NW, F (Flat), M (mixed)						

For each **LOCALE**, enter "1" for each prominent or characteristic **Topological Feature** then total down (*use more than one if necessary, e.g. slope w/ hummocks or slope w/ cliffs, etc.*)

C. Topological Features	**1**	**2**	**3**	**4**	**5**	**6**
i) summit/crest/ridge top/eminence						
ii) cliff, ledge, or bank						
iii) very steep slope						
iv) slope						
v) very low slope-flat (not floodplain-see below)						
vi) hollow, kettle, bottom, swale						
vii) riverbank/lake or pond edge						
viii) variable, rolling terrain						
ix) hummocky/broken						
x) floodplain (flat w/ swamps & alluvial feat.)						
xi) other _____						
TOTALS:						

Score: **0** = *not present* **1** = *present/detectable* **2** = *a substantial feature here*
3 = *THE major feature here* **N/A** = *unknown/no data*

D. Hydrological Features	**1**	**2**	**3**	**4**	**5**	**6**
i) vernal pools or minor (*fish free*) ponds						
ii) clear-water river/pond (*few plants or algae*)						
iii) perennial stream/river or pond/lake shore						
iv) sunny swamps, bogs, seeps, wet meadow						
v) salt marsh and/or mud flat						
vi) fresh/salt mixing						
vii) other _____						
TOTALS:						

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Score: **0** = *not present* **1** = *present/detectable* **2** = *a substantial feature here*
3 = *THE major feature here* **N/A** = *unknown/no data*

Add notes to cells to indicate what you're seeing that makes you give it a particular score

E. Terrestrial Habitat Features	**1**	**2**	**3**	**4**	**5**	**6**
i) extremely steep slopes (>50°)						
ii) boulders/ledge/cliff/scree						
iii) hilltop/eminence (*bare or wooded*)						
iv) event- or process-dependent community						
(1) fire (*e.g. pitch pine/scrub oak, barren*)						
(2) pasture/hay/meadow						
(3) early successional habitat/shrubland (*still having non-forest character*)						
(4) storms/flooding (*e.g. beaver meadow, seasonally exposed pond shore, wind exposure*)						
(5) sunny mineral soil/sand/beach/dune						
v) edge habitat/transition zone						
vi) pollinator habitat (*concentrations of flower sources, nest sites totaling >0.25 acres*)						
vii) noteworthy trees						
(1) closed forest canopy						
(2) large/old trees						
(3) standing & fallen deadwood						
viii) other _____						
TOTALS:						

F. Human-made Features	**1**	**2**	**3**	**4**	**5**	**6**
i) cellars/holes/mines/chimneys						
ii) stone walls						
iii) sunny wood or metal debris						
iv) cemeteries						
v) stone-lined well, springhouse, icehouse						
vi) dam, dyke, or impoundment						
vii) other _____						
TOTALS:						

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Negative Scores: **0** = *not present* **-1** = *present/detectable*
-2 = *a substantial feature here* **-3** = *THE major feature here* **N/A** = *unknown/no data*

Add notes to cells to indicate what you're seeing that makes you give it a particular score

G. Negative Features/Stressors	1	2	3	4	5	6
i) runoff (*from roads, ag., development, etc.*)						
ii) noise						
iii) outdoor lighting						
iv) deer browse						
v) human traffic (*footpaths, ATVs, fire pits, trampling*)						
vi) dumping/encroachment (*active, recent, NOT sunny wood or metal debris*)						
vii) saltwater intrusion (*sea level rise*)						
viii) crossed by a road, or bordered by a road on more than 1 side						
ix) water course w/ perched culvert, dam, or other bar to passage						
x) invasive species (*list below*)						
xi) other _____						
TOTALS:						

Invasive Species (*main species in order of decreasing cover/prominence; incl. point #s*): _____

_____

_____

_____

_____

H. ADD 1 for any LOCALE over 10 acres in size (approximately):

1: _____ 2: _____ 3: _____ 4: _____ 5: _____ 6: _____

NOTES: _____

_____

_____

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Total Scores:

Section:

II. Whole-Site Score: _____ (*Add Sections* **II-D**, **-E**, **-F**, *and* **-G**)

III. Locale Scores: (*Add Sections* **III-C**, **-D**, **-E**, **-F**, **-G**, *and* **H** *for each Locale*)

1: _____ 2: _____ 3: _____ 4: _____ 5: _____ 6: _____

Whole-Site Score: _____ + Highest Locale Score: _____ = [_____]

TOTAL

IV. Field Notes & Local Information

A. *—Record any specific observations, unusual conditions, or unique circumstances that strike you.*

B. *—Ask a resident, neighbor, local historian, etc. for their knowledge or memories about the site's landscape history (past uses), notable flora, fauna, and natural happenings.*

C.—Species Lists

(*List species observed or otherwise in evidence; keep species grouped into taxa—i.e. birds, plants, insects, mammals, etc. Also, indicate which species are, in your opinion, noteworthy and why; attach more sheets if necessary.*)

V. Assessment Summary

(In your own words, describe the site and your basic take-away about it: include significant positives, significant negatives and possible improvements or remediation strategies; note any observations or questions that could or should be followed up on).

This TOOL is accompanied by a MANUAL to be consulted for important information on how to complete each section.

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USERS GUIDE:

This tool—this Rapid Assessment Method (RAM)—is intended to provide a relatively quick overview of the character and features present on a piece of land that would add to its potential for supporting higher (or lower) than average species biodiversity within the site or contributing significantly to the species biodiversity of its surrounding area, region, or the state of Rhode Island as a whole.

This RAM is not intended to produce comprehensive or exhaustive assessments but to be light and quick in order that USERS can get at least basic coverage on more parcels. These assessments might be used to prioritize subsequent work which might include a comprehensive assessments or other more technically sophisticated surveys. Cumulatively across the town or state they would represent an inventory of certain notable features on the landscape.

The target USER is the scientifically literate land trust volunteer with modest training, training that includes review of this GUIDE. It is understood that many fields contain a measure of subjectivity, imprecision, or judgement. Everyone, even the most knowledgeable, experienced wildlife biologist or manager, has areas of greater and lesser perception depending on their interests and talents which naturally tint their assessment of a parcel of land. Their less informed observations do not, however, detract from the value of their most informed observations. Further, the personal impressions of someone actually on site, even if they have limited formal training or experience, are almost always superior to impressions of someone who has not been on site regardless of how much training they have. For initial surveys such as this is intended to be, it is invaluable to capture the field surveyor's impressions in as full fidelity as possible because later reviewers can make allowances for the surveyor's experience profile but they can never recover insights that were not recorded at all. At several points, therefore, this GUIDE and the RAM leave the definition of a feature loose and its identification up the USER. USERS are encouraged to "record what strikes you" or describe the site "in your own words." This is deliberate and important.

The unit of analysis is a SITE, usually meaning one parcel of land, either a single parcel from a plat map or a single block of land made up of more than one plat map parcel but acquired together or managed as a single unit. The checklist has provisions for assessing LOCALES within a site if they are sufficiently different that the USER thinks they warrant individual attention.

At each SITE, the checklist USER must assess at least one LOCALE but can assess up to six, depending on her time and the SITE's size, complexity, and features.

Selecting the LOCALES for evaluation is a matter of judgement and that's fine because USER's on-site impressions are something we want to record. To make the LOCALE selection easier and save confusion and duplication in the field, it is strongly recommended that USERS get a map or aerial photo of the site in advance of the visit (such as from Google Maps, Google Earth, Bing, or ArcGIS) and consider where the LOCALES are going to be. Or you might want to take a walk around the site once without deciding where your LOCALES are going to be, then decide them based on what you've seen, and then going back and do your assessment of each. If you don't make some effort to identify likely LOCALES in advance of commencing your

assessments, you will tend to start describing one LOCALE as containing a certain feature and then decide that that feature warrants being evaluated as its own LOCALE instead, and then you have to work backwards and correct your assessment of the first one.

It is also strongly recommended that USERS take a copy of the map or aerial with them on the visit in order conveniently to jot down, indicate, or pinpoint LOCALES, or other features or observations of note as you carry out your walk-over.

The checklist field form is split into five sections indicated by Roman numerals:

SECTION	
I	records information about the visit of the USER as an event.
II	records information about the SITE as a whole.
III	records information from LOCALES within the SITE
IV	A. field notes or observations: unusual conditions, unique circumstances, especially notable highlights and lowlights, things that need doing; B. information about a parcel from a landowner, resident, neighbor, local historian, or other person with local knowledge C. species noted during visit
V	includes summary observations, preliminary conclusions, suggested strategies, or observations or questions for follow-up work. It is for use in the field or immediately after, not a substitute for a final written report.

I. Survey Information

For recording information about the site visit itself...when, where, who, weather, etc. The fields should be more or less self-explanatory. If a GPS track or photos are recorded, provide enough information that a future USER could track them down.

II. Whole-Site Assessment

A. Site Area — The land owner can provide this, otherwise it might be available through the town's online GIS tool or digital plat map; or estimate as best you can (compare it to another parcel of known size; an acre is a square approx. 200 feet, or about 80-100 paces, on a side).

B. Elevation — Most GPS cellphone applications deliver elevation data of sufficient accuracy for this RAM, or use a USGS map or another source, or provide your best estimate within the range bands given on the RAM form.

C. Change in Elevation — Estimate how far it is, vertically, from the lowest to the highest point of the site. You might want to compare the relief to your own height or to stories of a building (most buildings are 9-10' from floor to floor so a hill as high as a two-story house could be approximately 20' high).

D. Rare Species — The Rhode Island Natural History Survey maintains a database of known rare species locales across the state known as the Natural Heritage Database. If you haven't already, consult the Survey for a list of rare species known from your SITE and from adjacent parcels. Provide the genus and species, the "RI Status" (e.g. Endangered, Threatened, Special Concern, or Historical), and the year it was last observed at your SITE according to the Natural Heritage Database, a field known as "LastObs." Total the number of rare species known to occur on your site at the bottom.

E. Ecological Community Classes — Refer to the Rhode Island Ecological Community Classification (Enser, et al. 2011) or list attached at the back of this guide. The classification is arranged hierarchically and "Classes" are the second highest level, between "Systems" at the top and "Communities". Examples of Classes include IA-Open Upland, IB-Deciduous Woodland, IC-Coniferous Woodland, IIB-Open Peatland, IIC-Forested Wetland, etc. Record the alphanumeric codes and names of the Classes that are present on the SITE. At the bottom, enter the total number of Classes present.

F. Key Habitats — Refer to the current Rhode Island Wildlife Action Plan list of Key Habitats or the list of Key Habitats at the back of this guide and record any that are present at the SITE. Total the number of Key Habitats present.

G. Other Considerations — each of these adds to the value of a parcel for biodiversity. Score them either "1" this is TRUE for the SITE or "0" it is NOT TRUE; acreage specified is meant to be approximate so estimate or measure using aerial imagery or maps (10 acres is a square two football fields by two football fields if you include the end zones).

For i) and ii) Consult the land trust, plat maps, state protected land data layer, or other sources for the arrangement of other nearby conservation land;

For iii) Regardless of whether your site contains notable biodiversity, if preserved would it help protect rare species or natural communities in adjacent parcels? Doesn't matter if the adjacent parcels are already in conservation;

iv) In this case, to be a corridor, a feature should extend beyond the edge of the site being scored; corridors help bring species to an area and are also often habitats of specialized species in and of themselves; some corridors (e.g. power line rights-of-way) are process dependent and could also pick up a score in section E(iv) as well;

v) By "Oasis" we're looking for sites that would be attractive to animals moving through because they are very different than surround land; the classic example is a well-treed park surrounded urban and dense suburban development but could also be the only wetland for miles around or literally an island in the bay;

vi) and vii) Grasslands and forests greater than 10 acres are big enough to begin to mitigate the negative effects of their own edges and hence have cores suitable to habitat specialist species; also count it if the site has a grassland or forest component that is less than 10 acres but which abuts a similar patch outside the parcel (whether or not that is already in conservation) such that the two add up to at least 15 acres;

Add up this section and enter the total where indicated.

III. LOCALE Assessments

- This RAM is arranged so that you can evaluate both site-wide factors and also inventory different features within the site that differ from it as a whole or are otherwise noteworthy, for example a bare hill, wetland, or sunny field within an otherwise homogeneous forest.

- You MUST assess at least one LOCALE at each SITE but you can do as many as you think it would take to catalog the variety present, up to six. Try to stick to six because with no limit it's tempting to go on doing more and more until the assessment starts to turn the RAM into a full inventory.
- Selecting the LOCALES for evaluation is one of the most important parts of the RAM and you should try to follow the guidelines provided here. Nevertheless, it naturally involves substantial amount of judgement by the USER and that's fine because recording on-site impressions is the whole point of the RAM.
- To make the LOCALE selection easier and save confusion and duplication in the field, it is strongly recommended that USERS get a map or aerial photo of the site in advance of the visit (such as from Google Maps, Google Earth, Bing, or ArcGIS) and consider where the up to six LOCALES are going to be. Or you might want to take a walk around the site once without deciding where your LOCALES are going to be then decide them based on what you've seen and then going back and assess each. If you don't make some effort to identify likely LOCALES in advance of commencing your assessments, you will tend to start describing one LOCALE as containing a certain feature and then decide to that that feature warrants being evaluated as its own LOCALE instead, and then you have to work backwards and correct your assessment of the first one.
- If the SITE is small and/or homogeneous, you might only want to evaluate a single LOCALE representing the whole thing. If the SITE is large, and you know you're going to do several LOCALES, you could make LOCALE 1 either:
    - a) the rough geometric center of the parcel if the SITE is homogeneous, or
    - b) any area that's representative of the main habitat type at the SITE, or
    - c) the area that is most important or that you come to first, for example if the white cedar swamp is the main attraction, make it LOCALE 1 or if there is a large parcel with a house lot in one corner, you could make the house lot LOCALE 1.
- Some assessment questions ask about linear features (walls, powerline ROWs, roads) that can either be <u>within</u> a LOCALE and evaluated as part of it, be the <u>boundary</u> between two LOCALES, or <u>be its own</u> LOCALE all by itself. The RAM will work however you choose to do the assessment, but you should be clear in your own mind how you're doing it so such features don't get counted twice or not counted at all.
- For each LOCALE
    - a) give it a descriptive name (e.g. old field, red maple swamp, hemlock grove, powerline ROW);
        - The descriptive name is meant to be a handle you and others can use when referring to this LOCALE, not necessarily the correct ecological name for that type of thing.;
    - b) enter the Lat and Long of the rough center point for each LOCALE (smart phone apps provide more than enough accuracy for this purpose)
    - c) estimate the size of the area you're describing (how big is the feature you've decided warrants its own LOCALE assessment, e.g. "wet area with vernal pools, 100'x500'", "hemlock grove, 1 acre", "frost hollow, 50' in diameter."

- The size estimate is meant to be rough, to give later readers a general sense of what you're talking about...do your best.

A. Ecological Community Class(es) and Wildlife Action Plan Key Habitat(s) at each LOCALE — As with II E and F above, record the names of the Class(es) and Key Habitat(s) present at the LOCALE. Usually there will be just one Class but you can enter more; there may well be no Key Habitat present but if that's the case, it's important to enter "none" so later users know you didn't just forget. Consult the online resources or the lists attached below.

B. and C. ASPECT and TOPOLOGICAL FEATURES — Aspect is the compass direction that sloped ground slopes down towards or faces. Aspect is an important factor in the suitability of a SITE for specialist plant species....a south aspect is one that the sun shines on, a north aspect is cooler and damp. TOPOLOGY is the three-dimensionality or relief of the site. Topological features help describe the physical conformation of the site. No particular feature adds more to the biodiversity value than any other but having a great diversity of features in one place does add to the biodiversity value.

Evaluating ASPECT and TOPOLOGICAL FEATURES can be tricky. A single LOCALE might have more than one Aspect or Topological Feature or you might use Topological Features or changes in Aspect to define LOCALES for separate assessment. Record each aspect or feature that's a substantial portion of or the strongest impression you get from the LOCALE you're assessing. If you break a SITE up into different LOCALES based on TOPOLOGICAL FEATURES or changes in ASPECT, you can record the dominant ASPECT or FEATURE for each LOCALE.

Depending on the SITE size, you may have to adjust the scale of your thinking to record the most meaningful description of the topology: for example at a half-acre LOCALITY you would record as a "slope" something that would count as part of "rolling terrain" if you were recording a 300-acre SITE. A shifting scale is okay because a later user will know the unit size and be able to take that into account.

Each section III-D to -F lists habitat features that, when present on a piece of land, add to its potential for supporting higher- or lower-than-average species biodiversity. The more positive features and the fewer negative features a LOCALE or SITE has, the more potential biodiversity value it has.

D. Hydrological Features — These are more or less self-explanatory.

i) the key with vernal pools is that they last long enough to have a habitat value for pool breeding amphibians (as well as other vernal pool specialist animals and plants) but not so long that they have fish. Definitive determination if a pool or other feature is a *vernal* pool may be hard, if you are doing the RAM in the fall or you can't tell if a pool has fish or not. Do your best: look for wetland plants or discolored leaf-litter at the bottom of presently dry depressions.

ii) water bodies that have clear, cool, well oxygenated water support a suite of specialized insects, plants, and fish but are increasingly rare. To identify such bodies for the RAM, we don't want surveyors to have to carry secchi disks, thermometers, or dissolved oxygen meters. If you can clearly see the soil, rocks, and sticks at the bottom that's a good sign, whereas if the water is too cloudy (green, light brown, or tan) to see into or if the water looks moderately clear but you see a faint white "haze" in the water those aren't good signs. But even if the water is clear, if you can't see the bottom because of lots of aquatic vegetation, that almost certainly means the temperature is too high and there are too many nutrients, so don't record anything under this feature. If you see a lot of orange "rust" on sticks and rocks in the water, those probably indicate minerals flowing in from nearby disturbed soils in which case don't use this.

iii) shores of open water attract a species typical of both the terrestrial and aquatic habitats and are therefore hotspots for biodiversity. If the locale has either a stream/river running through it or bordering it or includes a pond or lake shore, record this feature.

iv) the "sunny" part is what to look for with swamps, bogs, seeps, and wet meadows because there are large number of rare plants that grow under those conditions. A wide fringe of emergent vegetation around open water might also qualify if it's got a lot of sphagnum-type moss on the surface under the plants. There are many different labels applied to special types of sunny wetlands but don't worry about those, just that a substantial amount of sun reaches the herbaceous plants (or the shrubs for sunny shrub swamps) at or near the surface. Try not to use this label for sites that are sunny because they are just young red maple swamps (use F(i) instead).

vi) for salt marsh look for a bed of peat, not just a few marsh grasses growing out of shoreline gravel or dirt.

vii) for fresh and salt mixing look for places where there is direct connection between freshwater habitats and saltwater ones such as streams that flow directly into saltwater without a dam or tidal ponds that have a lot of freshwater flow entering from the landward side or wet bogs that transition directly into salt marsh at their seaward end/side.

E. Terrestrial Habitat Features — Some of these will be more obvious than others and USERS with less field experience may want to consult reference resources. Nonetheless, USERS should record these to the best of their ability. Look for FEATURES with some meaningful extent, not single, isolated patches too small to function as habitat. With the exception of a notable old tree, look for patches that are the size of a suburban house lot or larger. If something is too subtle for a USER to take note of, it's probably not a very important factor at the SITE anyway. Don't put anything in the shaded lines.

A note about natural versus human-mediated process: Human-made Features are inventoried in Section IIIF whereas fire, grazing, mowing, and cutting, all often human-caused, are counted here in IIIE TERRESTRIAL HABITAT. These latter are processes that are ongoing or could happen again as opposed to habitat features

created by past human activity that is not likely to occur again, for which see Section IIIF. So a field that is still being grazed or could be grazed again at a moment's notice would be a process-dependent community under IIIE and stonewalls that were built once and are now just sitting there would go under IIIF.

i-ii) a very steep slope may well have areas of bare stone, scree, and ledge interspersed with areas of very steeply lying soil. Pick the more substantial or if there is a lot of both, then put both.

iii) this would have to be a prominent feature of the terrain. A hilltop in a field wouldn't have to be as high to qualify as would a hilltop in the woods; regardless, a wooded hilltop could count if it rose enough that the tree cover didn't hide it.

iv) many rare species and specialized habitats are maintained by periodic events such as fires, storms, or flooding. Often these impacts affect only patches and so one may encounter small areas of such habitats. Record them as features if they are big enough to be conspicuous. They should be at least the size of a suburban house lot, a quarter- to a half acre...something a tree couldn't fall entirely across.

Since most forest in RI has been cut at some point in the past, deciding when to stop counting something as "late successional abandoned field" can be tricky. An area with mature, straight-trunked forest trees without specialized successional species such as black cherry or red cedar is ready to grow out of the "successional" appellation.

Under iv(3), wind exposure could include clearings resulting from windstorm blow-downs but big ones are rare and their cause can be hard to ascertain. Wind exposure could also include certain coastal shrublands that are prevented to succeeding to forest by wind and salt spray exposure or certain dwarf forests that grow on exposed hilltops (a "krummholz").

v) "edge" is often seen as a detriment to conservation. This is because as suburban development grows edges and edge species are favored to the detriment of unbroken blocks of forest or grassland and the specialist species they support. However, ecotones (the places where ecological communities meet) can be biodiversity hotspots. For this assessment, edge has to be more than just "there are bushes where the lawn meets the woods." Look for a field-forest edge, pond shore, back-of-beach dune or shrub area, hill-to-floodplain transition, a place where a large area of coniferous forest is juxtaposed with deciduous forest, etc. If you make two adjacent, contrasting natural communities into two different LOCALES, figure out which one you're going to count the edge into.

example: you have a 1 acre house lot with lawn and shrubs bordered on one side by a mature woods and on the other by a lake. If you were counting the lot and the woods as a single LOCALE, you'd say the locale had "edge habitat." If you had the woods and the house lot as separate LOCALES you'd say the house lot had edge habitat and the woods did not.

vi) by "pollinator habitat" is meant something more than just a few flowers in the garden. Look for major goldenrod patches, big areas of flowering shrubs, lengthy border plantings or wildflower boarders. For nesting habitat look for

long grass, high perennials with old stems remaining, stands of sumac or other twiggy shrubs together with long grass. Use your judgement as to size but you should look for patches bigger than your typical suburban flower border or garden.

vii) for "closed forest canopy" (vii[1]), the canopy really should be closed, with a dark forest under it; ask yourself if the forest canopy is the main thing at the SITE or LOCALE because if it is you'll feel it. For "large, old trees" (vii[2]), think landmarks...wolf trees or other trees from a different era, a massive beech in a Victorian planted landscape, etc. For "standing/fallen deadwood" (vii[3]), don't record every stick but just note when you're seeing a lot of trunks with shelf fungi and whole trunks down on the ground, especially if jumbled or accompanied by root-throws (the pile of dirt flipped up when a tree blows over with its roots).

F. Human-made Features — Several aspects of human-made features foster biodiversity, especially when the human use is in the past but the features remain. This category also serves to record features of potential cultural/historical value as well as biodiversity value.

i) for cellars, holes, mines, and chimneys we're looking for sites that could support roosting bats, nesting swifts, or certain snakes or salamanders

ii) many sites will have stone walls. You might want to score typical amounts of these as "1" and reserve "2" or "3" for sites where the walls really are a significant part of the SITE or "THE" main feature of interest at a LOCALE.

iii) the key here is "sunny" because sunny debris on the ground is excellent habitat for snakes, salamanders, and small mammals among other things. This should not be confused with "Dumping" listed in G)vi. Dumping is recent, contains household garbage, yard waste, tires, construction debris, or otherwise noxious waste and even if sunny doesn't have many places for snakes, etc., to get under or among.

iv) cemeteries sometimes support rare plants; certain monuments support especially diverse lichens

v) stone walls <u>in</u> water...e.g. in certain regions, stone-lined wells can support rare salamanders; also mosses, ferns

vi) generally dams, dykes, and impoundments are bad for rare species but strictly from the biodiversity point of view the ponds above them and riffles below them do support an array of species.

G. Negative Features/Stressors —Research on environmental monitoring methodologies in Rhode Island and elsewhere has found that cataloguing factors that "stress" a site, or cause it to be less good for biodiversity than it could be, produces consistent assessments across a range conditions. Items in the list here are all known to degrade sites as wildlife habitat. Some are self-evident.

i) look for street and parking lot drains, building downspouts, and erosion gullies mobilizing sediment that spill out into water or wetlands or over fields or into woods.

ii) traffic noise is the big one here and a site next to a busy highway would be a "3". But shooting range noise can be a 1 or 2, as can train tracks.

iii) suburban house lights or streetlights might be a 1, a gas station might be a 2, a car dealer, a mall, a highway interchange, AND a housing development would be a 3.

iv) look for evidence of plants (herbaceous as well as woody) being nipped off and evergreen trees with "waterlines." Also, look for erosion on trails through the woods.

vi) this is recent deposits of household garbage, yard waste, tires, construction debris, or otherwise noxious waste. It should not be confused with "sunny wood or metal debris" under F.) iv. Sunny debris on the ground is excellent habitat for snakes, salamanders, and small mammals among other things whereas dumping, even if sunny, isn't habitable by snakes or many other organisms.

vii) for saltwater intrusion look for dead trees at the edge between salt and terrestrial systems; also salt marsh grasses growing among terrestrial grasses.

viii) don't count driveways and dirt roads unless they're busier than the usual single family home driveway. You're looking for a cause of amphibian and reptile death as well as a source of invasive species intrusion.

x) for invasive species, decide if you want to rate it 0, 1, 2, or 3 and then unless it is "0" list the most obvious invasive species on the lines below starting with the most obvious and working your way down. Don't go crazy, this isn't a botanical inventory, just get the ones that look like they're having an impact. If you find scattered ones with a bad reputation but that aren't having an impact YET, rate it 1 but note your concern about spread in the notes.

TOTAL SCORES

Add up the scores you gave in Section II, the "Whole-Site Score", from section II-D, -E, -F, and -G and enter the result.

Add up the scores you gave each locale in section III, the "Locale Scores", from section III-C, -D, -E, -F, and -G for each LOCALE and enter the results for each LOCALE.

Add the Whole-Site Score and the highest of the Locale Scores together and enter it in the box labeled "TOTAL."

The resulting numerical score is NOT an absolute measure of anything, it is a score that is entirely relative to scores from other parcels using the same RAM. Initially it won't mean much but over time, as more parcels are assessed, the scores will have more value.

IV Field Notes & Local Information

A. Field Notes — This is a place for you to record any specific observations, unusual conditions, or unique circumstances that struck you as you moved about the SITE. Elaborate on conditions that factored into your scoring but wouldn't fit into the scoring box, citing the LOCALE and LINE number you're referring to. Describe dumping or encroachments you noted in G(vi)

for example. Did you have any questions you wanted to look up when you got home?

B. Local Information — Ask a resident, neighbor, local historian, etc. for their knowledge or memories about the site's landscape history (past uses), notable flora, fauna, and natural happenings. Be sure to note the names of people you talk to and their relationship to the land, e.g. owner, resident, farmer, child of owner, neighbor, etc., and the time period their experience comes from, e.g. "lived here in the '70s," "grandfather farmed here in the '20s," etc.

C. Species list — List species observed or otherwise in evidence; you might find it easier to keep species grouped into taxa—i.e. birds, plants, insects, mammals, etc. Also, indicate any species that are, in your opinion, noteworthy and why; attach more sheets if necessary. make notes about new rare species discoveries including location and condition.

V Assessment Summary — In your own words, describe the SITE and your 1, 2, or 3 basic take-aways about it: include <u>significant positives</u> and <u>significant negatives</u>. Include what you would say are the highest priority recommendations for management to preserve the good and reduce the bad. Is there an overall land management strategy in evidence or can you think of one to implement that would help preserve the biodiversity values at the SITE? Is there an overarching stressor responsible for the worst of the negative observations? Note any observations or questions that could or should be followed up on by the owner/easement holder.

Developed by RI Natural History Survey (RINHS.org) in 2019 w/ funding by RI Conservation Stewardship Collaborative.

RIECC Classes:

System	Class	Community
I. UPLAND SYSTEM		
	A. Open Uplands (Grassland and Shrubland)	
		1. Coastal Grassland
		2. Coastal Shrubland
		3. Ruderal Grassland/Shrubland
		4. Sparsely Vegetated Rock
		5. Inland Sand Barren
	B. Deciduous Woodlands and Forests	
		1. Maritime Woodland
		2. Oak Forest
		3. Northern Hardwood Forest
	C. Coniferous Woodlands and Forests	
	D. Mixed Deciduous/Coniferous Forests	
	E. Plantation and Ruderal Forest	
		1. Tree Plantation
		2. Ruderal Forest
	F. Agricultural	
		1. Cropland
		2. Hayfields/Pasture
	G. Developed Land	
		1. Urban/Recreational Grasses
		2. Urban/Suburban Built *
		3. Extractive Industry
II. PALUSTRINE SYSTEM		
	A. Open Mineral Soil Wetlands	
		1. Coastal Plain Pondshore
		2. Emergent Marsh
		3. Wet Meadow
		4. Shrub Swamp
		5. Modified/Managed Marsh
	B. Open Peatlands	
		1. Northern Peatlands
		2. Coastal Plain Peatlands
	C. Forested Wetlands (Mineral and Peat Soils)	
		1. Floodplain Forests
		2. Forested Swamp
		3. Seeps, Springs, Vernal Pools
III. ESTUARINE SYSTEM		
	A. Estuarine Intertidal	
		1. Intertidal Shore
		2. Salt Marsh
		3. Brackish Marsh
	B. Estuarine Subtidal	
		1. Tidal River/Stream
		2. Tidal Creek
		3. Brackish Aquatic Bed
		4. Coastal Salt Pond

Rhode Island Wildlife Action Plan Key Habitats:

Brackish marshes
Tidal flats
Maritime beaches/dunes
Northern hardwood forests
Hemlock forests
Cold water streams
Cold water ponds
Shrub swamps/wet meadows
Emergent marshes
Vernal pools
Hardwood (Red Maple) swamps
Atlantic White Cedar swamps
Floodplain forests
Salt marshes
Pitch Pine woodlands/barrens
Oak-Pine forests
Warm water rivers and ponds

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